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Managing Change in Education- Adoption of Bangladesh National Qualifications Framework (BNQF) across the Higher Education Sector in Bangladesh: A Conceptual Study

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Abstract:

Based on the review of relevant literature using the lens of the Theory of Planned Behaviour, this study aims to forward a novel model supported to explicate stakeholder-related mechanisms that could facilitate higher education adoption of Bangladesh National Qualifications Framework (BNQF) and Outcome-based education (OBE). This study would extend the body of knowledge in the context of education quality assurance and accreditation. The results of the study would provide insights regarding factors of adoption for the quality assurance frameworks, such as the BNFQ. For policymakers, the findings would support them in devising relevant strategies for the effective adoption of BNQF across the Institutes of Higher Education in Bangladesh,

Keywords: Managing Change, Higher Education, Outcome-based curriculum, Bangladesh

Introduction:

The BNQF integrates general, vocational, and technical as well as higher education into a single holistic quality-assured system that outlines equivalencies and pathways, giving access to qualifications and facilitating individuals to explore diverse education sectors and related labour markets readily and without hassle (ILO, 2021). It is undoubted that as a quality

assurance system, the BNQF has some challenging and complex steps ahead related to its adoption and implementation, such as recognition of prior learning, bridging courses, and the conversion of non-BNQF programmes (ILO, 2021). According to Chisholm (2007), although there could be common 'semantics' of academic reform, in reality relatively little implementation and corresponding impact on practice could be witnessed. In a study based on South Africa, Chisholm (2007) mentioned that the partial acceptance of the NQF was reflected by the schooling sector who abandoned their national qualifications framework and adopted a modified outcomes-based curricula while sections of higher education spurned outcomes and performance-based education entirely. In a separate study, Bezuidenhout et al. (2013) highlighted that adoption and implementation of education quality standards and accreditation are challenging, thanks to all the tensions, paradoxes, social dilemmas, and contestations embedded in them. Moreover, Rekkor et al. (2013), showed that the process of adopting national curricula developed to comply with professional standards and labour market needs, coined as outcome-based education corresponding to the needs of the learners as well as society, remains complex, multifaceted, and complicated. In a recent study, Opoku et al. (2021) argued that while the challenges of implementing educational approaches are complex and include several determinants, however, individual-related factors are known to have significant consequences. Hence, to bridge gaps in literature and for effective and successful adoption and implementation of the BNQF, a nuanced understanding of the adoption factors and their effect across all stakeholders is both timely and significant.

Literature Review and Conceptual Framework:

Rapid societal development has called for the necessity to develop and reorganize education (Rekkor et al., 2013). As a potential tool to mitigate skills mismatch and prepare future workforce, the BNQF results from four rounds of consultation coupled with 60 plus workshops and bilateral meetings with several government agencies in the education sector, as well as inputs from various professional associations in the country (ILO, 2021). It is perceived that the BNQF seeks to increase employability and productivity opportunities through an inclusive, environmentally conscious, demand-driven, integrated skills development system responding to the current and potential needs of the labour market.

The primary objective of the BNQF is to uphold lifelong learning, increase employability of approximately 2.5 million youth entering the labour market yearly, and reap benefits of demographic dividend (ILO, 2021). Although relevant policy convergence could exist,

however, motivations for the adoption of BNQF, a framework representing a strategic instrument to enhance the competitiveness of Bangladesh and contribute to further labour market and economic integration, could differ across the stakeholders. In this regards Opoku et al. (2021) noted that while the challenges of implementing educational approaches are complex and include several determinants, however, individual-related factors are known to have significant consequences. Hence, acknowledging that stakeholders' adoption intention is instrumental to the successful mass inclusion of the national quality framework, this study aims to identify relevant factors and measure their effect on adoption intention towards BNQF among the various stakeholders across the higher education sector in Bangladesh using the theory of planned behavior (TPB) to generate new knowledge and facilitate effective adoption of the BNQF.

Theoretical Foundation

Theory of Planned Behaviour (TPB) is a theoretical model commonly used to predict individual's behaviour (Shmueli, 2021). The TPB implies that intention depends on attitude towards an action, subjective norms for carrying out the action, and perception of behavioural control (PBC) of the concerned action (Ajzen, 2015). Due to its successful application across diverse arenas of human activity, it has been widely adopted as a framework to assess intentions toward implementing education approaches (Opoku et al., 2021). Moreover, the recognition and importance of individual-level factors has further summoned interest in to use of TPB for studying the effectiveness of practices and frameworks (Opoku et al., 2021). Hence, we base this study on TPB to investigate the adoption intention of BNQF among the major stakeholders in the higher education sector of Bangladesh.

The TPB stresses that behaviour refers to a willingness to avoid or perform a certain task (i.e., intention), and the degree of control an individual perceives he/she has over a concerned behaviour (i.e., perceived behavioural control (PBC). Besides PBC, intention also functions as an individual's attitudes and subjective norms (Ajzen et al., 1991). According to the TPB, human actions are driven by three kinds of belief; namely behavioural beliefs, normative beliefs, and control beliefs (Ajzen et al., 1991). Collectively, behavioural beliefs form favourable or unfavourable attitudes towards a particular behaviour. Normative beliefs form subjective norms, while control beliefs form PBC. The combination of attitude, subjective norms, and PBC forms behavioural intention.

Attitude towards BNQF

The first type of belief from the TPB is about the possible outcome of a specific behaviour and the evaluations of such outcome (behavioural belief) (Ajzen, 1991). Collectively, behavioural beliefs form favourable or unfavourable attitude towards a particular behaviour. Stakeholders of higher education (university teachers, students, their parents) are agents who are expected to internalise policies such as the BNQF through their behavioural beliefs about its implementation.

Subjective Norms

The second type of belief is concerned with the normative expectation of others significant and the motivation to comply with such expectation (normative beliefs). According to the TPB Normative beliefs form subjective norms. We expect that the subjective norms of various stakeholders could have an impact on their adoption intention towards BNQF.

Perceived Behavioural Control

The third type of belief concerns the absence or presence of other factors that may impede or facilitate the performance of behaviour along with the perceived power of such factors (control beliefs). According to TPB, control beliefs form PBC.

Conceptual Framework

Based on the literature review above, the following conceptual framework is developed, as illustrated in Figure 1.

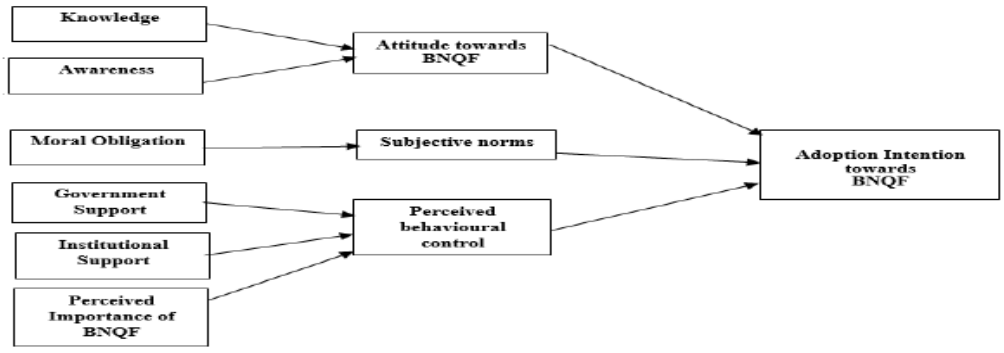

Figure 1. Conceptual Model

Conclusion

This study attempted to reveal the determinants of adoption for BNQF and OBE among the institutes of higher education in Bangladesh through the review of relevant literature. Provide insights regarding the effect of identified factors on the adoption of BNQF among institutes of higher education in Bangladesh. Based on the review of relevant literature using the lens of the Theory of Planned Behaviour, this study further forwarded a novel model supported to explicate stakeholder-related mechanisms that could facilitate higher education adoption of Bangladesh National Qualifications Framework (BNQF) and Outcome-based education (OBE). Apart from enriching the existing body of knowledge, particularly in the Bangladesh context, the study supports Government and university-level policymakers in formulating relevant strategies for the effective adoption of BNQF across the Institutes of Higher Education in Bangladesh.

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Causation and Effectuation – Two Guiding Decision-Making Principles in Startups

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Abstract:

About 50% of all business startups in the U.S. vanish by their fifth year (Fisher, Maritz, & Lobo, 2014). A survey by the U.S. Census Bureau (2015) identified 5.4 million small businesses in operation, with about 67% having fewer than 20 employees. Most small businesses are known as micro-business enterprises (MBEs) and are run by micro-business owners (MBOs). This qualitative phenomenological study explored decision-making principles of causation and effectuation on MBOs whose MBEs had fewer than 15 employees. There are challenges MBOs experience when the MBE transitions out of the startup phase and enters into growth—a phase known as the inflection point (Dimovski, Penger, Peterlin, & Uhan, 2013). Exploring MBO decision-making was central to the study. Understanding the role decision-making principles of causation and effectuation had on the success or failure of an MBO's business at the inflection point in the business lifecycle was central to the study findings. The findings in the study supported the problem statement in that MBO behavioral characteristics contribute to how decisions are processed as the MBO engages in decision-making when looking at opportunity, resource utilization, strategy development, and other functions necessary to the building of a successful business.

Keywords: Causation, Effectuation, Startup, Decision-making

Introduction:

New venture creation is a primary source of innovation, competitiveness, and productivity. Entrepreneurs are viewed as drivers of the economy and that the economic activity they deliver supports jobs, wealth, and social engagement. The consensus among scholars is that new venture startups in the U.S. account for nearly 99% of all business creation (Gilmore et al, 2013). Fisher et al. (2014) looked at understanding indicators of entrepreneurial success, but what they found was that many startups fail (closed/bankrupt) within their first five years.

The U.S. Census Bureau (2015) has identified 5.4 million small businesses in operation, with about 67% having fewer than 20 employees. According to Gilmore et al. (2013), they coined

these small businesses as micro-business enterprises (MBEs) and are run by micro-business owners (MBOs). Based on data the U.S. Department of Labor collects, the sharpest declines in business failure rates occur in the first three years of the business startup, about 40%. On average, the failure rate for new business births in year one is 21%, the failure rate in the second year averages 11%, and the failure rate in the third year averages 8% (U.S. Department of Labor, 2016). The rate of decline slows in the years that follow, with a 10% decline split over the next two years. By the fifth year, about 50% of all business startups in the U.S. have vanished. Although the trend in failed businesses continues operations, the year-over-year rate decreases by a smaller percentage and one that never flatlines (U.S. Department of Labor, 2016). By year 10, fewer than four out of 10 businesses remain—a mere 38%.

This is a significant challenge for startup MBOs. Of particular interest in this study is the gap identified in the literature understanding the challenges MBOs experience between the startup and growth phases—a point in the business cycle known as the inflection point. The inflection point occurs when the MBO hires help, which brings new personalities into the business. With unique personalities entering the business, the business environment and culture of the organization change. The MBO must now lead, manage, and develop these new personalities, impacting the organization's identity, culture, and structural makeup. Based on this study's findings, the study participants' lived experiences suggested that personal experiences and the decision-making principles of causation and effectuation at the point of inflection impact the organization's identity, culture, structure, and ultimate success.

Decision-Making Principles of Causation and Effectuation

The decision-making principles of causation and effectuation can be used in the decision-making process to determine the best course of action for an opportunity. Sarasvathy (2001) found that MBO decision-making processes were based on how the MBOs perceive the business environment. On a typical business day, MBOs engage in two primary decision-making processes. MBOs are either planning future strategies or controlling tactical functions. As MBOs work through their decisions, they unconsciously choose a decision-making principle they are most comfortable with given their unique perspective on a presented opportunity. Bhowmick (2015) found that causation is a rational approach best suited for a designed strategy when the business environment is stable. Effectuation is more favorable to outcomes when applied to rapidly changing business environments.

This study focused on analyzing MBO decision-making processes at the inflection point in the business's lifecycle through the decision-making principles of causation and effectuation (Sarasvathy, 2001). The literature review section explores three aspects of the study: connecting decision-making to theory, understanding entrepreneurial types, and determining how entrepreneurial behavior is developed.

Literature Review

MBOs start and operate businesses. Some MBOs find sustainable success, while others do not. MBOs who can find ways to grow their business identify with the opportunities presented. Growth presents not only new opportunities but also new challenges, both of which demand decisions. MBOs often hire employees to help distribute the growing workload, considered the inflection point in the business' lifecycle. What occurs is that adding employees tends to change the organization's cultural identity.

Discovery Theory and Creation Theory

Experiential researchers Baden and Parkes (2013) found that the decision-making process MBOs use to identify marketplace opportunities is grounded in the experiences that determine their behavior. Thus, experiences tend to influence the MBO's process to identify and understand business opportunities through two theoretical lens' (Phelan, 2015). The first is through discovery theory, where realists decide on different opportunities through planned activities. The other is through creation theory, where constructionists make decisions based on opportunities presented after an action, such as a market test. Microbusiness researchers Clark and Douglas (2014) proposed that whichever lens the MBO uses to determine opportunity, the driver used is the MBO's behavior, knowledge, and the environment—behavioral characteristics formed through experience.

Entrepreneurial Theory

Entrepreneurial theory was first defined in the literature by Schumpeter and Opie (1934), authors of seminal importance to the entrepreneur research community. They identified an entrepreneur as an individual who allocates resources to exploit an opportunity to create a new product or service not yet presented to the marketplace. The definition is still true today, and the literature has further contributed to the belief that interactions develop an entrepreneur's attitudes, beliefs, social norms, and perceptions of control (Baden & Parkes, 2013).

Entrepreneurial Types

Building a business is a function of an entreprenuers personality and developed characteristics of their behavior, knowledge, and environment. Yet, entrepreneurs do not always have the skills necessary to build a sustainable business. Entrepreneurs can be defined in three broad categories: Craftsmen, Opportunistic, and Expert.

The literature has identified different MBO behavioral types. They are craftsmen, opportunists, and experts. Wegener et al. (2010) found that the craftsman MBO has limited characteristics of knowledge, behavior, and environmental experiences. They have limited strategic objectives and incorporate a strategy limited to "price, quality, and reputation" (p. 1,514). The opportunistic MBO has developed the characteristics associated with knowledge, behavior, and environmental experiences. They identify with long-term vision while being risk averse and incorporate broad strategic and innovative objectives (Wagener et al., 2010). The expert MBO has many of the same characteristics as an opportunistic entrepreneur, but they are considered experts in their profession (Sarasvathy, 2001). The biggest difference between the expert and the opportunistic MBO is that the expert creates a business, gets it running, and then sells the company's rights, whereas the opportunistic MBO generally sustains the business they started.

Behavioral Characteristics of the MBO

As noted, each MBO has different behavioral characteristics from which to draw, and collectively, these differences affect decision-making and sustainable business development. The alignment of these characteristics includes tangible behaviors as intentions, attitudes, beliefs, social norms, and perceived control (Baden & Parkes, 2013). Additionally, characteristics also contain various intangible attributes, such as self-efficacy, hope, optimism, resilience, and trust. The make-up of both tangible and intangible characteristics is known as psychological capital.

Psychological Capital

The characteristics of psychological capital influence success and failure through the MBO's decision-making processes. These characteristics include values, professionalism, education, knowledge, leadership orientation, and environment (Sajilan & Tehseen, 2015). The underlying attributes of MBO psychological capital and the influence these attributes have on MBO decision-making processes can have an impact on the success or failure of a business.

Problem Statement, Methodology, Design, and Research Questions

The problem is that about 50% of all start-ups fail within the first five years in business. Williams (2014) suggested that MBEs fail due to a lack of resources, while Phelan (2015) interpreted the failure of MBEs to be related to MBOs not understanding how the external environment interacts with the internal environment.

Connecting both Williams' and Phelan's research, Stewart and Hoell (2016) determined there is a gap in the literature about understanding the impact hiring employees has on the startup at the inflection point. Thus, it was central to the study to understand how MBOs implement the principles of causation and effectuation in their decision-making.

In this qualitative phenomenological study, decision-making processes through the principles of causation and effectuation were explored on MBOs whose MBE has fewer than 15 employees. Individual, semistructured interviews supported the data collection process. Participants for the study were identified through purposeful sampling. Participants were defined within two distinct pools. The first pool was identified as successful MBOs, meaning those whose business was sustainable and presently in operation. The second pool was identified as unsuccessful MBOs, meaning those who closed the doors of their business or went bankrupt. For both groups, it was essential for the company to have hired a first employee. The following three research questions guided the study:

- What were the lived experiences of MBOs as they related to how they processed decision-making at the point of inflection in their business' lifecycle?
- How have successful versus unsuccessful MBOs differed on the implementation of the decision-making principles of causation and effectuation?
- What role, if any, have these decision-making principles of causation and effectuation had on the success or failure of a micro-business?

Findings

The answers that the participants provided to the questions asked helped to link possible reasons why some businesses were still in operation while others failed. Table 1 defines the themes and the related conceptual categories.

Table 1

Themes and Conceptual Categories

Themes	**Conceptual Categories**
Decision-Making	Causation
	Effectuation
Experiential Learning	Experience
	Leadership
	Passion
	Employee Value
	Employee Training
	Capacity
	Trust
Network	Friends/Family
	Extended network
	Industry Knowledge

Conclusion

Twelve participants participated with each participant currently operating a micro-business within the Puget Sound area. Within the group of 12 participants, ten were new to operating a business of their own, and 2 experienced a failed business but have since started a new business. Each participant's MBE was at a different stage within the business lifecycle. Two-thirds of the participants had not yet entered or were just entering the point of inflection and were more animated in their verbal and non-verbal expressions. The remaining businesses were either in or past the point of inflection. These MBOs appeared more reflective when asked about decision-making at the point of inflection.

Research Question 1

What were the lived experiences of MBOs as they related to how they processed decision-making at the point of inflection in their business lifecycle?

The research participants provided examples that reveal how decisions were made depending on the opportunity or circumstance involved in their business. Within the theme of decision-making, two conceptual categories emerged from the research: causation and effectuation. These two categories were integral to the body of the study.

The findings between the two groups of MBOs differed in that the MBOs who were close to entering or had recently entered the point of inflection were more animated in their verbal and non-verbal expressions. They were also somewhat agitated during the delivery of the interview. The MBOs who had more established businesses and were past the point of inflection reflected on the experiences and stated that they were stressed at the time, but they had framed the conversation as if it had fit a plan they had in place.

The data provided lived experiences of MBO decision-making processes as MBOs reached the point of inflection in their business. What became clear was that a combination of the attributes that make up an MBO's psychological capital, from tangible to intangible characteristics to the attributes of behavior, knowledge, and environment, were on display. As MBOs processed decisions about bringing in their first employee, barriers challenged their decision-making processes. Barriers such as trust, capacity, cash flow, and training were brought up. These aspects are just a few of the challenges the participants identified in the interviews.

Research Question 2

How have successful versus unsuccessful MBOs differed on the implementation of the decision-making principles of causation and effectuation?

There was an observed difference between the lived experiences of MBOs who were new to entrepreneurship and those who had previously operated a business. Two MBOs participated in this study who had experienced a business failure and had since started a new business venture. The analysis of how they both changed their implementation strategies between the time of their failed business to how their decision-making changed in their new enterprise illustrated how decision-making practices can change over time and with additional experiences.

Research Question 3

What role, if any, have the decision-making principles of causation and effectuation had on the success or failure of a micro-business?

The development of a business plan – a causation-oriented activity, is aligned with discovery theory. Creating a business plan can be beneficial to a business that functions in a stable environment. Consequently, a stable environment allows the business plan to serve its purpose, which can have a positive outcome for the business. This was the finding from one of the participants' data who did build a business plan.

Another participant did not develop a business plan. Had the participant devoted the time to creating a business plan prior to building a base of clients, the MBO may have prepared the business for the capacity issues experienced early in the business cycle. The business plan can be a place to incorporate milestones that can help to identify bottlenecks, thresholds, and other criteria that could have supported the business. The findings from the data collected illustrated that not building a business plan could have been detrimental to the MBO by either running the MBO out of the business or the MBO could have experienced burnout (capacity) from being too busy for an extended period. It was determined that MBOs were stressed about not only working too hard but also recognized that by not hiring someone to help prepare for the future, the sustainability of the business was in jeopardy.

Conclusion

The research in the study illustrated how experiential learning influenced an MBO's behavioral attributes, which provided depth to an MBO's psychological capital necessary to develop decision-making capabilities. From the findings, many of the participants appeared not to have enough learning experiences to have prepared them adequately for many of the decisions they had to make early on in their business. In addition, the types of decisions made, whether causation or effectuation influenced, also contributed to the challenges MBOs experienced while building their business. Consequently, MBOs may not have utilized the most effective decision-making principle needed to support the desired outcome for their business.

While some MBOs were not able to make the quality decisions demanded in their business, other findings described MBOs who were experienced in operating a business had an elevated level of psychological capital pertaining to decision-making processes.

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The Influence of Prosocial And Leadership Traits On Work Engagement In A Social Work Setting

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Abstract:

Prosocial and leadership traits have a significant influence on employee well-being and retention. However, the conceptual theories of prosocial and leadership traits have been different across professions, leading to diverse theoretical foundations of the prosocial and leadership traits across practices. Empathy and self-efficacy are essential psychological assets in the social work profession and practice. As a result, this quantitative methodology, a non-experimental study, aims to assess the influence of personal assets such as empathy and self-efficacy on work engagement to determine the impact of personal psychological assets in responding to social work workforce shortage. As part of a quantitative study, an anonymous online survey instrument using reliable and valid social work professional theories with a work engagement theoretical foundation grounded in occupational health was sent to social workers working for a department in a larger organization. This study adhered to convenience sampling with 63 participants in this research. The results of the Spearman correlation coefficient revealed that empathy had a statistically significant positive correlation with work engagement, with a p-value of .287 at the .05 level. As a result, empathy was statistically significant in assessing work engagement in a social work setting.

Keywords: empathy, psychological capital, self-efficacy, work engagement

Introduction to the study

The current social worker shortage in the Western region of the United States is alarming as the demand for social work services continues to increase while the current workforce experiences a higher workload. Using age-based projected changes in population, Lin et al. (2016) developed a model on the social work workforce that suggested that by 2030, the social worker shortage would climb near 200,000 with significant consequences that would affect the client's quality of life. Consequently, social work leaders must adopt new strategies to accommodate the profession's current state and restore work to a manageable state through

better work engagement initiatives through assessment of psychological capital such as empathy and self-efficacy on work engagement.

Empathy

Empathy is one of the core characteristics of the social work profession. Han and Kim (2021) pointed out that empathy was vital for social workers as it ensured an effective relationship-based practice. Similarly, Gerdes and Segal (2011), in a study titled Importance of empathy for social work practice: Integrating new science noted that empathic social workers were more effective in performing tasks. In addition, King Jr and Holosko (2012), in a journal on social work practice, underlined three-dimensional levels of empathy in the social work profession: compassionate contextual assessment (CCA), accepting and attentive collaborative inquiry (ACI), and intrinsic helping and emotional support (IHS).

In a study on the self-reported assessment of empathy published in a healthcare journal, Moudatsou et al. (2021) affirmed that CCA focused on the experiences of in-taking and delivering services, and ACI described the collaborative approach inherent in social work practice. Lastly, the authors underlined that IHS encompassed the altruistic values of the profession. Consequently, in social work literature, empathy consists of three distinct facets: CCA, ACI, and IHS.

Self-Efficacy

Self-efficacy focuses on individual capacities to strive and achieve success in a situation. Bandura (1977) argued that in social learning analysis, self-efficacy was grounded on 'performance accomplishments, vicarious experience, verbal persuasion, and physiological states' (p.195). As a result, self-efficacy is a tradeoff between psychological capital and social drives to overcome adversity and strive for better performance.

In the social work field, Pedrazza et al. (2013) established a theory founded on the work of Bandura (1977) that is utilized to evaluate the level of self-efficacy in a population and establish a general conceptual framework on self-efficacy in psychology and the social work field. The proposed field-oriented self-efficacy scale consisted of emotional regulation, procedural self-efficacy, and self-efficacy in seeking support, which were elements of Bandura's social learning analysis theory.

Work Engagement

Most of the work engagement research primarily focuses on analyzing the factors that may assist in managing organizational burnout and turnover to promote workplace well-being. Mendes and Stander (2011), in a study on work engagement and retention, noted that employees who were not engaged were most likely to leave the organization. Similarly, Su et

al. (2022), in a study on social workers' work engagement, pointed out that work engagement was equivalent to positive workplace well-being driven by vigor, dedication, and absorption, characterized by positive and fulfilling mindsets.

Work engagement impacts employee turnover. In an exploratory study on work engagement, Takawira et al. (2014) concluded that work engagement was associated with lower employee turnover and a predictor of employee satisfaction and retention within an organization. Similarly, Maslach et al. (2001) admitted that work engagement was the direct opposite of burnout in the taxonomy of employee well-being, characterized by vigor, dedication, and absorption. As a result, the concept of work engagement in this study was assessed through the lenses of the taxonomy of well-being.

Purpose of the Study

This study aims to assess the influence of social work program manager empathy and self-efficacy on work engagement in a department in a larger organization. Takawira et al. (2014) noted that personal attributes influenced work engagement and significantly impacted employee satisfaction. In addition, Rahman (2020), in a literature review on qualitative and quantitative approaches, noted that quantitative research provided a path to quantify and find patterns in social behaviors involving a larger sample. As a result, this research will use quantitative methodology, a non-experimental study, to assess the impact of the significance of social work program manager empathy and self-efficacy on work engagement. This study aims to assess the relationship between social work program managers' empathy and self-efficacy on work engagement in a department in a larger organization. A statistical correlation analysis was used to assess the strength of the correlation between empathy and self-efficacy on work engagement.

Methodology and Research Design Overview

The sample for this research is the social work program managers working for a department in a larger organization. The study is narrowed to these program managers as the department provides various social work services, and there is a considerable variation among the service recipient populations. The sample size was determined using the G* Power Software Version 3.1. In a study on statistical power analyses and testing for correlation and regression analyses, Faul et al. (2009) pointed out that G* Power was commonly used in social and behavioral fields to determine the sample size for correlation statistical analysis. In this study, there is one predictor, the effect size is 0.15, and the alpha error probability is 0.05 with a power equal to 0.80. Using the G* Power Software Version 3.1, the minimum sample size for the correlation

statistical test is 55. The sample size was selected from the population using convenience sampling.

The researcher will use valid and reliable survey questionnaires on theoretical frameworks of empathy, self-efficacy, and work engagement and combine them into a survey instrument for the study. Consequently, the researcher will not create new questionnaires for empathy, self-efficacy, and work engagement.

Research Questions/Hypotheses

The research will address the following research questions and hypotheses:

1) Is there a significant correlation between social work program managers' empathy and work engagement in a department in a larger organization?

   Null Hypothesis (H_0). There is no statistically significant correlation between social work program managers' empathy and work engagement in a department in a larger organization.

   Alternative Hypothesis (H1). There is a statistically significant correlation between social work program managers' empathy and work engagement in a department in a larger organization.

2) Is there a significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization?

   Null Hypothesis (H_0). There is no statistically significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization.

   Alternative Hypothesis (H_1). There is a statistically significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization.

Data analysis

This study aims to assess the relationship between social work program manager empathy and self-efficacy on work engagement in a department in a larger organization. A correlation analysis was used to assess the existence and strength of the correlation between empathy and self-efficacy on work engagement. The independent variables for correlational analysis were empathy and self-efficacy, and the dependent variable was work engagement. In an article on an overview of correlational research, Seeram (2019) affirmed that the correlational analysis explained the associations between variables, and the significance was categorized in one of three ways: no correlation, negative correlation, or positive correlation. So, correlational analysis fitted this study and aligned with research questions 1 and 2.

Spearman's correlation coefficient was used to test research question one, which tried to assess the significant correlation between social work program managers' empathy and work engagement in a department in a larger organization. The Spearman correlation coefficient between empathy and work engagement was .287, significant at 0.05. Similarly to research question one, the Spearman correlational analysis was used to test research question two. Research question two focused on assessing the significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization. The SPSS Version 27's Spearman correlation analysis result was .210, but no significance was reported at the .01 or .05 confidence interval levels. Between the independent variables for the study, the Spearman correlation analysis was .452, which was significant at the .01 confidence interval level.

Summary of Findings

Correlation statistical analyses were performed to test the hypotheses. As part of research questions one and two, Spearman's correlation statistical analyses were used to test research questions one and two as all the variables were not normally distributed. Research questions one and two focus on assessing the relationship between social work program manager empathy and self-efficacy on work engagement in a department in a larger organization.

Research question one assessed the significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization. The SPSS Version 27's Spearman correlation analysis result confirmed a significant correlation between social work program managers' empathy and work engagement in a department in a larger organization, as the Spearman correlation coefficient was .287 at the .05 level (2-tailed). As a result, the null hypothesis was rejected.

Like the statistical analysis for research question one, SPSS Version 27's Spearman correlation analysis was used. Research question two focused on assessing the significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization. The result of the Spearman correlation demonstrated no significant correlation between social work program managers' self-efficacy and work engagement in a department in a larger organization.

As part of the Spearman correlation analysis, an additional finding was discovered. The independent variables, empathy, and self-efficacy demonstrated a statistically significant positive relationship at the 0.01 level with a Spearman correlation coefficient of .452. This finding was not part of the research questions. However, the report underlined a critical aspect of this study by clarifying the significance of the dependent variables on the dependent variable.

The SPSS Version 27's Spearman correlation analysis provided a conceptualized approved test hypothesis for research questions one and two. However, the Spearman correlation analysis had some limitations as the statistical model could not predict the influence of a variable on an outcome.

Future Research

This study aimed to assess the impact of empathy and self-efficacy on work engagement in a social work context using a non-experimental quantitative research design. The instruments used to collect data on empathy and self-efficacy were grounded in the social work profession. However, the work engagement scale was conceptualized in occupational health science, leaving room for adopting a theory on work engagement grounded in social work practices.

In addition, this study provided the groundwork to assess the impact of empathy and self-efficacy in a social work setting. Future studies could focus on developing a social work scale on work engagement to have consistency as related to the field of social work. In addition, the categorical variables of empathy, self-efficacy, and work engagement could be examined at each theoretical construct level to draw conclusive findings on the significance of each categorical variable. In addition, future studies need to explore the mediating role of self-efficacy on empathy and work engagement to determine the level of influence of self-efficacy on work engagement.

Conclusion

This study aimed to assess the influence of social work program managers' empathy and self-efficacy on work engagement in a department in a larger organization. There were two research questions and four hypotheses. The research questions focused on assessing the influence of empathy or self-efficacy on work engagement. The theoretical foundations of empathy and self-efficacy were grounded in the social work profession, while work engagement was in occupational health science theory.

In addition, the studied variables were assessed at the theoretical foundation level. The data analysis results using SPSS Version 27's Spearman correlation model provided statistical significance on empathy on work engagement. In addition, the independent variables had a statistical significance that suggested that leaders in the social work profession should align workforce retention initiatives around empathy while finding common traits between empathy and self-efficacy.

This study contributed to the social work field by assessing empathy and self-efficacy on work engagement in a social work setting by pointing out the significance between empathy and

work engagement and the influence of self-efficacy on empathy. However, future research opportunities need to focus on developing a social work construct for work engagement and assessing the mediating role of self-efficacy on empathy and work engagement at the categorical construct levels.

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An Analysis of Application of Pike Syndrome for Student Capacity Building

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Abstract:

This paper is based on pike syndrome. Many time some student in -our class is not interactive at all. They are not responding to any activity just because of imaginary fear or barriers. So, it is responsibility of mentor to identity weakness in Student and try to overcome them.

Keywords: Capacity Building, pike syndrome.

Introduction:

Here in this paper, we are discussing on application of pike syndrome in student capacity building. Many colleges have mentor mentee system to solve the problem related to student and make counseling of students. Many times we know that many students of our class or college are not reactive to anything. Even they do not interact with teachers. Then we have mentor to each student so now it is responsibility of mentor to make them interactive. Then we have pike syndrome which can be applicable on student capacity building.

In our life many obstacles are coming or we have to face many up and downs. But if we got frightened of these then our life is over and we just stop thinking about how to overcome situation and we start thinking that we are different from other and whatever happened to us is just “kundali dosh”. Actually, nothing depends on star we are failed to solve situation. We are paralyzed by internal imaginary fear.

We humans are just like to pike. We have less self-belief, continuous failure in life and other people perception about ourselves influence our process of thinking and ultimately we stop doing new efforts. (Afful 10th oct 2023)

Pike Syndrome:

This experiment undertaken in 1873 by Dr. Karl Mobius, a German marine biologist. The pike is a large fish that survives by eating smaller fish. An experiment was conducted years ago where the pike was placed in a large fish tank. Then several smaller fish were introduced into the tank, but separated from the pike by keeping them within in a large, bottomless, glass jar. The jar was submerged to the bottom of the tank, closing them off completely from the pike. Of course, the pike didn't know this and immediately struck at the minnows. In fact, the pike hit the glass over and over until, frustrated and "conditioned", it settled at the bottom, right next to the minnows. After a while, the jar was lifted, and the minnows swam all around the pike and throughout the large tank. And yet, the pike remained motionless. Indeed, the pike never tried again and died in that tank with its main source of food and survival right in front of it! (Greene 2022)

Capacity Building:

A capacity Building Approach to development involves identifying constraints that human being experience and finding appropriate way through which they can strengthen their ability to overcome causes of their exclusion and suffering. Capacity Building is nothing but process of building positive attitude and empowering human being to bring positive changes in thir lives. (Eade, 1997)

Working Model:

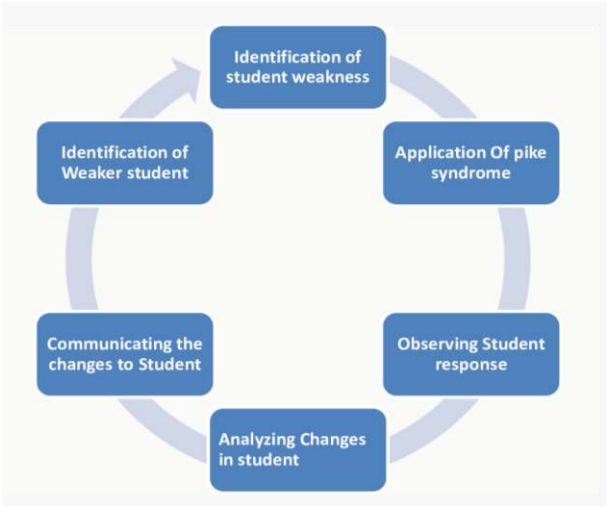

Fig1.Modified Model of capacity building by application of spike syndrome on student (Rajesh Bahadur Thapa 22 oct 2019)

Identification of weaker Student:

When we continuously interact with students' day to day working, we start understanding students. Normally in colleges mentor mentee system is designed to know your student from close and understand problem they are facing in their personnel life as well as in college premises.

In mentor mentee system mentor Need to identify weaker Student among the student.

Identification of Student weakness:

Once we find out the weaker student from the group of student now it is time to understand the student weakness. We can find out the student weaknesses by personal communication, interacting with student or by observing student while he or she is facing any situation and the way he will handle the situation.

Analyzing problem: After a continuous search or observation we will analyses the student behavior and understand the problem of our student.

Application of pike Syndrome. -

. Once we identified the student problem of student now as a mentor we need to decide and set the difficulties level for student. According to the problem the mentor has to decide the activity that he will suggest the student to overcome the problem. Mentor need to assign activity to the particular student. Now let him to free to perform activity on his own. At the time of doing activity student will suffer from various difficulties let him to tackle the situation on his own. Again, it is now responsibility of mentor to guide them time to time if he or she is facing any problem in handling the situation. There is one common proverb that action speaks louder than word. Mean if we intentionally drawn person in difficult situation then he will definitely try hard to escape from such situation but proper guidance is necessary.

Observing student Response:

After Application of pike syndrome mentor has to continuously observe the student behavior during the situation. He has to notice the changes in the personality or to find out how he behaves in difficulties. After notifying student behavior mentor need to guide student to make them comfort.

Analyzing Changes in student:

During this process some changes definitely take place in mentee. It is responsibility of mentor to continuously observe the student and find out the lacunas in them. Notice the changes that take place in them and solution should be define for future development.

Communicating the changes to Student:

After the completion of activity mentor need to communicate the analysis made by mentor during the process of application of pike syndrome what changes are take placed in student and what he or she need to do to make changes in their personality and thinking process so that he or she can face any problem in their future life.

Research Methodology:

After the discussion of model I applied this model for student capacity building. For this we selected first year student as our sample size of total 100 students. We send Google form to these students with some basic question. We got response of 63 students who actually participated in this research work.

Result and Findings:

To support of above theory, we conducted research survey on First year student of our college.

Table1: of sampling of BCCA first year student.

BCCA First year student	Fear of Stage	Problem of Communication	Problem of Reading and Writing	Fear of people stare at me any
Male	18	10	03	01
Female	28	0	03	00
Total Students	46	10	06	01

After the data analysis of above problem mentors suggested various activity to student such as Group discussion, presentation, newspaper reading, Debate on current topic, poster presentation, seminar on syllabus topics, Anchoring etc. Each student participated in allocated

task. After some day review of student was taken on improvement, they observed in themselves. Following Response, we got from student**.**

Which Activity is suggested by your Mentor to overcome the problem?

word	count	relevance
seminar	16	1
presentation	15	0.94
group discussion	8	0.61
anchoring	6	0.4
debate	4	0.28
seminar power point presentation	2	0.21
seminar presentation	2	0.19
speech	2	0.17
essay PowerPoint presentation	1	0.13
PowerPoint presentation		
group discussion anchoring program	1	0.13

Group debate.

Fig1: Activity is suggested by Mentor to overcome the problem word cloud representation.

Table2: Do you overcome with the problems you are facing?

Student Response Gender wise	Yes	No
Male	31	1
Female	29	2
Total student	60	3

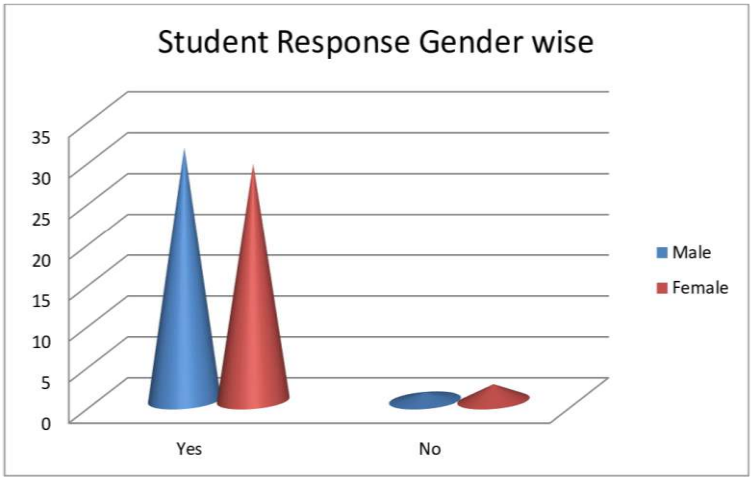

Fig: 2 Graphical representations of Student Response

From the above diagram we come to know that near about 95.23% student overcome the problem after chasing the task assigned to them and only 4% of student does not over come from the problem. From the above discussion it is proved that student can overcome from the problem after successful treatment of problem.

Is there any improvement in your performance?

word	count	relevance
stage	32	1
confidence	30	0.94
increase	30	0.94
personality development	12	0.48
writing	6	0.25
skill of reading	4	0.22
communication	4	0.19
personality	4	0.19
improvement	3	0.16

Fig2: Word cloud representing student skill improvement.

Conclusion

1. From above discussion we can prove that if we understand the student problem then we can suggest activities to overcome them from the fear they are suffering. The follow up and monitoring of student is very necessary for student Capacity Building.

2. Student problem are not gender dependent both male and female are facing same problem.

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Acharya Kotilya : NEP20 Towards the Indian Knowledge System

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Abstract:-

More than 75 years have passed since India got independence. However, the sustainable development and higher education rates of some castes and tribes in India are disappointing. It is a matter of concern that some backward tribes are today struggling to achieve their sustainable development and increase the rate of higher education. In this research paper, India's sustainable development and Indian knowledge system has been reviewed.

Keywords:- Indian Knowledge System, Kautilya, NSP 2020, Education Policy.

Objective:-

The main objective of the presented research paper is to look at the sustainable development of India and the changes in the Indian education system.

Research methodology:-

The present research paper is based on the monetary economy of India as well as the world. The paper highlights the steps taken by India for reforms in the monetary economy, the present study is based on primary as well as secondary sources of data, such as government departments, national international economic surveys, monetary and finance research journals, government documents, RBI reports etc.

Objectives of Research:

1) To study the knowledge system of Indian civilization.
2) To Study the Indian Knowledge System from Ancient Period.
3) To Study History of Kautilya’s Education Policy.

Introduction:-

The National Education Policy 2020 was launched on 29 July 2020 to improve the education system in India which had become weak due to customs and traditions and to promote multilingualism and digital education.

The Department of Indian Knowledge Traditions or Indian Knowledge System (IKS) Division of the Ministry of Education (MOE) located at AICTE Headquarters was established in October 2020 by the Government of India to transmit the knowledge of one generation to the next.

Kautilya focused on three outcomes in his education policy, which included Vidya – creation of new knowledge, Viveka – right time for the right purpose, Vichakshana – skill to achieve appropriate results. If the integration of these three is balanced in the education system, then the education system will be properly balanced. The Indian Education Department has integrated these three systems of Kautilya in the Indian Knowledge system.

Indian Knowledge System:-

Indian civilization has always given great importance to knowledge in the Indian knowledge system. The knowledge of Indian civilization has been preserved in the form of books, collections and manuscripts. The tradition of this knowledge is currently visible in texts, thinkers and schools. Indian knowledge system is related to these three departments: philosophy, knowledge and education. But due to time it is not possible to maintain ancient texts and manuscripts. Therefore, to keep the idea of culture alive in the Indian knowledge system, texts and manuscripts have been renovated through renewal mechanisms.

According to the ancient Indian tradition, 18 Vidya (sciences) and 64 Kala (arts) include knowledge ranging from philosophy to practical, business as well as craftsmanship. Over time, many disciplines of knowledge in various fields, sciences and crafts have been institutionalized. Eg. Ancient Indian Economic thinker Kautilya

Ancient Indian thinker Kautilya:-

The name of ancient Indian thinker Kautilya is famous as the author of 'Arthashastra'. This book is written in the style of another man. In this, apart from Kautilya, the name 'Vishnugupta' has also been given. It is generally accepted that Acharya Vishnugupta, the creator of 'Hitopradesh' and Acharya 'Kautilya', the pioneer of 'Arthashastra', were the same. Hitopradesh is also a book written on politics, which has been written in the style of stories of animals and birds for the purpose of children. The principles discussed through these stories are very practical and visionary; hence they are similar to the principles of economics. Kautilya's third name is believed to be Chanakya, which was the name of Chandragupta Maurya's prime minister.

The description of the status and powers of the king under Kautilya's Arthashastra, we can consider it as his principle of sovereignty from the perspective of western thought. Kautilya's explanation of the origin of the king or sovereign is similar to the theory of the social contract prevalent in seventeenth century Europe. Under the theory of social contract, the natural condition has been imagined before the formation of the state. Kautilya has imagined a state of anarchy parallel to this. Kautilya has placed before us the political obligation of the

individuals arising out of the establishment of the Sovereign, in the form of the obligation to pay taxes. They have taken the support of religious beliefs to give absolute powers to the sovereign. But at the same time, with the help of these religious beliefs, they have also bound the sovereign with elaborate duties.

Arthashastra book of Kautilya:-

Arthashastra book are texts referred to the ancient economics of India. This book was written before 300 BC. These texts deal with economics, administration, political thought and many other subjects. Kautilya's Arthashastra (Economics) was written keeping in mind the administrative system.

In Arthashastra, Kautilya shows the knowledge of basic economics. In Kautilya's time the king was at the center of the political body. Kautilya believed that the king was bound by an implicit social contract. Because of which the ultimate aim of the king in economic and other matters should be to benefit his subjects.

In the context of Kautilya's Arthashastra, Jawaharlal Nehru has said, "This Arthashastra deals with many subjects. It covers the duties of the king, his ministers and advisors, the state council, the various departments of the state, the duties of the employment of the villages. Governance of cities, law and judicial courts, social customs-reflecting customs and manners, women's rights, elderly and destitute people, marriage and divorce, military and navy, war and peace, consolidation, farming, eviction, cars, dogs, passports and even the governance is also described in the Arthashastra!"

Kautilyas Economic Evaluation

Establishment of Statehood:-

The need for the state to be active in helping the poor and helpless and contributing to the welfare of its citizens is why Kautilya emphasized human capital formation. The institution of the state has been created to enable the individual to practice his dharma and thus move towards liberation from the cycle of death and rebirth. A state of arajat (unrighteousness) was viewed with distaste as it was against the practice of dharma. Many ancient Vedic texts refer to Matsya Nyaya (law of fish) which prevails in the state of nature. Such a state is characterized by the absence of dharma and mamtava (private property rights).

Taxation Policy:-

Kautilya envisioned a 'righteous social contract' between the king and the citizens. Taxes were imposed for the maintenance of social order and a state-run welfare system. In case of aggression by an outside agency, the janapadas (districts) could demand tax exemption as the king had failed in his duty to protect the citizens. The hallmark of his tax system was the 'certainty' of time, rate and mode of payment. The stability of the tax system was an important factor in ensuring active trade and commerce in the Mauryan Empire. This in turn strengthened the state's revenue base and enabled it to maintain a large standing army and welfare apparatus.

Land Tax:-

Kautilya made certain rules for determining the proportion of tax, in which he made the basis of the type of land, its productivity, the type of produce and the type of irrigation. In this way, he had also proposed tax exemption as an incentive to increase productivity.

Conclusion:-

Changes and digitalization are increasing day by day in the Indian education system. But over the years it has been observed in India that ancient Indian education has contributed to literary, art and other fields of education, which has lost popularity among the new generation. Therefore, in the Indian Knowledge System (IKS) and National Education Policy 2020, it is necessary to make efforts to preserve and promote the culture and language of other backward tribes including the Banjara tribe, who have sacrificed their body, mind and wealth in the building of India.

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Study of Growth of Indian Start-ups

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Abstract:

India currently has the world's second-largest startup ecosystem. One of the most crucial ways to handle the urgent problems facing humanity is through startups, as they are able to come up with answers and react to problems faster than other organizations. Incubators are becoming more prevalent, and young people's enduring inclination to establish their own companies is another factor propelling early-stage startups and entrepreneurship in India. While startup claims to be able to transform the world are sometimes overblown, successful businesses may make a big difference in the world. Over the past 20 years, India's view of startups has changed dramatically, moving from a specialized business to a thriving ecosystem that has fueled the nation's economic growth and elevated its prominence abroad. India's market has a wide spectrum of wants and aspirations because of its huge and youthful population as well as its expanding middle class. The youth talent pool in India has been crucial in fostering innovation and accelerating economic expansion. India has developed into a hub for logistics, cars, and IT, which encourages start-ups. The objective of this paper is to analyse the current expansion and advancement of Indian startups. This research is based on the secondary data available through various journals and reports. The Government of India as well as State Governments have provided a strong support to the start-ups as it has a proven track record of employment generation which help to tackle the increasing unemployment in India. It is hoped that in times to come Indian Start-ups will scale high and will provide leadership to the developing world.

Introduction:

After the US, India now is the second-largest startup ecosystem globally. India is a hub for startups and is growing exponentially in this regard. The Global Startup Ecosystem Report 2022 ranks Bengaluru, Mumbai, and Delhi as among of the top 40 global startup clusters. India's startups have raised over $23 billion in 2021 alone, closing over 1000 deals and sending 33 of them into the exclusive unicorn club. Thirteen more firms have joined the unicorn club thus far in 2022. Global startup trends are changing rapidly. For example, the United States leads the world with 7.1 percent of startups in the Fintech sector; more than 69 percent of startup companies began as home-based ventures; and sixty percent of entrepreneurs have

placed their trust in artificial intelligence. India's economy is now experiencing expansion. With the implementation of liberal policies and programmes for entrepreneurs such as "Make in India," "Startup India," "MUDRA," and others, the Indian government is progressively demonstrating greater eagerness to improve the GDP rate of development from the grassroots levels. Due to a surge in creative ideas, the number of entrepreneurs in the nation has increased recently. Startups can become market leaders by embracing innovation. This kind of spontaneous growth and improvisation's role in entrepreneurial development is the reason the study was carried out.

India's conception of startups has evolved significantly over the last 20 years, from a specialised industry to a thriving ecosystem that has fuelled the country's economic growth and raised its profile internationally. This evolution can be divided into three primary phases:

Phase 1: Pioneers of the 1970s–1990s: The seeds of India's startup movement were planted in the 1970s with the growth of IT services companies like TCS, Infosys, and Wipro. These pioneers leveraged India's highly qualified IT workforce and cost-effectiveness to establish the nation as a global powerhouse for outsourcing. Their success paved the way for a generation of entrepreneurs who saw the potential of technology to tackle pressing issues and inspire creativity.

Stage 2: Dot-com the 1990s saw a boom in e-commerce during this time. The growth of Indian startups was aided by the dot-com boom and the internet's development in the 1990s. Online shopping for Indian consumers was revolutionised by the rise of e-commerce companies like Flipkart, Snapdeal, and Jabong. Additionally, entrepreneurs started to emerge in other sectors of the economy during this time, such as journalism, tourism, and hospitality.

Phase 3: The Startup Boom and Mobile Revolution (2010s-Present): The emergence of smartphones and fairly affordable internet access in the 2010s marked a significant turning point for the Indian startup ecosystem. During this period, there was a surge in the number of startups across several areas, such as fintech, e-commerce, healthcare, education, and logistics. The rise of venture capital firms and angel investors allowed entrepreneurs to grow by providing the funding they required.

The Indian startup ecosystem has evolved as a result of several factors, including:

1. India's large and youthful population, along with its growing middle class, make it a market with a wide range of demands and ambitions. This has made it simpler for businesses to create innovative goods that fit the Indian climate.

2. Swift advancements in technology, particularly in domains such as cloud computing, artificial intelligence, and mobile computing, have empowered entrepreneurs to offer innovative solutions for urgent problems.

3. In order to help startups and encourage entrepreneurship, the Indian government has been instrumental. Funding, coaching, and infrastructural assistance have been made available to companies through initiatives such as Startup India, Stand Up India, and Made in India.

4. India is home to a substantial pool of brilliant and highly educated labourers, particularly in the IT sector. This talent pool has been essential for encouraging innovation and quickening business growth.

5. The emergence of angel investors and venture capital firms has enabled companies to secure critical funding, enabling them to expand their operations and tap into new markets.

6. The creation of co-working spaces and incubators, which have provided businesses with a pleasant setting to work, interact, and access resources, has encouraged a healthy entrepreneurial ecosystem.

7. Indian consumers are growing increasingly tech-savvy and open to embracing new technologies. This has facilitated the introduction of innovative products and services by new enterprises.

REVIEW OF LITERATURE

According to the report, all kinds of start-ups in India seek to support emerging, creative companies by helping them launch and by giving them a little boost (Dr. Pooja H. R. 2017). Since start-up is conceptualised using ideas from the west, it may not be entirely appropriate for Kenyan firms. Therefore, a start-up should be seen in the Kenyan context as an innovative corporate organisation that is scalable and has endured for three to five years (Beatrice K. Wanja W.; Stephen M. 2022). Anubhab P. and S.S. Pasumari's paper focused on a review of the literature on startups in India, how they operate, what motivates them to start, how they create jobs, how the startup policy affects them, what financing options are available, and what obstacles they face when trying to secure funding (2020).

OBJECTIVE

This paper aims to analyse the current expansion and advancement of Indian startups.

RESEARCH METHODOLOGY

The nature of the current study is analytical research. The study makes an effort to analyse the development and potential of Indian startups, as well as the opportunities and risky situations that aspiring business moguls must deal with. The study's secondary data came from books, journals, periodicals, newspapers, research papers, annual reports from the Indian government, and websites with permission.

DISCUSSION

The present world scenario of Unicorn Start-Ups is as follows:

Those start-ups whose market value is over 1 Bn dollars are called Union Corn start-ups.

Country	Number of Unicorn-Start-Ups
America	644
China	302
India	111
Britain	46
Germany	29
Other countries	73

Source: World of Statistics. 2023

Funding to the Starts ups during the last four years.

Country	Funding in Bn Dollars
America	930
China	259
Britain	106
India	103
Germany	48

Source: World of Statistics 2023

INDIAN START-UPS SCENARIO 2023

India's startup scene is expected to have an even more significant impact on the future of the nation as it develops. Indian startups, centred around innovation, sustainability, and social impact, are poised to propel economic expansion, tackle societal issues, and reshape India's worldwide standing.

1.14 lakh registered start-ups are currently operating, according to the Software Technology Parks of India (STTPI) report that was just released. This was made feasible by the accessibility of smart phones and low-cost internet, which has sparked a revolution and encouraged the creation of new start-ups. Thirty-four hundred start-ups were registered in India between January and October 2023. The bulk of these start-ups are located in second- and third-class cities, which has greatly aided in the creation of jobs. India is the second-largest internet consumer nation in the world. In India, Four G service covers 98% of the country. This is encouraging new businesses in the digital space. The increased digitization has been advantageous for logistics and education. The rural sector can now receive technology-based services thanks to this. As a result, 1.40 crore young people have received training through the Prime Minister's Skill Development Scheme.

A programme that the Central Government has implemented to assist startups is contributing to the creation of job possibilities. The World Bank's "Ease of Doing Business 2020 report" states that there are a growing number of professional services and marketing opportunities in India. India used to be ranked 142 in the world in the "Ease of Doing Business" index, but that number dropped to 63 in 2020, and it continues to rise year.

Highlights of the startup in India

India has the world’s second-biggest fintech hub with more than 2,565 startups operating currently, there were only 737 in 2014. India’s largest share from fintech startups is through ‘payments’ and

- With over 2,565 companies now operational, India is the second-biggest fintech cluster in the world; in 2014, there were only 737. The biggest portion of fintech businesses in India are in the payments space, with lending, wealth tech, personal finance, and other categories following.
- As of July 30, 2022, 102 incubators have received approval for Rs. 375.25 crore out of the Rs. 945 crore capital under the Startup India Seed Fund Scheme (SISFS).

- ❖ Global market research and advisory services company International Data Corporation (IDC) projects that the Indian public cloud services market will expand at a compound annual growth rate (CAGR) of 24.1 percent from 2020 to 2025, reaching $10.8 billion.
- ❖ The second-highest number of internet users worldwide, the third-largest startup ecosystem in the world in terms of unicorns and total startups, 61 percent internet penetration, 373 million+ rural internet users, the $450 billion+ combined valuation of Indian startups, the creation of 7.7 lakh jobs, and the $131 billion+ in venture capital inflow since 2014 are just a few examples of the positive economic impact of Indian startups (Startup Report-2022)

In India "Unicorn" startups will increase.

As per the Harun India study, there are currently 96 "Chitta" and 51 "Chinkara" and 83 "Unicorn" startups in India. There were 84 unicorns, 51 chinkara, and 71 Chitta startups in this number last year. The market capitalization of upcoming businesses with the potential to become "unicorns" is 4.67 lakh crores, a 16 percent increase over the previous year.

The number of new businesses and startups becoming "Unicorn" start-ups has surged over the past several years. As on the Harun India Future Unicorn Index 2023, 147 firms will become "Unicorns" in the next five years, while 51 startups have the potential to become Unicorns in three years.

Types of Startups.

Unicorn: startups with a market value of at least $1 billion that were founded after 2000.

Chinkara: The startups which have the potential to become unicorns in three years.

Chitta: startups having the potential to become unicorns in the next five years.

India's Top 5 "Chinkara' Startups

Name	Total funding Rs. In Crores	Sector
Ninjacart	3,009	Aggrotech
Zepto	2,952	Quick Commerce
Ather Energy	2,804	E-Bike
Observe AI	1,755	Artificial Intelligence
Leap Scholar	1,255	Edtech

Source: Harun India Future Unicorn Index 2023

India's Top 5 "Chitta Startups

Name	Total funding Rs. In Crores	Sector
Danzo	5,739	Quick Commerce
Paper Fry	2,336	E-Commerce
Insurance Dekho	1,393	E-Commerce
Clear 1,147	1,147	Fin Tech
Atlon	566	Software

Source: Harun India Future Unicorn Index 2023

Pune ranks within 100 cities of the world in respect of Global Start-Ups Ecosystems.

CONCLUSION

Due to their ability to invent solutions and respond to issues more quickly than other organizations, startups are one of the most important ways to address the pressing issues facing humanity. The number of incubators is increasing, and young people's constant propensity to launch their own businesses is another factor driving early-stage startups and entrepreneurship in India. Although the promise of startups to change the world is occasionally exaggerated, prosperous firms do have the power to significantly improve the globe. Furthermore, companies still have an influence even when they fail, particularly in terms of the lessons learned by the founders, staff, investors, and other stakeholders. The jobs of the future belong to startups. People are increasingly accepting temporary or freelance work with startups in place of the traditional career route.

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Modern Media: employment opportunities and challenges

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Abstract :-

Media is a form of communication to world. Such as print media, publishing, news media, photography, cinema, broadcasting, and advertising etc. In this research Paper reviewed on Modern Media's employment opportunities and challenges in India.

Keywords :- Modern Media, Social Media, Digital Marketing, GDP.

Objective:-

The main objective of the presented research paper is to take a look at the employment opportunities and challenges of Modern media in India.

Research methodology:-

The present research paper is based on the Modern Media of India as well as the world. The paper highlights the employment opportunities and challenges of Modern Media in India, the present study is based on primary as well as secondary sources of data, such as government departments, national international economic surveys, Media and finance research journals, government documents, RBI reports etc.

Objectives of Research:

4) To Study the history of Media.
5) To Study the development of Modern media in India.
6) To Study Contribution of Modern media in India's GDP.
7) To Study the employment opportunities and challenges of Modern Media in India.

Introduction:-

Media are the tools used to distribute information or data. Media refers to the medium of mass communication such as print media, publishing, news media, photography, cinema, broadcasting, and advertising. This media is considered to be the main means of communication in today's modern world.

Types of Media:-

Print Media:-

In print media, information is exchanged through matter or photographs. For example, books, magazines, News Papers that contain words or images are used to exchange information.

Newspaper:-

Newspapers are prepared and distributed daily at national, regional as well as local level to disseminate news as well as other information. In which newspapers are sold at affordable prices by getting advertisements from big businessmen or organizations.

Newspapers make the general public aware of world or local news. As newspapers are circulated daily, the readers have easy access to daily world and local news.

Magazines:-

Magazines provide readers with information on glamour, lifestyle, entertainment and special interests every month. While business magazines are related to business, glamour, lifestyle or entertainment magazines capture the attention of consumers in today's world.

Magazines are printed according to the preferences of the readers, in which the customers are divided according to age, gender. Magazines also provide information to consumers by advertising according to readership and trends and information about goods or products through advertisements.

Electronic Media:-

In broadcast media, mass communication is transmitted through video or voice. It mainly includes media like television, movie and radio.

Television:-

Television provides information and entertainment services to the audience through audio as well as visual. Through television, millions of viewers can watch live broadcasts of events like television shows or sports. Advertisers attract the audience towards their products by including advertisements thus the advertiser advertises and the audience gets information about many products at home. Television is a Modern Media.

Radio :- Although the radio culture is dying now, listeners get a 24-hour access to music through modern culture like FM brand. Brands operated by Akashvani include news, music and podcasts. Since radio is only through audio, advertisers can advertise their products cheaply, but because the advertisement is 15 or 30 seconds long and in audio format, listeners

do not pay attention to these product advertisements. This is a disadvantage of radio advertising.

Movie :-

Movies entertain people through videos and audio. Due to the large worldwide audience of these films, sometimes agreements are made between film studios and product marketing companies to include advertisements for the products in the film. While making a film, the director makes the film by considering age, gender, regional and local geographical structure. Which in turn entertains a huge audience around the world and also advertises the manufacturers. Movie is a Modern Media.

Internet Media:-

Internet media involves the exchange of information in the form of text images, links, video or sound etc. using the Internet.

Internet: - Audio and visual content is sent from one place to another through the Internet. It can also include words, emails, graphics as well as interactive elements. Internet includes media such as email. Although this is a modern medium of the modern era, it has numerous advantages as well as disadvantages.

E-mail:- A quick message can be sent to anyone through email. Everyone makes the most of this service as it is free to send files or messages to anyone in an instant via email. Advertising companies are conveying information about their products to customers through this email.

Social Media: - Social media is the most modern and popular media medium in today's modern world and is an important component of marketing plans of many companies.

Social media includes WhatsApp, Telegram, and Instagram. As people all over the world are using social media these days, it helps advertising and manufacturing companies to know people's habits, buying history. The same trend is also widely used in this. Today, if a product trend becomes popular on social media, it directly benefits the product company. Also, ideas can be exchanged between companies, society or advertisers in real time, so social media is an important factor in today's modern world.

Modern Media Concept:-

Modern media is the modern era of the Internet era, which emerged around 1995. Due to the changes in modern media and internet day by day, someone started to release information from

one place to the whole world. Modern media includes 3d film, 3d graphics, Augmented Reality, Cloud Storage, Digital Advertising, Digital Art, Digital Audio, Digital Audio Books, Digital Broadcasting, Digital Film, Digital Magazines/Newsstands, Digital media Archives, Digital Music, Digital Outdoor Media, Digital Photos, Digital Television, Email, Secure Messaging, Holograms, Immersive Art, Interactive Media, Live Streaming, Massively Multiplayer Online Games, Media Sharing Networks, Memory Storage Devices, Messages, Mixed Reality, Mobile Apps, Photo/Video/Music editing software , Podcasts, Printers, Search, Social Media, Steaming Media, Social Media, Steaming Media, Steaming Music, Video Blogging, Virtual Reality, Websites, e-books or digital publications etc. Information related to any or various topics and issues can be presented in the form of stories, text, images, sounds, animations and videos. As the sector is so widely dispersed, of course numerous employment opportunities also arise in the field of modern media.

Employment opportunities of Modern Media in India:-

In India, there are a lot of job opportunities available in the media and entertainment industry. Because the media and entertainment sector has a large share in the Indian economy. All companies in India use digital media to provide better services and facilities to customers. According to a FICCI-EY report, the advertising to GDP ratio is expected to reach 0.4% by 2025 from 0.38% in 2019.

According to a latest report by The Global EY Organization (EY), India's media and entertainment industry will touch Rs 2.34 trillion. By 2025, the industry is estimated to grow by 10% to reach 2.83 trillion. EY also predicts India's advertising revenue to reach 394 billion in the current year 2024. According to a Business Insider report, India is the fastest growing internet advertising market in the world at a CAGR of 18.8% during 2020-2025. Mobile Internet advertising revenue in India was INR 7331 Cr in 2020 and will grow to INR 22350 Cr in 2025 at a CAGR of 25.4%.

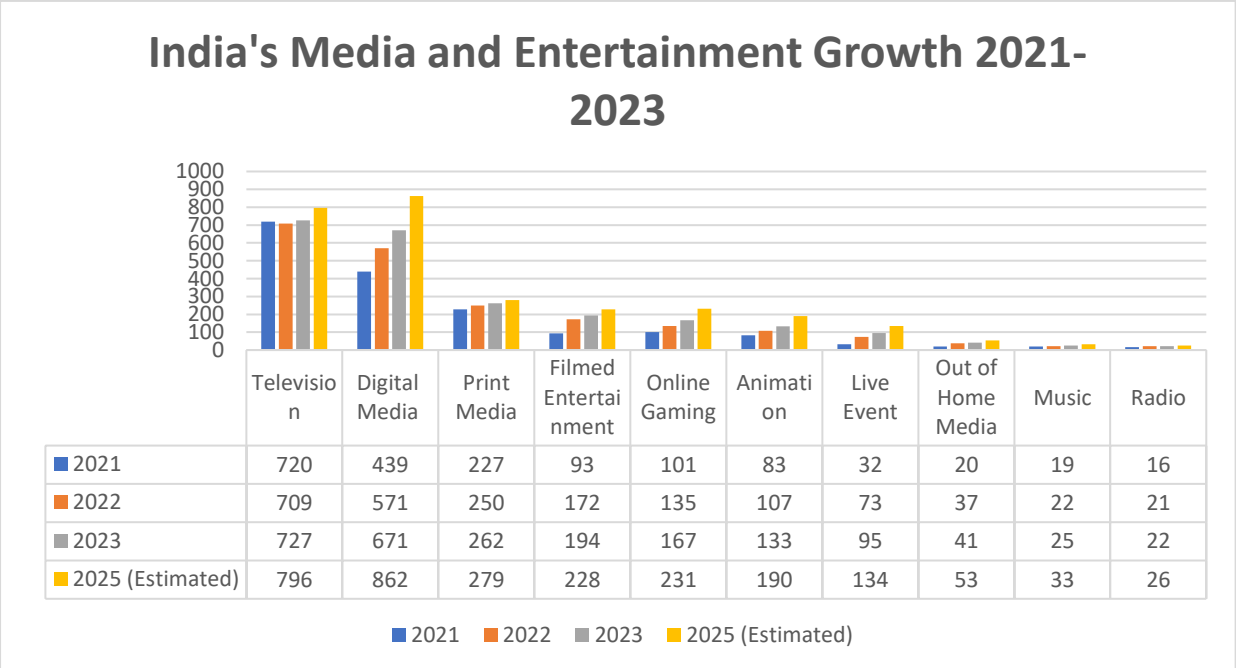
The role of modern media is important in daily life. Because every human is trying to get some entertainment or information through video, podcast, OTT or digital broadcasting. So through all these advertising companies get a chance to connect directly with the consumers through digital marketing, so many job opportunities are available in the field of digital marketing today.

India's media and entertainment sector grew by 20% to reach Rs 2.1 trillion in 2022.

India's Media and Entertainment Growth 2021-2023

Sector	**2021**	**2022**	**2023**	**2025 (Estimated)**
Television	720	709	727	796
Digital Media	439	571	671	862
Print Media	227	250	262	279
Filmed Entertainment	93	172	194	228
Online Gaming	101	135	167	231
Animation	83	107	133	190
Live Event	32	73	95	134
Out of Home Media	20	37	41	53
Music	19	22	25	33
Radio	16	21	22	26
Total	**1750**	**2098**	**2339**	**2832**
Growth	**19.3%**	**19.9%**	**11.5%**	

Source :- Windows of Opportunities, Apr 2023



Above Figure shows India's Media and Entertainment Sector Growth is increases day by day.

Employment opportunities in Digital Marketing:-

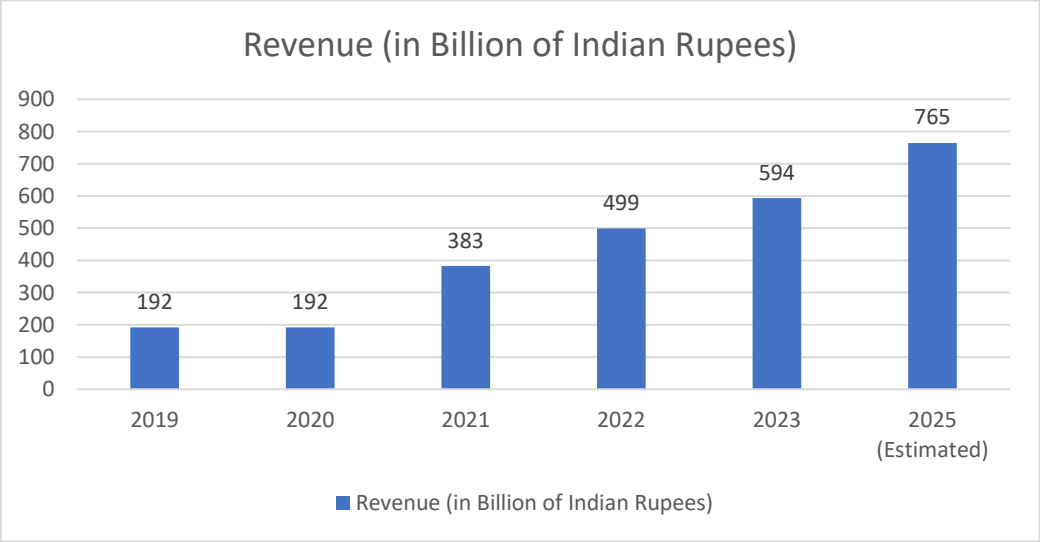
In digital marketing, advertisers communicate their brand to consumers through email, social media, web, and multimedia, so the creation of such a large network of marketing creates a large number of employment opportunities. Digital marketing is divided into eight main areas which are affiliate marketing, content marketing, email marketing, marketing analytics, mobile marketing, pay-per-click, search engine optimization and social media marketing etc.

Digital Marketing Manager, Content Writer, Social Media Manager, SEO Manager, UX Designer, Data Analyst, SEO Specialist, Content Strategist, Copywriter, Content Marketing Manager, Search Engine Marketer, Influencer, Analytics, Ecommerce jobs, Web Developer, Automation Expert, Content Manager etc. jobs are available, and there is a lot of opportunity to make a career in this.

Year wise Indian Revenue growth of Digital Marketing 2019-2025 (In Billions of Indian Rupees)

Year	Revenue (in Billion of Indian Rupees)
2019	192
2020	192
2021	383
2022	499
2023	594
2025 (Estimated)	765

Source :- FICCI Data (2018-2023)



As of 2019 and 2020, the revenue generated by digital advertising across India was valued at around 192 billion Indian rupees. As of 2021, the revenue generated by digital advertising across India was valued at around 383 billion Indian rupees. While as of 2023 revenue generated by digital advertisement across India was values at around 594 billion Indian rupees. 2025 estimated value of digital advertisement in India is across 765. All figures shows Media and Entertainment sector India's No.1 revenue and employment sector.

Challenges of Modern Media in India:-

India's media sector also faces numerous challenges due to day-by-day increasing competition and advancing technology. Some of the important challenges are as follows:-

1. Advertising and Events Industry: - Due to the war between Ukraine and Russia, the prices of raw materials have increased, causing recession in many countries of the world. Due to this recession, many international companies have decided to reduce their staff to reduce operational costs. Therefore, it is necessary to prepare for the future challenges by increasing the skills through modern media even during such recession.

2. Entertainment Industry and OTT:- In the global epidemic like Corona, the entertainment sector was hit in a big way. But during this Corona period, there was a large increase in the entertainment business through other OTT platforms like Netflix, Amazon. Therefore, developing OTT platform skills among students and providing job opportunities to them is a big challenge in front of modern media sector.
3. Journalism and Broadcasting :- Due to the increasing spread of digital channels and webcasting, the modern media is facing a big challenge of making the young generation employable by learning new technologies and making them employable.
4. Misuse of Social Media Platforms :- The biggest challenge facing the modern media is to make strict laws to prevent the misuse of modern media at the national and international levels due to the increase in crime, juvenile delinquency and character defamation for one's own selfishness due to the excessive spread of social media in modern media.
5. Rising Share of New Age Media and Gaming: - According to the changing trends and demands of new age media in modern media as well as gaming related businesses, creating skilled workforce is a major challenge facing modern media.

Conclusion & Recommendation:-

Modern media is also undergoing changes from time to time according to the rapidly changing trends, but as online security, privacy and trustworthiness of the source is a concern in this modern media, it is necessary for modern media to develop safe modern media through artificial intelligence by interrelating some traditional and new media.

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"The Strategic Imperative of Succession Planning: Enhancing Organizational Resilience and Performance"

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Abstract

Succession planning is a strategic process that plays a pivotal role in ensuring the long-term success and sustainability of organizations. This proactive approach involves identifying and developing internal talent to fill key leadership positions, thereby mitigating potential disruptions caused by retirements, resignations, or unforeseen departures. This paper explores the multifaceted benefits of succession planning for organizations, emphasizing its positive impact on leadership continuity, talent retention, organizational resilience, and overall performance. Through a comprehensive review of literature and case studies, this research highlights the proactive and forward-thinking nature of succession planning, illustrating how it contributes to organizational agility and adaptability in the face of evolving business landscapes. The keywords associated with this abstract include succession planning, leadership continuity, talent retention, organizational resilience, and organizational performance.

Keywords: Succession Planning, Talent Retention, Organizational Resilience, Organizational Performance.

Literature Review on Succession Planning Benefits for Organizations

Introduction:

Succession planning is a critical component of human resource management, addressing the need for organizations to identify, nurture, and develop a pipeline of talent capable of assuming key roles within the company. The literature on succession planning emphasizes its multifaceted benefits, ranging from organizational resilience to enhanced performance and long-term sustainability.

Organizational Resilience:

One of the key advantages highlighted in the literature is the role of succession planning in ensuring organizational resilience. Rothwell and Graber (2015) argue that a well-structured succession plan helps organizations anticipate and mitigate the potential negative impacts of leadership transitions, reducing disruptions and maintaining operational continuity. This aligns with the findings of Mello (2015), who stresses the importance of developing a pool of internal talent to buffer against the uncertainties associated with external hires during critical leadership turnovers.

Talent Retention and Employee Engagement:

Succession planning is closely linked to talent retention and employee engagement. According to Wellins, Smith, and Rogers (2016), employees are more likely to be engaged when they see a clear path for career progression within the organization. Succession planning fosters a positive work environment by providing employees with growth opportunities and demonstrating that the organization values their long-term development (Lepsinger & Lucia, 2017). This alignment between individual career goals and organizational objectives contributes to increased employee satisfaction and commitment.

Innovation and Adaptability:

In the dynamic and rapidly evolving business landscape, succession planning emerges as a catalyst for innovation and adaptability. Research by Conger and Fulmer (2003) suggests that an effective succession planning process identifies and nurtures individuals with diverse skills and perspectives, injecting fresh ideas into leadership roles. This diversity in leadership enhances the organization's ability to navigate change, capitalize on emerging opportunities, and remain competitive in the marketplace.

Knowledge Management:

The literature underscores the significance of succession planning in knowledge management. As experienced employees retire, their departure often entails the loss of critical institutional knowledge. By systematically identifying and developing successors, organizations can facilitate the transfer of essential skills and insights (Rothwell & Arnold, 2007). This

knowledge continuity is crucial for maintaining organizational stability and competitiveness over the long term.

Conclusion:

The literature review establishes that succession planning is not just a reactive response to leadership gaps but a proactive strategy with far-reaching benefits. From ensuring organizational resilience to fostering employee engagement, promoting innovation, and preserving institutional knowledge, the advantages are manifold. Organizations that prioritize succession planning are better positioned to navigate the challenges of the contemporary business environment, contributing to sustained success and longevity.

Online Survey Conducted for HR Professionals only:

1. Survey Design:

A comprehensive online survey questionnaire was designed to gather insights into HR professionals' perspectives on Succession Planning within their organizations.

2. Target Audience:

The target audience comprised HR professionals working in various industries and organizational levels.

3. Sample Size:

A total of 197 HR professionals were invited to participate in the survey.

4. Data Collection:

The survey was distributed electronically through email invitations, professional networking platforms, and HR-related forums. Participants were provided with a link to the online questionnaire hosted on a secure platform.

6. Response Rate:

Out of the **197 HR professionals** invited, **134 respondents** completed the survey, resulting in a response rate of approximately **68%.** The high response rate indicates a strong interest and engagement within the HR community regarding the topic of Succession Planning.

6. Data Cleaning:

Thirty-two responses were deemed incomplete and were excluded from the analysis to ensure the reliability and accuracy of the findings. This decision was made to maintain the integrity of the data and focus on fully completed responses.

7. Non-Response Analysis:

Thirty-one HR professionals chose not to respond to the survey. While the reasons for non-response were not explicitly explored, it is essential to acknowledge this group and consider potential biases introduced by their non-participation.

8. Data Analysis:

The analysis focused on the **134 complete** responses, examining patterns, trends, and insights related to Succession Planning in HR. Both quantitative and qualitative data analysis techniques were employed to derive meaningful interpretations from the responses.

9. Limitations:

While efforts were made to ensure a diverse and representative sample, the findings are based on self-reported data and may be subject to respondent bias. Additionally, the exclusion of incomplete responses may introduce some selection bias.

10. Ethical Considerations:

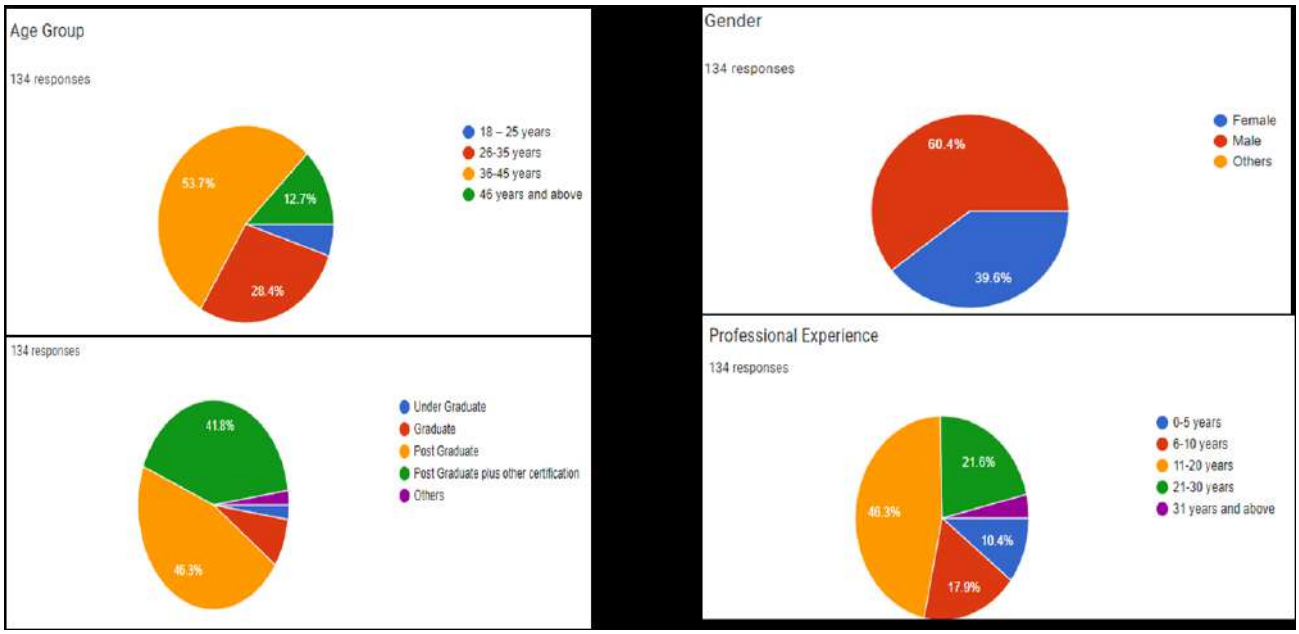
The survey adhered to ethical guidelines, ensuring participant confidentiality and privacy. Informed consent was obtained from all participants before they commenced the survey.

11. Reporting:

The results were compiled and presented in a detailed analysis report, providing valuable insights into the perspectives of HR professionals on Succession Planning. The report includes key findings, implications, and recommendations based on the survey results.

By following this methodology, the survey aimed to capture a robust dataset and provide a reliable foundation for understanding HR professionals' attitudes and practices related to Succession Planning.

Survey Graph and its Analysis



Analysis of Survey Demographics:

Age Distribution:

A significant majority of the respondents, approximately **82%,** are aged **above 26 years**. This suggests that the survey primarily captures insights from a relatively **experienced and mature demographic**. Understanding the perspectives of this age group is crucial for gaining insights into the challenges and expectations of individuals with substantial professional and life experiences.

Gender Distribution:

The survey indicates a gender distribution with **60% male respondents and 40% female respondents.** While there is a slight skew towards male participants, the representation of both genders allows for a more diverse and inclusive analysis. This gender distribution is essential for exploring potential variations in responses based on gender-related perspectives and experiences in the context of the survey topic.

Educational Attainment:

A noteworthy **88% of respondents** have **completed post-graduate education**. This high level of educational attainment suggests that the survey participants possess advanced qualifications.

This demographic characteristic is significant, as individuals with post-graduate degrees often bring specialized knowledge and skills to the workforce, potentially influencing their perceptions and expectations regarding succession planning in HR.

Professional Experience:

The professional experience of the respondents spans a wide range, providing a comprehensive understanding of the workforce. Around **28% of respondents** have **less than 10 years** of professional experience, indicating the presence of a segment of relatively early-career professionals. This subgroup may offer insights into the expectations and concerns of individuals in the early stages of their careers.

A substantial portion, approximately **46%, of respondents** have **more than 11 years of experience**. This group likely consists of mid-career professionals who have encountered various organizational changes and workforce dynamics. Their responses may reflect a nuanced understanding of succession planning based on their extensive professional backgrounds.

A notable **22% of respondents** possess **more than 21 years** of experience, signifying a group of seasoned professionals and potential organizational leaders. The perspectives of this segment could be instrumental in identifying overarching patterns and strategic considerations related to succession planning, given their wealth of experience.

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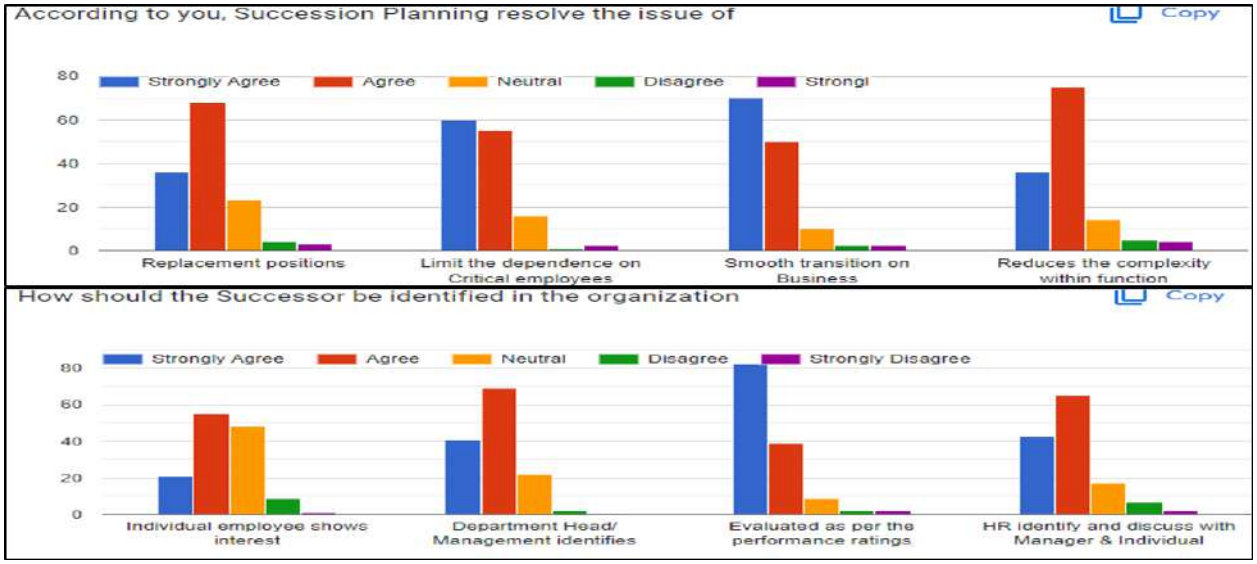

Smooth Transition on Business (52% strongly agree):

The majority of respondents **strongly agree** that one of the primary benefits of Succession Planning is achieving a **smooth transition within the business**. This indicates a high level of confidence in the ability of succession planning to facilitate seamless handovers of key roles, minimizing disruptions and maintaining operational continuity.

Limit the Dependence on Critical Employees (45% strongly agree):

A significant portion of respondents **strongly agrees that Succession Planning helps in reducing dependence on critical employees.** This suggests an awareness of the potential risks associated with key individuals and the importance of having a well-prepared pipeline of talent to mitigate these risks.

Reduces Complexity within Function (56% agree):

The majority agrees that **Succession Planning contributes to reducing complexity within functions.** This implies that having a structured plan in place helps streamline operations and ensures that roles and responsibilities are clearly defined, leading to increased efficiency and effectiveness.

Replacement Position (51% agree):

A notable percentage of respondents agree that **Succession Planning effectively addresses the need for replacement positions.** This highlights the perceived value of having a pool of qualified individuals ready to step into key roles when required.

Evaluate the Successor as per Performance Rating (62% strongly agree):

A substantial majority strongly agrees that **evaluating successors based on performance ratings** is a crucial aspect of Succession Planning. This underscores the importance of aligning succession decisions with individual performance, ensuring that the chosen successors are well-equipped for the responsibilities of the role.

HR Involvement in Succession Planning (32% strongly agree, 51% & 48% agree):

A significant portion of respondents agrees that **HR should play a role in identifying and discussing succession plans with managers and individuals**. However, a smaller percentage strongly agrees. This suggests that while there is **recognition of HR involvement**, there may be varying opinions on the extent of HR's role in the process.

Department Head/Management Involvement (51% agree):

More than half of the respondents agree that **department heads or management should be involved** in the identification and discussion of succession plans. This emphasizes the collaborative nature of succession planning, involving both HR and departmental leadership.

Implications and Recommendations:

Organizations should capitalize on the perceived benefits of Succession Planning, such as facilitating smooth transitions, reducing dependence on critical employees, and streamlining functions. This can be achieved by strengthening existing succession planning programs or implementing new ones.

The emphasis on evaluating successors based on performance ratings suggests that organizations should align their performance management and succession planning processes, ensuring a transparent and merit-based approach.

Considering the varying opinions on HR involvement, organizations should clarify and communicate the role of HR in succession planning to create a unified understanding among employees.

Collaboration between HR, department heads, and management is crucial. Organizations should foster a collaborative culture that involves key stakeholders in the identification and discussion of succession plans, ensuring a comprehensive and well-rounded approach.

Conclusion:

The demographic analysis of the survey respondents reveals a diverse and experienced participant pool. The insights gathered from individuals with varying ages, genders, educational backgrounds, and professional experiences contribute to a comprehensive understanding of the awareness of succession planning in HR.

Overall, the survey results highlight the perceived effectiveness of Succession Planning in addressing key organizational challenges and underscore the importance of a comprehensive and collaborative approach to succession management.

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Enhancing Organizational Resilience: A Study on the Awareness of Succession Planning among HR Employees

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Abstract

This study aimed to explores the Succession Planning and Business Continuity Practices in Automobile Industry in Pune. As organizations strive for sustained success and growth, the importance of effective succession planning becomes increasingly evident. Succession planning is a critical component of human resource management that ensures a seamless transition of all key positions within an organization. This conference paper delves into the awareness levels of HR professionals regarding succession planning, shedding light on the crucial role played by human resource management in ensuring organizational continuity. This study investigates the level of awareness among HR employees within Automobile Industry in Pune, regarding the succession planning and business continuity in fostering organizational resilience. Through a combination of literature review, empirical research, and case studies, this paper aims to provide valuable insights into the current state of awareness among HR employees, identify potential challenges, and propose strategies for enhancing the effectiveness of succession planning initiatives.

Keywords: Succession Planning, Business Continuity, HR Employee Awareness, Key Talent

Online Survey Conducted for HR Professionals only:

1. Survey Design:

A comprehensive online survey questionnaire was designed to gather insights into HR professionals' perspectives on Succession Planning within their organizations.

2. Target Audience:

The target audience comprised HR professionals working in various industries and organizational levels.

3. Sample Size:

A total of 197 HR professionals were invited to participate in the survey.

4. Data Collection:

The survey was distributed electronically through email invitations, professional networking platforms, and HR-related forums. Participants were provided with a link to the online questionnaire hosted on a secure platform.

5. Response Rate:

Out of the **197 HR professionals** invited, **134 respondents** completed the survey, resulting in a response rate of approximately **68%.** The high response rate indicates a strong interest and engagement within the HR community regarding the topic of Succession Planning.

6. Data Cleaning:

Thirty-two responses were deemed incomplete and were excluded from the analysis to ensure the reliability and accuracy of the findings. This decision was made to maintain the integrity of the data and focus on fully completed responses.

7. Non-Response Analysis:

Thirty-one HR professionals chose not to respond to the survey. While the reasons for non-response were not explicitly explored, it is essential to acknowledge this group and consider potential biases introduced by their non-participation.

8. Data Analysis:

The analysis focused on the **134 complete** responses, examining patterns, trends, and insights related to Succession Planning in HR. Both quantitative and qualitative data analysis techniques were employed to derive meaningful interpretations from the responses.

9. Limitations:

While efforts were made to ensure a diverse and representative sample, the findings are based on self-reported data and may be subject to respondent bias. Additionally, the exclusion of incomplete responses may introduce some selection bias.

10. Ethical Considerations:

The survey adhered to ethical guidelines, ensuring participant confidentiality and privacy. Informed consent was obtained from all participants before they commenced the survey.

11. Reporting:

The results were compiled and presented in a detailed analysis report, providing valuable insights into the perspectives of HR professionals on Succession Planning. The report includes key findings, implications, and recommendations based on the survey results.

By following this methodology, the survey aimed to capture a robust dataset and provide a reliable foundation for understanding HR professionals' attitudes and practices related to Succession Planning.

Survey Graph and its Analysis

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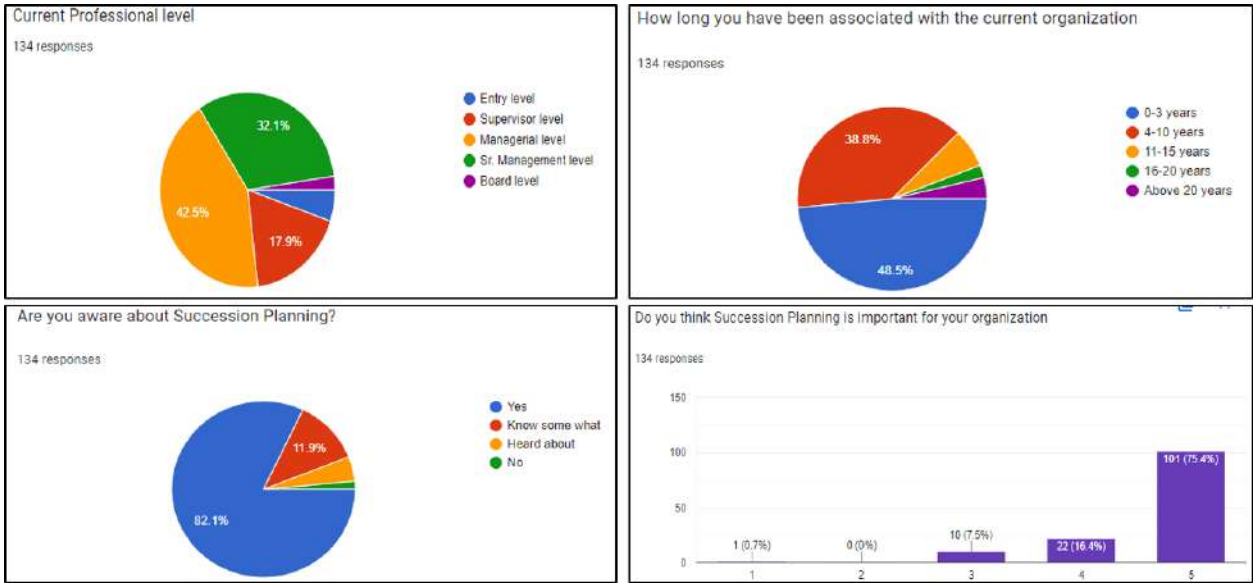


Job Level Distribution:

The survey indicates that a substantial **77% of respondents** hold managerial positions or higher within their organizations. This suggests a predominant participation of individuals in leadership roles, emphasizing the importance of gathering insights from decision-makers and those involved in strategic planning. The perspectives of this group are crucial for understanding organizational strategies, including succession planning.

Approximately **23% of respondents** work at supervisory levels or below. While this segment is smaller, their perspectives offer insights into the experiences and perceptions of employees closer to the operational level. This diverse representation allows for a holistic examination of succession planning awareness across hierarchical levels.

Tenure with the Organization:

Almost half of the respondents, **around 49%**, have been associated with their organizations for **less than 3 years**. This subgroup likely includes relatively new employees who may provide insights into how succession planning is perceived by those in the early stages of their organizational tenure.

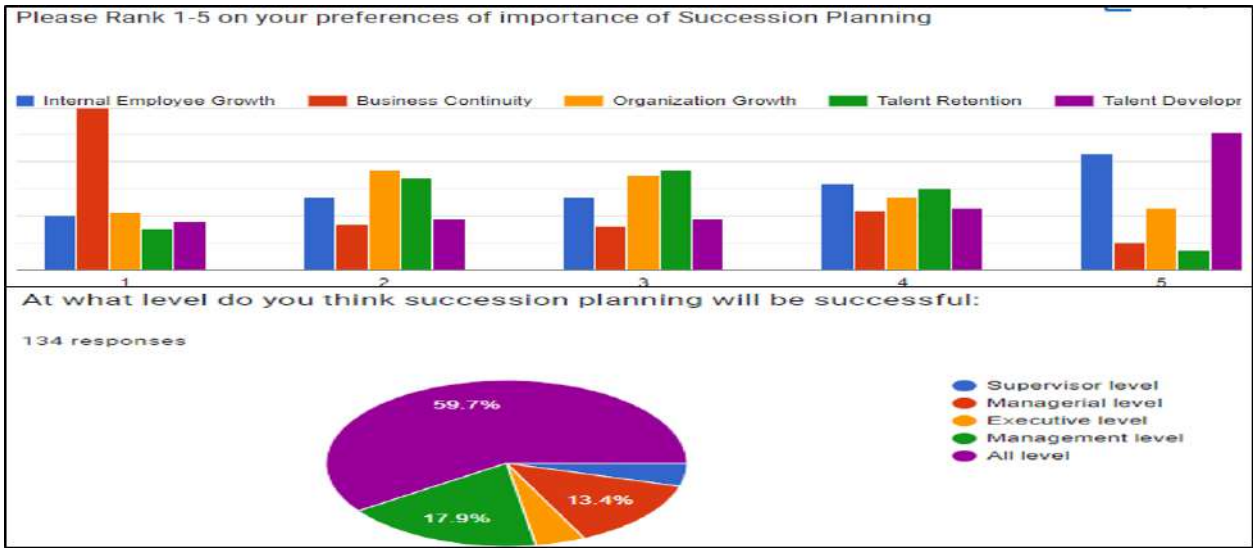
A significant **39% of respondents** have a tenure ranging between **4 to 10 years** with their organizations. This group represents a mix of mid-career professionals who have likely witnessed organizational changes and may have insights into the long-term impact of succession planning on employee development and organizational stability.

Awareness of Succession Planning:

An overwhelming **82% of respondents** claim to be very well aware of succession planning in their organizations. This high awareness level is promising, indicating that a majority of the surveyed individuals are cognizant of the importance and implications of succession planning. However, a notable **28% of respondents** acknowledge having only some awareness, having heard about, or being unaware of succession planning within their organizations. This subgroup presents an opportunity for further exploration to understand the reasons behind the lower awareness levels and to identify potential areas for improvement in communication or training.

Perceived Importance of Succession Planning:

An impressive **97% of respondents** express that succession planning is important for their organizations. This overwhelming consensus underscores the perceived significance of succession planning in ensuring organizational stability, talent development, and strategic workforce planning.



Primary Reasons for Succession Planning:

Business Continuity (45%):

Almost half of the respondents indicated that ensuring **business continuity** is **the primary reason** for implementing succession planning. This suggests a strong awareness of the need for a well-thought-out strategy to ensure the seamless transition of key roles within the organization.

Organization Growth (28%):

A significant portion of **respondents, 28%,** ranked **organizational growth** as the **second most** important factor in succession planning. This indicates that organizations recognize the role of succession planning in supporting and facilitating growth initiatives.

Talent Retention (28%):

Similar to organizational growth, talent retention is also ranked by **28% of respondents** as a crucial factor in succession planning. This suggests that retaining top talent within the organization is a priority, and succession planning is seen as a tool to achieve this.

Scope of Succession Planning:

Planned for All Levels (60%):

The majority, 60%, of respondents believe that succession planning should be implemented at **all levels** within the organization. This viewpoint aligns with a holistic approach, emphasizing that every role, regardless of its level, contributes to the overall success of the organization.

Planned for Management Level Only (18%):

A notable **18% of respondents** feel that succession planning is sufficient when focused on management levels. This could be attributed to a belief that upper management positions have a more direct impact on the overall strategic direction of the organization**.**

Planned for Managerial Level Only (13%):

A smaller percentage, **13%, of respondents** believe that succession planning should be limited to managerial levels. This viewpoint may stem from the perception that middle management plays a critical role in day-to-day operations and team management.

Implications and Recommendations:

The high emphasis on **business continuity** suggests a recognition of the potential risks associated with leadership gaps. Organizations should continue to prioritize succession planning to mitigate these risks and ensure a smooth transition during times of change.

Acknowledging the importance of talent retention and organizational growth in succession planning, organizations should integrate these elements into their strategies to create a comprehensive approach that aligns with overall business objectives.

The majority's belief that succession planning should be planned for all levels highlights the need for organizations to adopt inclusive practices, fostering leadership development at various tiers. This can contribute to a more robust and adaptable workforce.

Organizations need to balance the focus on different levels, considering that a significant portion of respondents believe in planning for management or managerial levels only. A tailored approach to succession planning that addresses the unique needs of each level may enhance its effectiveness.

In conclusion, the survey results reveal a nuanced understanding of the reasons for succession planning and varying opinions on its scope. Organizations should leverage these insights to tailor their succession planning strategies to meet the specific needs and priorities of their workforce.

Conclusion:

The analysis of survey responses reveals a strong representation of managerial and leadership perspectives, highlighting the strategic relevance of succession planning within organizations. The diversity in job levels and tenure with the organization provides a multifaceted understanding of the awareness and importance attributed to succession planning. The findings emphasize the need for targeted interventions to enhance awareness, especially among those with shorter organizational tenures or lower job levels. The near-unanimous acknowledgment of the importance of succession planning signals a collective recognition of its value, paving the way for informed strategic decision-making in HR practices.

The survey results reveal a nuanced understanding of the reasons for succession planning and varying opinions on its scope. Organizations should leverage these insights to tailor their succession planning strategies to meet the specific needs and priorities of their workforce.

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Unveiling the Dark Stores Phenomenon: A Comprehensive Literature Review

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Abstract

The concept of 'Dark Store' in India is still the one which is finding its foot in the market. It is one of the models which got famous as an effect of long lock-downs during the COVID-19 pandemic. It can be simply explained as a store with a virtual ordering interface that supplies daily necessities including groceries to the doorstep of the customer. Most of the people order from dark store as the deliveries are quicker and people save time to go to the store physically to buy the products. Looking at the current scenario, a lot of big business houses are getting into this sector and setting up dark stores at even faster speed. This paper tries to find out the evolution of the dark stores and fast delivery service modules carried by dark stores, their opportunities expansion and growth reasons behind it. The data was collected by the researcher through structured questionnaire. But psychological and financial factors have not been considered in this study.

Keywords: - dark stores, fast delivery, supplies, commodities

Introduction

We live in the age of digital innovation where the biggest store in the world does not have a physical store. Q-commerce has been a topic of debate around the world, most especially in recent times. Internet shopping is freeing customers from having to shop from physical shops in person, changing people's everyday lives (Ming-Sung Cheng et al. 2009). E-commerce is defined as the use of electronic networks such as the Internet and as a distribution channel. (Kardaun,1999) defines q-commerce as dependent on digital communication and information technology. Ever since the Internet came in 1995, q-commerce has constantly been developing with its fast growth. With advanced growing technology, businesses seize the opportunity to strengthen cross border sales. As time goes by, it has given room for stores to progress and improve, which has made it possible for retail stores to be found worldwide. Due to the

increasing competition, many retail store owners have merged digital technology with their physical retail service scopes. Online purchase has been growing remarkably over the years, and presently with the ongoing pandemic, it has given more opportunity for further growth. With this continuous rapid growth of Q-commerce, all retailers will have no choice but to get on board by creating websites for their businesses to remain competitive in the retail environment. Despite the challenges from rising q-commerce, increased costs, and structural shifts, retail is not yet on its knees. As earlier said, retailers have tackled the benefits and challenges the Internet has brought since its existence by merging the physical retail environment to the online retail environment to have several platforms to further interact with their customers. However, retailers with just retail spaces such as shopping malls are not far behind; they have paid more attention to strengthening the retail spaces' worldly standards and providing diversified up-to-date experiences and services in the shopping centres. The concept of 'Dark Store' in India is still one which is finding its foot in the market. It is one of the models which got famous as an effect of long lock-downs during the COVID-19 pandemic. It can be simply explained as a store with a virtual ordering interface that supplies daily necessities including groceries to the doorstep of the customer. This can simply mean a work-from-home scenario for grocery and supply merchants. Dearth (2021) defines it as a brick-and-mortar location that has been shut down for customers and has been turned into a centre for fulfilment operations. The model of it is based on the same concept of a dark kitchen or cloud kitchen. Customers can not visit a distribution outlet physically. They can see and select the products available with the store virtually, with the help of a mobile app or a website. Then the order is placed and paid for. The store dispatches the ordered supplies and products to the given address. The model has not only helped the merchants to earn during difficult times but has also helped customers to get the supplies at the doorstep even going out of their homes. Many big companies which used to be in the food delivery business like Zomato, Swiggy, etc. have started these dark stores across India during the pandemic. The main advantage of a dark store is that the shopping does not need to have any contact between a buyer and a vendor. The placing of orders and payment happens virtually and supplies are often delivered to the doors in a contact-free style. At the same time, it becomes possible for a merchant to reach a larger audience irrespective of the geographic location as anyone downloading the app can have access to the products sold by the merchant. Many of the big companies who have started dark stores also promise to deliver within very less time. This has affected people largely to order through the app than going to an actual grocery store. To have a successful delivery option, a merchant has to keep all the perishables in a flawless warehouse. This requirement helps the

customers to get a better stored product of which the quality has not deteriorated. Because of the above-said benefits and due to cost-effectiveness and optimization of the supply chain, it can be said that these dark stores are here to stay for a long time.

Objectives of the Study

Following are the objectives of this study –

1. To study the several imperative theoretical and empirical findings of the Q-commerce studies.
2. The identify attributes from previous studies cannot fully explain why consumers are using fast delivery
3. To understand the requirement of the Q-Commerce to the retail organization

Literature Review

Digital transformation of Organisation

The thesis focuses on Q-commerce and how it disrupts physical stores, specifically in the clothing industry and grocery sector. Digital business transformation is disturbing most businesses in almost all industries and not just the grocery and clothing sector. It does so by breaking barriers between people and businesses. Digital business transformation can be seen as merging up-to-date online technologies into businesses, leading to a fundamental change in the way organizations perform their activities. However, many businesses have found it very hard to keep up with the digital era because of their failure to hurriedly create and apply business strategies that adapt to the new digitalization, such as the bankruptcy of Blockbuster, which was a company that rents out movies (Hess et al., 2016). The surge in internet usage because of how the security is greatly improved and how prices of products can be easily compared has influenced customers to shop from the comfort of their homes or wherever they find themselves irrespective of the time. In Eurostat (2020), the current coronavirus pandemic has forced consumers to remain indoors by distancing themselves socially, and with the high streets on lockdown, e-commerce will 8 thrive more and more. According to them, the number of men shopping online is slightly more than that of women, but online shopping has significantly surged in the past years among all the age groups. The grocery retail industry is one of the industries disrupted by e-commerce, and it is gradually moving from traditional grocery stores to online grocery stores called e grocery. The concepts are perfectionist, conscious of the brand, conscious of fashion, hasty and negligent consumers, confused due to

much variety, brand-loyal consumers, amused and self-indulgent shopping consciousness, and conscious of the price. With consumer behaviour having a significant influence on the shopping environments, e-commerce can have a significant impact on physical stores or not. This will depend on which environment consumers choose to shop. Today fashion brands understand how important it is to be online, but some find it difficult to extend their values online, mainly due to the offline shopping environment, which attracts customers for several reasons (Keller, 2008).

Digital disruption of retail and E-commerce

Since the mid-2000s, when the Internet became a legitimate option for consumers, e-commerce has developed at an astounding level (Szolnoki et al., 2016). The Internet has a significant effect on humanity and prompts a modern age where almost everyone and everything is online (Navimipour & Zareie, 2015; Nguyen & Simkin, 2013; Saberi & Ekhtiyari, 2019). Currently, e-commerce provides innovative and efficient tools for online shopping. As a result, online shopping becomes an energy-efficient activity wherein the consumers have a vast number of alternatives without relation to geography (Chuan et al., 2018). For more than a decade, e commerce has seen exponential growth. As of the most recent eMarketer forecasts, worldwide B2C e-commerce revenues will increase by 20.1% in 2014, achieving $1.500 trillion (eMarketer, 2014). The ongoing e-commerce study recognizes that cognitive and affective online experiences relevant to shopping websites influence online consumer loyalty and purchase intentions (Rose et al., 2012). For example, convenient access to information or a simple transaction. Furthermore, the quality of the product and service and the price influence online customer satisfaction. As per market research firm Mintel (2012), the most effective method for consumers to buy new clothes is in stores, and according to studies, the overall number of hours people spend during shopping has decreased (Chu & Lam, 2017). Some authors point the finger squarely at e-commerce for the current state of affairs. (Fashion Online, 2012). One of the biggest obstacles to purchasing fashion online is a lack of experiential information (Merle et al., 2012) and physical interaction with the product. Nowadays, more and more products are bought online. It is not due to our laziness but rather to a lack of time and a general question of practicality. Many of us would think twice about going shopping today, particularly when we do not have much time or do not want to go outside because of the quick shipping and wide range of goods available online at attractive prices. While logic would imply that retailers' ability to communicate and build brands online has led to more concentrated and impactful physical store identities, the ability of retailers to communicate and

build brands online has led to more focused and impactful physical store identities. Some argue that discussing brick-and-mortar versus online channel competition in either/or terms is insufficient and that the most viable model for the future is a hybrid of the two (Donegan, 2000). Others forecast a market split with lower margin, lower involvement goods (such as produce) sold primarily through online channels, and higher margin, in-store experience goods (such as clothing) sold primarily through store channels (Hickins & Michael,2000).

Factors determining the quick commerce development

The huge leap in this business segment was stimulated by filling the niche of a specific type of consumer demand, formed by the rapid development of digital technologies, increasing concentration of urban population, anti-epidemic measures imposed during the epidemic of COVID 19, etc. The development of this commercial service is determined by a simultaneous combination of several circumstances and forces: • omissions in planned purchases or when the person finds the lack of a necessary product that is not traded in convenient locations and must be procured in a very short time; • the dynamic change in lifestyle and physical activity of the modern individual, in which certain individuals do not have time to plan purchases and need to react immediately to meet certain needs, such as product needs in the workplace without the possibility of leaving it, product demand after a long working day and in non-working hours for traditional trade, the provision of prepared meals or products in households, etc.; • another point is related to the imposed epidemic circumstances and related restrictions or preferences for social exclusion. In the case of the first, certain people placed under quarantine are restricted in the free visit to commercial sites and in order to procure the necessary products, they must use services for remote orders and deliveries to the place of the declared quarantine. In the case of the second, for reasons of their own health safety, others prefer to limit their public contacts and visits to retail establishments, for them the option of fast delivery to the place of receipt of the order is alternatively and conditionally safer solution to meet a variety of product needs and self-imposition of restrictions on social contacts. Moreover, in the future the human population will have to adapt to live in local and global epidemics, without significantly affecting the course of individual and economic life, for which quick commerce is a suitable alternative to meet a variety of consumer needs and smooth running of trade; • the dynamic development of digital competences and skills, where for certain individuals, the use of electronic communication channels for ordering products is part of the digital existence of the subject and the natural state in the digital age. the expansion of the multiverse and the time consumers spend in it for work and entertainment creates new opportunities for a point of contact and

realisation of product exchange. At the same time, some factors and risks can be identified as adversely affecting the development of quick commerce. They are related to the commercial skills and experience of final consumers, but they also affect other participants in this business model (quick commerce operators, traders, actual contractors). They can be summarised as underdeveloped digital skills and competencies of the participating parties (customers, traders, couriers); poorly designed applications/websites and strong dependence on continuous internet connectivity and online information exchange; growing operating costs of providing immediate courier service; difficulties and dangers in transportation in an urban environment (for the courier and the ordered products); risks in making payments and reporting sales for tax purposes; compromising product qualities in case of improper storage and transportation; difficulties in making complaints, complications in the organisation of product returns and refunds for paid orders as well as possible omissions for protection of personal data of final customers and unfair behaviour of participants in the trade exchange; need for critical volume of consumers, high frequency of ordering, significant value of the average purchase in order for the business model of quick commerce to be cost effective, etc.

Need for Quick Commerce

Traditional e-commerce offered consumers ease of ordering from a broad selection of products, across different categories and with a wide range of SKUs, at the best possible price. While this model has dramatically transformed the consumer's purchasing experience compared to offline channels, it mainly works on the concept of bulk pick-up from far-off locations and bulk-drop within a large delivery radius. This means that delivery timelines often get stretched to more than a day and, in many cases, the available delivery slots are either inconvenient or non-flexible and, sometimes, not even communicated to the consumers. As a result, despite lucrative promotions run by online platforms, a sizeable proportion of consumer wallet spends that include unplanned, indulgence-related or fresh-products (low shelf-life), are primarily catered to by the neighbourhood brick-and-mortar (kirana) stores. However, the Covid-19 pandemic led to the evolution of consumer expectations due to restrictions on movement or general reluctance to venture out. Consumers began to explore online channels even for purchases that required instant fulfilment. This led to the emergence of Quick Commerce platforms, who promised to deliver high-in demand and high rotation products (mainly related to grocery) within a few minutes of order placement. Assuming that this change in consumer purchasing behaviour is permanent post-Covid, and seeing the vast underlying opportunity size, a host of new-age companies have of late joined the Quick Commerce bandwagon.

Previous Studies on Organized Retails

Martineau (1958): was the first researcher to work on store attributes (Erdem, Oumlil, & Tuncalp, 1999). He described store attributes as factors responsible for store image formation. Further, he opined that the store image leads to create personality of the store in the mind of customers and customers' decisions are influenced by the picture of the entire store. The image of the store is formed in customer mind by some store attributes like: Layout and Architecture, Symbols and Colours, Advertising, and Sales personnel matched with various patterns of consumer behaviour.

Kunkel & Berry (1968): understood that store image has increased notably in past decades but the rate of knowledge has not progressed accordingly. Kunkel et al. opined that a man selects a store for buying based his experiences while shopping in a store. Work in this area carried out by developing a behavioural concept (influenced by societal and subculture norms) of store images (formed by 12 store attributes: Price of Merchandise, Quality of Merchandise, Assortment of Merchandise, Fashion of Merchandise, Sales personnel, Location convenience, other convenience factors, Services, Sales Promotion, Advertising, Store Atmosphere and reputation on Adjustments).

Lindquist (1974-75): conducted a survey of empirical and hypothetical evidence for defining the meaning of image. He summarized the image-related attributes found or hypothesized by 26 scholars in the field of defining store image through store attributes. He found that following attributes were mentioned by a certain percentage of the scholars: Merchandise Selection or Assortment (42%), Merchandise Quality (38%), Merchandise Pricing (38%), Locational Convenience (35%), Merchandise Styling, Fashion (27%), Service, General (27%) and Salesclerk Services (27%). There are studies related to store selection based on consumer perceptions, which are formed or influence by store attributes.

Miller (1976): had an insight to the stores customers' satisfaction in terms of customer discontent. This article primarily investigated the possibilities of identifying segments of discontented customers.

Hansen and Deutscher (1978): used a base of 485 consumers in Ohio and examined the relative importance of the various aspects of retail image to different consumer segments. They made comparison of different attributes across departmental and grocery stores to indicate congruence and concluded that the same attributes are important across different types of stores. Westbrook (1981): used some range of non product related factors and identified eight

variables Sales personnel, Store environment, Merchandising, Services, Product satisfaction, Store clientele, Value-price, and Special sales that may influence customer satisfaction and dissatisfaction. Among them he concluded that Sales persons, Store sales, Product satisfaction, Value price relationship, and Store environment were most influential variables of retail customer satisfaction.

Subramanyam et al (1982): conducted a study in Visakhapatnam to examine the buying habits of the consumers relating to groceries, apparel and electrical appliances.

Lumpkin (1982), (1984), (1985) and Lumpkin et al (1985): examined the purchase behaviour in the context of apparel and found that the respondents have patronized the store rather than the brands of the products in their studies. He'reached the conclusion that there was a clear difference in the reasons for patronizing these stores with the types of products purchased. In case of food and grocery store purchases, issues pertaining to convenience, closeness to home, 83 percent respondents have responded.

Lumpkin (1984) and Schiff Man et al (2001): They have also studied purchase behaviour regarding activities, interests and opinions (Ala) in the context of various products. They reached the conclusion that store are patronized. Further the outcome of their studies reflect that respondents were very conscious about price and quality/guarantee of the products.

Sproles (1985) and Sproles and Kendall (1986): provide the Consumer Styles Inventory (CSI), which is an early attempt to systematically measure shopping orientations using decision-making orientations. Sproles (1985): provides eight central decision-making dimensions to explain why shoppers behave in certain ways. One of the most important assumptions of this approach is that each individual consumer has a specific decision-making style resulting from a combination of their individual decision-making dimensions. The theoretical assumption behind Sproles and Kendall's (1986) ideas about CDM styles is that consumers have eight different decision-making dimensions that determine the shopping decisions they make.

Parasurama (1990): in his study on superior customer service and marketing excellence discussed the meaning and measurement of service quality and offered managerial guidelines for delivering superior service by invoking key insights from a multi-year, multi sector stream of research on customer service. He developed a model called SERQUAL, which consisted of five dimensions like reliability, responsiveness, assurance, empathy and tangibles. He concluded that reliability to be the most important of the five SERQUAL dimensions. He also

concluded that a company should effectively blend external marketing with customer service to deliver superior service to customers.

Moschis (1992): reviewed a number of studies of shopping behaviour and research reports of the Centre for Mature Consumer Studies and examined the reasons for patronizing a range of retail shop types- food and grocery stores, apparel and shoe stores. Prus (1993): in a qualitative study said that a number of dilemmas for consumers are created by shopping companions like additional definitions (encouragements, discouragements and distractions) of products, money, users as well as their concerns with the identities and ensuing relationships implied by the presence of their companions.

Gagliano B and Hathcote (1994): defined service quality as the customers' overall impression of the relative inferiority or superiority of the organization and its services. Carpenter, J.M. Moore, M., (2000) suggested that perceived service quality directly and significantly influences satisfaction.

Joyce & Lambart (1996): found that consumers' perceptions about the store image are likely to be influenced by the types of stores visited repeatedly in past and attributes of these stores such as Colour, Lighting, Signage, Clientele, Salespeople.

J.A.F. Nicholls (1997) in his article has mention about the situational dimensions affecting purchasing behaviour of Hispanic customers in a mall at some distance from their neighbourhoods. The Hispanic shopper (which would also include a large segment of immigrants) makes the (shopping) trip worthwhile by traveling with companions, consummating a purchase while at the mall, and buying food or beverage during the visit. The Hispanic shopper also spends more time at the mall and visits more stores while there.

Rogers (1998): investigated customer satisfaction of visitors to history museum stores in relation with customer demographic and nostalgia proneness. This research aimed at measuring the level of customer satisfaction, identifying the attributes responsible for satisfaction.

Leung and Oppewal (1999): had conducted research on the roles of store and brand names in consumers' choice of a retail outlet and concluded that a high-quality brand or high-quality store is sufficient to attract the customer to a retail store. The study also revealed that store names have a larger impact on store choice than the brand names of the products that these stores have on offer.

Conclusion

The future development of the activities of quick commerce operators faces many challenges, but their activities provide a new dimension of convenience for final customers and wide opportunities for innovative entrepreneurship. The initial priority for its development in large urban centres can gradually be developed in smaller territorially compact settlements, where the potential for quick delivery to the desired point of a wide range of product alternatives can be mastered. Its affirmation may also be that it is a suitable alternative for product exchange in places not preferred for positioning by traditional physical traders (business or industrial areas, suburban settlements, tourist complexes during and out of high season, etc.). The distinctive feature of quick commerce to attract participants (final customers and couriers) among the younger consumer segments can be gradually extended to a wider range of people to find opportunities for immediate delivery of desired products in the preferred location and time. At the same time, the driving force behind the motivation of couriers will continue to be the wide opportunities for flexible employment and the attractiveness of pay according to commitment. Moreover, the openness of the concept presupposes its development to be in full synchrony and adaptation to the needs and preferences of customers and their time evolution.

Findings

After studying various papers, it has been observed that due to the changing demographics, urbanization, and awareness due to electronic media especially internet the customers have multiple options to choose from modern retail outlets. Majority of the customers are visiting organized formats for variety, easy availability, cleanliness with additional facility of entertainment for children and convenient parking facility and restaurant etc. Today it has been found that all age group customers prefer to visit organized retail stores because of various customer facilities provided to them. Families with less annual income prefer shopping with nearby unorganized retail stores where customers with higher qualification were found to be more attracted towards organized retail outlets. It is investigated that modern retail developments and growth of modern formats are taking place in India and challenges & opportunities are available to the retailers to succeed in Indian retail market and retailers need to innovate in designing the value proposition, deciding the format to deliver to the customer and also strive to serve the consumer better, faster and at less cost. Though the concept of dark store is relatively new, it has grabbed a considerable market share, thanks to the COVID-19 restrictions. The lockdown imposed made people order through these stores. As customers have

already experienced the delivery system, a lot of customers still prefer ordering from dark stores. The percentage of people ordering from the dark store even after the unlock phases has not dropped. While ranking the motivators for ordering supplies from dark stores, quick and contact free delivery was the topped ranked reason followed by convenience. Availability of quality products and offers promoted by companies were the next popular reasons. Getting variety of product at a single click was the least favourable reason to order supplies from dark stores.

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Sustainability in the era of digitalization

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Abstract

In the age of rapid digitalization, sustainability emerges as a paramount concern, intertwining with technological advancement. This abstract gives the insight into the complex relationship between sustainability and digitalization, highlighting the challenges, opportunities and imperative for concerned actions. As digital technologies permeate every aspect of modern life, they wield immense potential to drive sustainability efforts across various sectors. From smart technologies, ecommerce, digitalization fosters innovation and efficiency, enabling sustainable practices.

However, this digital transformation also poses significant challenges, such as electronic waste accumulation. Navigating these complexities necessitates a holistic approach that integrates technological innovation with environmental and social; considerations. Harnessing the power of data analytics, artificial intelligence, and block chain can optimize resource utilization, enhance transparency and facilitates sustainable decision making.

Furthermore, fostering digital literacy, bridging the digital divide, and ensuring equitable access to technology are crucial for harnessing its potential for sustainable development. Collaboration between governments, industries, academia and society is essential to develop regulatory frameworks, norms that will sustain and survive practices.

The era of digitalization will require a collective commitment to leverage technology as a catalyst for positive environment, social and economic change.

Keywords: Sustain, digitalization, decision making, innovation

Introduction

The need for the survival in the era of digitalization is imperative as society becomes increasingly reliant on digital technologies for communication, commerce education and more. All have to get acquainted with the digital to remain in the societal largest technology to survive. It requires digital literacy skilled, staying updated on technological advancements and leveraging digital tools for productivity and innovation.

The need is felt in sectors like manufacturing, healthcare and transportation**.** The access to information provides easier access to vast amounts of information, empowering population to participate more actively in society. Technology enables communication and collaboration across the global, fostering connections and expand the business borderless boundaries. Due to technology it improved services like healthcare, education, government services making easy access like online services, Pay Tm, Gpay, online services etc.

But on one hand we see changes in the behavioral aspects, addiction of electronic gadgets, cyber security are some of the challenges that we are facing in this competitive edge. Job profile is changing, Artificial Intelligence is a emerging technology. Technology, innovation and digitalization offers great potential for societal development, advancement, addressing these challenges is crucial to ensure that the benefits are utilized in a proper way.

Objectives of the study

1.To under the need for sustainability in the era of digitalization.

2.To analyze the impact of digitalization on society as whole.

3.To understand how technology helps society to accept the change as per needs.

Research Methodology

The paper has been on conceptualized on theoretical framework. The Secondary Research was undertaken to gain the insights of the Sustainability in the era of digitalization sources such related material, papers etc. are been used for framing the paper.

Review of Literature

Reviewing the literature on sustainability in the era of digitalization reveals a rich body of work from various authors exploring the intersection of these two critical areas. Here's a review of some key authors and their contributions:

Jason Dedrick, Kenneth L. Kraemer, and Greg Linden: These authors have extensively researched the environmental impacts of digitalization, particularly focusing on the energy consumption of digital technologies such as data centres, cloud computing, and mobile devices. Their work emphasizes the importance of sustainable practices in the design, manufacturing, and use of digital technologies to mitigate their environmental footprint.

Andrew McAfee: McAfee, known for his work on the impact of technology on business and society, has written about the potential of digitalization to drive sustainability through increased

efficiency, resource optimization, and innovation. His research highlights how technologies like IoT, big data analytics, and AI can be leveraged to monitor and manage environmental performance, reduce waste, and enhance sustainability across various industries.

Francesco Polese and Fabio Iraldo: Polese and Iraldo have contributed extensively to the literature on sustainable business models in the digital age. Their research explores how digital technologies enable new forms of collaboration, sharing, and circular economy practices that support sustainability goals, such as product-as-a-service models, collaborative consumption platforms, and closed-loop supply chains.

Daniel Schien: Schien's work focuses on the role of digitalization in fostering sustainable urban development and smart cities. His research examines how technologies like smart grids, intelligent transportation systems, and digital governance can contribute to reducing carbon emissions, improving resource efficiency, and enhancing quality of life in urban environments.

Marie-Christine Therrien and Ahmed Bounfour: These authors have written about the concept of "digital sustainability," which emphasizes the need to align digitalization efforts with environmental and social sustainability objectives. Their work emphasizes the importance of incorporating sustainability considerations into digital strategy, design, and decision-making processes to ensure that digitalization contributes positively to long-term sustainability goals.

Luciano Batista and Tiago P. Leal:

Batista and Leal have explored the potential of digital technologies, particularly blockchain and IoT, to enhance transparency, traceability, and accountability in supply chains, thereby supporting sustainability objectives such as ethical sourcing, fair trade, and responsible consumption.

Their research highlights how digitalization can enable more sustainable and ethical practices across global supply chains by imp**roving visibility, data** sharing, and collaboration among stakeholders.

Overall, these authors and many others have contributed valuable insights to our understanding of how digitalization can drive sustainability and how to navigate the challenges and opportunities that arise at the intersection of these two important domains. Their work underscores the importance of integrating sustainability considerations into digital strategies, policies, and practices to ensure a more sustainable future for society and the planet.

an overview of some key authors and their contributions over recent years:

2010-2015: Andrew McAfee and Erik Brynjolfsson: Authors of "The Second Machine Age," they explored the impact of digitalization on the economy, productivity, and sustainability,

arguing that technological advancements can lead to both economic growth and environmental sustainability.

Jeremy Rifkin: In "The Zero Marginal Cost Society," Rifkin discussed how the convergence of digital technologies, renewable energy, and the sharing economy could lead to a more sustainable future.

2016-2020:Peter Dauvergne and Maxwell Boykoff: Their book "Environmentalism of the Rich" examined how digital technologies contribute to both environmental degradation and sustainability efforts.

Thomas L. Friedman: In "Thank You for Being Late," Friedman discussed the intersection of globalization, technology, and sustainability, highlighting the role of digitalization in addressing environmental challenges.

Tim O'Reilly: O'Reilly's writings on the concept of "Government as a Platform" and "The WTF Economy" explored how digital platforms and technologies can be harnessed for sustainable development and social good.

2021-present:Kate Raworth: In "Doughnut Economics," Raworth introduced the concept of the "doughnut" model, which emphasizes the need for economic development to operate within planetary boundaries. She discusses how digital technologies can be leveraged to achieve sustainable development goals.

Andrew Winston: In "The Big Pivot," Winston argued for a fundamental shift in business strategies towards sustainability and resilience, highlighting the role of digital technologies in enabling this transition.

Francesca Bria: "Digital Democracy and Technological Sovereignty" explores how digitalization can empower communities and governments to pursue sustainable development agendas and address social and environmental challenges.

These authors have contributed significantly to the literature on sustainability in the context of digitalization, offering insights into the opportunities and challenges presented by technological advancements for achieving environmental, social, and economic sustainability goals.

The impact of digitalization on society as a whole is profound and multifaceted, touching almost every aspect of human life. Here are some key areas where digitalization has made significant impacts:

Digitalization has revolutionized communication, enabling instant, global connectivity through email, social media, messaging apps, and video conferencing platforms. This has led to greater access to information, easier collaboration, and the formation of online communities.

Providing access to online learning platforms, educational resources, and virtual classrooms. It has made learning more flexible, personalized, and accessible to people worldwide, breaking down geographical barriers and providing opportunities for lifelong learning. Even reshaped the workplace, leading to the automation of tasks, the rise of remote work, and the emergence of new job roles in fields such as data science, cybersecurity, and digital marketing. It has also facilitated the gig economy and freelance work through platforms like Uber, Airbnb, and Upwork.

E-commerce has transformed the way people buy and sell goods and services, while digital payment systems have revolutionized financial transactions. The digital economy has also given rise to new business models, such as the sharing economy and subscription-based services.

Access to healthcare services through telemedicine, remote monitoring, and health tracking apps. It has enabled the digitization of medical records, facilitated better coordination of care and improved patient outcomes. Additionally, advancements in medical technology, such as wearable devices and Artificial Intelligence -powered diagnostics, have transformed the delivery of healthcare.

Digitalization has brought numerous benefits and opportunities, it has also raised complex challenges and implications for society, requiring careful consideration and management to ensure that its impacts are positive and equitable for all members of society.

Surviving and thriving in the digitalization era requires individuals to adapt to the changing landscape of technology and society. Here are some strategies for navigating this digital age successfully:

Cultivate adaptability to navigate changes and disruptions brought about by digitalization. Try to accept new technologies, workflows, and ways of doing things. But on the other hand how to protect from frauds, online security, keeping software and antivirus programs updated, and being cautious of suspicious emails and websites. Building meaningful connections and relationships online can lead to valuable opportunities and support networks.

It develops entrepreneurial skills, identify market needs, and to launch and grow your own business ventures. Innovation and entrepreneurship are essential drivers of success in the digital age. By adopting these strategies and mindset, individuals can not only survive but thrive in the digitalization era, seizing opportunities for personal growth, professional advancement, and meaningful engagement in an increasingly interconnected world.

Both technology and digitalization plays a crucial role in helping a society to adapt to change by providing tools and solutions that address evolving needs. It facilitates societal acceptance of change for enabling people to stay informed about changes happening in their environment. Whether through news websites, social media, or online forums, technology ensures that individuals are aware of new developments and can make informed decisions accordingly. Irrespective of boundaries it can connect anywhere ,anytime at any point of time.

The need for sustainability in the era of digitalization is critical for survival due to several interconnected factors such as addressing social inequalities and promoting inclusive development. By bridging the digital divide, ensuring equitable access to technology, and empowering marginalized communities, societies can enhance social cohesion, reduce vulnerability, and promote shared prosperity, essential elements for survival in an interconnected world.

Sustainable business practices creates jobs, drives economic growth, and reduces dependence on finite resources, thereby enhancing societal resilience and ensuring sustainable livelihoods.

It can foster collaboration among governments, businesses, civil society, and individuals, societies can mobilize resources, share knowledge, and implement effective solutions to global sustainability issues, enhancing resilience and ensuring survival in a rapidly changing world.

Integrating environmental stewardship, economic prosperity, social equity, and global cooperation into digital transformation efforts, societies can build a more resilient, equitable, and sustainable future for all. Failure to do so could jeopardize the well-being and survival of current and future generations.

Through smart phones and the internet, individuals can quickly access information about changing circumstances ,enabling informed decision -making and adaptation to new situations

.Even the payment ,technology has simplified reducing the physical cash acceptance ,adapting to changing preferences for convenience and security. Even fitness trackers and mobile apps ,dietary habit based personalized training and guidance is made available. Few examples are enough to connect with the daily use of technology for each sector in the economy.

Conclusion

Sustainability in the era of digitalization is crucial. Since digitalization brings efficiency and convenience . Technology, innovation and digitalization offers great potential for societal development, advancement, addressing these challenges is crucial to ensure that the benefits are utilized in a proper way. The access to information provides easier access to vast amounts of information, empowering population to participate more actively in society. Technology enables communication and collaboration across the global, fostering connections and expand the business borderless boundaries. Due to technology it improved services like healthcare, education, government services making easy access like online services, Pay Tm, Gpay, online services etc.

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An analysis of medical and wellness tourism framework in India and its impact on the Indian economy

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Abstract

The influence of medical tourism on the Indian economy has been noteworthy, offering substantial contributions to economic growth, foreign exchange earnings, and the healthcare sector. It has emerged as a pivotal enabler to the financial system in India, fostering growth across diverse sectors. The upsurge in revenue for the healthcare industry, covering hospitals, clinics, and specialized medical facilities, directly stems from the increasing number of international patients seeking medical treatments. The impacts on the Indian economy are varied, and with the ongoing development of the industry, addressing prevailing challenges will be essential to optimize the continuous positive contributions to India's economic landscape.

Keywords: Medical Value Tourism/ Travel, MVT, Healthcare, Wellness tourism

Introduction

The rising global trend in medical tourism involve individuals seeking healthcare services abroad, driven by factors like cost, quality, and availability. This industry has experienced substantial growth, with various destinations becoming popular choices for international patients. Contributing to this trend are advanced medical facilities, skilled healthcare professionals, reduced waiting times, and the appeal of combining medical treatment with leisure activities.

Countries like India, Thailand, Mexico, and Turkey have emerged as significant hubs for medical tourism, providing a diverse range of medical procedures at competitive prices. Specialized treatments, including elective surgeries, dental procedures, and cosmetic interventions, attract patients from developed nations where healthcare costs are notably higher.

India, in particular, has positioned itself as a leading destination for medical value tourism (MVT) in recent years. MVT involves traveling to another country for medical treatment, often

driven by cost savings, better quality of care, or access to specialized treatments. India's healthcare industry has experienced remarkable growth, thanks to the increasing number of medical tourists from around the world.

Objectives

1. Explore the impact of medical tourism on India’s economy, healthcare Industry, and brand value.
2. Analyse the efficacy of National Strategy and Roadmap for Medical and Wellness Tourism formulated by Ministry of Tourism in 2022.

Impact of Medical tourism on India’s economy, healthcare industry and brand value

Impact of Medical tourism on India’s economy, healthcare industry and brand value can be classified into three broad categories:

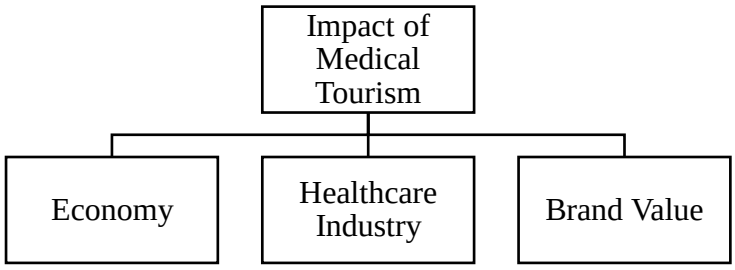

Figure1: Impact of medical tourism on India’s economy, healthcare industry, brand value

Impact on Economy:

Revenue Generation

The medical tourism sector has become a thriving industry in India, playing a substantial role in the nation's economy. The heightened demand from international patients seeking top-notch medical services at more affordable rates has resulted in a substantial increase in revenue for Indian hospitals, clinics, and healthcare facilities. According to a KPMG report, India's medical tourism industry is experiencing an annual growth rate of 15-20%, with projections indicating a remarkable 200% growth in the next five years.

Creation of Employment Opportunities

The expansion of medical tourism has resulted in the emergence of job opportunities across a spectrum of sectors, encompassing healthcare, hospitality, travel, support services, and various other professional domains. To address the needs of medical tourists, healthcare institutions and service providers have augmented their workforce, thereby creating employment prospects for the local community. Furthermore, the positive impact of medical tourism has extended to the tourism sector, fostering employment opportunities in hospitality, transportation, and entertainment.

Foreign Exchange Earnings

Medical tourism has emerged as a substantial contributor to India's foreign exchange earnings. The arrival of international patients adds to the inflow of foreign currency, playing a role in stabilizing the country's balance of payments and providing support to the overall economy.

Impact on Healthcare Industry:

Infrastructure Development

The need for high-quality medical amenities by global patients has led to increased investments in healthcare infrastructure. The growth of medical tourism in India has prompted the development of modern healthcare facilities. Hospitals serving international patients frequently enhance their amenities, integrate advanced technologies, and comply with global quality standards, ultimately benefiting both local and international patients.

Patient Care Quality

The increase in the number of medical tourists has also prompted enhancements in the quality of healthcare services in India. Hospitals and healthcare providers are making efforts to meet the requirements of medical tourists, leading to the adoption of international standards of care. Consequently, there has been an elevation in the quality of healthcare services provided to local residents as well. The surge in medical tourism in India has generated a need for skilled medical professionals, particularly in fields such as cardiology, oncology, neurology, and orthopaedics. The demand for these specialists has motivated numerous Indian doctors residing abroad to return to India, seizing the opportunities arising from the expanding medical tourism industry.

Specialized Treatments

The emergence of medical value tourism has expanded the accessibility of specialized treatments for patients in India. Hospitals and healthcare providers now provide a diverse array of specialized treatments, including organ transplants, cardiac surgeries, and cancer treatments, which were previously unavailable in the country. Consequently, India has become a preferred destination for patients in search of specific medical treatments.

Diversification of Services

To address the varied requirements of medical tourists, healthcare facilities in India frequently provide an extensive array of medical services, ranging from routine procedures to specialized treatments. This diversification has fortified the healthcare sector and broadened its capacities.

Impact on Brand 'India':

Technological Advancements

The imperative to adhere to global healthcare standards has motivated healthcare providers in India to allocate resources to research and development, resulting in technological advancements. This not only serves the needs of medical tourists but also elevates the general quality of healthcare services for the domestic population.

Global Reputation

As India becomes acknowledged for delivering top-notch medical services at competitive rates, it bolsters the country's global standing in the healthcare sector. Favourable encounters of medical tourists generate possibilities for word-of-mouth endorsements and heightened international visibility.

Despite the positive impacts, challenges such as potential strain on local healthcare resources, ethical concerns, and regulatory issues need to be addressed. Balancing the needs of domestic and international patients while maintaining quality standards is crucial for the sustainable growth of medical tourism in India. Careful management and regulation are essential to address challenges and ensure the continued success of this industry.

Analysis of National Strategy and Roadmap for Medical and Wellness Tourism, 2022

India has consistently secured a position among the leading nations for global medical tourism. According to the Medical Tourism Index (MTI) for 2020-2021 by the Medical Tourism

Association, India was ranked 10th among 46 global destinations. Information from the Ministry of Tourism reveals the number of foreign tourists arriving in India for medical purposes as follows:

Sr. No	Year	Total Foreign tourist arrivals (in Lakhs)	Total Foreign tourist arrivals for medical purpose (in Lakhs)
1.	2017	100.3	4.95
2.	2018	105.6	6.44
3.	2019	109.3	6.97
4.	2020	27.44	1.83
5.	2021	15.27	3.23
6.	2022	61.9	4.75
7.	2023	31.33*	5.04**

Table 1: Foreign tourists' arrival on medical purpose

* as in April 2023, Bureau of Immigration, India

** as in October 2023, Bureau of Immigration, India

With an aim to further improve medical tourism in country, Ministry of Tourism has formulated a National Strategy and Roadmap for Medical and Wellness Tourism in 2022.

The policy framework identifies following key pillars for the development of medical tourism in the country:

1. Create a distinctive identity for India as a wellness retreat.
2. Strengthen the medical and wellness tourism ecosystem.
3. Facilitate digital transformation of medical tourism by establishing Online Medical Value Travel (MVT) Portal.
4. Enhance accessibility of Medical Value tourism
5. Promoting Wellness Tourism
6. Strengthening Governance and Institutional Framework for MVT.

The Union Ministry of Health & Family Welfare is partnering with diverse ministries such as Home Affairs, Tourism, AYUSH, External Affairs, Civil Aviation, State Governments, and other stakeholders to amplify the promotion of Medical Value Travel (MVT) within the nation.

Several consultations involving key participants like line ministries, hospitals, MVT facilitators, insurance companies, and the National Accreditation Board for Hospitals & Healthcare Providers (NABH) have been conducted to recognize challenges and opportunities in the sector.

The thrust generated by each of these policy pillars is evaluated below:

Distinctive identity for India as health and wellness retreat.

In addition to India's advanced proficiency in contemporary medical science, the country holds the origins of some of the oldest and renowned branches of medicine and holistic healing. From Ayurveda to yoga and naturopathy, India's legacy in alternative medicine and healthcare spans centuries, emphasizing a holistic approach to maintaining a well-balanced and healthy life.

With the increasing complexity of modern life, there is a surge in "lifestyle ailments" such as diabetes, hypertension, and heart disease. This has prompted a heightened awareness of the profound connection between the mind, spirit, and body. The ancient science of Ayurveda is now gaining greater recognition, not only within India but also internationally, for its capacity to promote long-term health without any side effects.

Moreover, there is a rising preference in the western world for organic products, vegan diets, and locally sourced farm-to-table produce. All this places India, in unique limelight for medical as well as wellness tourism.

Furthermore, as per details from the Ministry of Health and Family Welfare, the National Accreditation Board for Hospitals & Healthcare Providers (NABH) is tasked with accrediting healthcare organizations. Recognized by the International Society for Quality in Healthcare (ISQua), NABH itself holds accreditation. Hospitals that receive accreditation from NABH gain international recognition, thereby fostering the expansion of medical tourism in the country. Additionally, NABH provides accreditation to Medical Value Travel Facilitators (MVT Facilitators), a segment within the medical tourism sector that currently lacks significant regulation.

India thus presents a fusion of distinctive medical and wellness capabilities and quality and trustworthy endorsement led under the “Heal in India" brand which can add substantial value in establishing India as a global name in medical and wellness tourism industry.

Strengthening the medical tourism ecosystem

The ecosystem for medical and wellness tourism encompasses a variety of entities, including service providers, facilitators, commercial agencies like hotels and airlines, regulatory bodies, and the government. It is imperative to establish connections and mutual understanding among these stakeholders regarding their roles and responsibilities, fostering collaborations to advance the sector. Medical Value Travel is a specialized service offered by hospitals and wellness centres, encompassing both modern and traditional systems of medicine. It entails the involvement of healthcare service providers, VISA requirements, insurance, and MVT facilitators, among other aspects. Medical value travellers look to these facilitators to provide information about quality, safety and legal issues. The facilitators also extend their services for accommodation, transport and medical VISA etc. Setting up of MVT facilitator association, due registration processes and listing on incredible India portal, are sure to go a long way in streamlining information dissemination regarding options for MVT and steadily increasing the numbers of tourists visiting India for medical purposes.

Enable digitalization by setting up Online Medical Value Travel (MVT) Portal

The Services Export Promotion Council aims to revamp its current portal significantly, creating a comprehensive solution for international patients throughout their medical value travel journey to India. The redesigned portal will streamline exploration, planning, service booking, payments, and post-operative support. It will include a detailed mapping of services offered by each stakeholder, ensuring effective oversight and enforcement of industry regulations. The enhanced Medical Value Travel (MVT) Portal will be seamlessly integrated with the Incredible India Website.

This upgraded portal has the potential to formalize the medical tourism industry by enforcing regulations and policies, thereby contributing to industry growth and increasing foreign exchange earnings. Additionally, it promises benefits such as reducing the presence of illegal foreign nationals in the industry, enhancing healthcare services for international patients, and improving branding, marketing, institutional tie-ups, and investments in the sector.

Enhancement of accessibility for Medical Value Travel

India has already implemented e-VISA and other measures to ease the entry of medical value travellers. To enhance patient convenience, India is committed to further liberalizing its visa

regime, ensuring a comprehensive and transparent approach. Particularly for visitors from Africa and the Middle East, where direct air connectivity is often lacking, patients currently have to endure tiring layovers at Middle East airports, which can be uncomfortable, especially for those undergoing intensive medical procedures. Improving air connectivity to these regions will not only reduce travel fatigue but also make India a more appealing destination for medical value travel.

Promoting Wellness Tourism

Given its multifaceted nature that encompasses physical, mental, social, emotional, spiritual, and environmental dimensions, wellness is a complex concept. Similarly, wellness travel is characterized by diversity, involving a wide array of activities like preventive health services, spa treatments, beauty, fitness, personal growth, nature experiences, and more. This diversity creates opportunities for various businesses and service providers.

Destination Management Organizations are actively working to enhance the wellness offerings of their destinations, aiming to attract both primary and secondary wellness travellers. The convergence of wellness, hospitality, and travel is occurring in unprecedented ways, with businesses exploring new partnerships and business models. Encouraging collaborations among airports, airlines, and wellness businesses can take various forms. Established wellness enterprises are expanding their markets and services to travel venues. Social media and a variety of apps empower savvy air travellers to easily find the health and wellness services they require, offering efficient ways to search airports for options like gyms, spas, and pools.

As wellness travel becomes more mainstream, hotels are encouraged to incorporate wellness into their design, amenities, services, and programming. Wellness amenities could encompass conventional elements such as bedding and lighting designed to enhance sleep quality, windows and shades for light and noise control, in-room fitness equipment with accompanying videos, as well as options for healthy snacks, minibars, and restaurant menus. Additionally, on-site spas and gyms may be part of these wellness features. These will further be accentuated with the assistance of emerging design trends such as wellness architecture, biophilic design, and sustainability elements imbibed into the entire design of the property. The Ministry will highlight India’s wellness offerings by the industry in its promotional material and incredible India campaign. The Ministry of Tourism will strengthen its Market Development Assistance Scheme for promoting the wellness industry. The Ministry will also encourage the development

of tourism destinations and products for promoting wellness tourism. It will also encourage public-private partnerships for promoting wellness tourism in the country.

These endeavours aim to provide expanded services and programming, allowing travellers to find and incorporate wellness into every aspect of their trips to India.

Governance and Institutional Framework

The Ministry of Tourism has established the National Medical & Wellness Tourism Board (NMWTB) with the key goal of the board is to create a dedicated institutional framework to further the promotion of Medical and Wellness Tourism, encompassing Indian systems of medicine such as Ayurveda, Yoga, Unani, Siddha, and Homeopathy (AYUSH). Functioning as a comprehensive organization, the NMWTB ensures the systematic promotion of medical and wellness tourism.

The board adopts an approach with patient and tourists at its core, uniting all stakeholders on a common platform to foster medical value travel and wellness tourism. Positioned as a comprehensive centre, the Board functions as a one-stop hub for the promotion, business development, facilitation, networking, regulation, and grievance redressal related to medical value travel in India.

Recognizing the importance of states with a notable presence in the Medical Value Travel sector or future potential, it is recommended for such states to establish a State Medical and Wellness Tourism Promotion Board or allocate a dedicated cell within their Tourism Promotion Board. This entity would be responsible for coordinating, facilitating, and promoting medical value travel within their respective states. Additionally, all medical value travel facilitators will be encouraged to register with the government, and efforts will be made to enhance their capacity and facilitate their growth and development. The registered medical value travel facilitators will be promoted on the sector-specific portal as well as the incredible India portal, simplifying access to medical tourism information and options available in India

Conclusion

The rise of medical tourism in India, has been facilitated by improved infrastructure for transportation, communication and healthcare. This, along with increased accessibility to

patients to information on medical facilities, treatment options, and reviews is highly significant for enhancing transparency and informed decision-making.

While the medical tourism industry has experienced growth, it encounters challenges associated with the standardization of healthcare practices, patient safety, and regulatory frameworks. Factors such as language barriers, cultural differences, and diverse healthcare standards also influence the overall patient experience. The future of medical tourism is likely to see ongoing expansion fuelled by technological advancements, heightened collaboration among healthcare providers, and increased patient awareness regarding quality healthcare options beyond their borders. Nonetheless, addressing regulatory concerns and ensuring patient safety through continuous efforts will be vital for sustaining the positive trajectory of the global medical tourism industry.

Strengthening various public as well as private domain healthcare platform can contribute substantially to the growth of tourism for healthcare purposes in India. It is required to deploy robust network of healthcare professionals, educational resources, and support groups, which can help patients make informed decisions about medical treatment options and amenities in India. This will go a long way in transforming India's image from that of land of snake charmers to a land with bountiful health, wellness and longevity.

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Contribution of the Private Sector Banks in India's Economic Growth

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Abstract

The banking sector plays an efficient role in economic development of a country. Banks are considered as back bone of any economy for financial growth and stability. Since the 1990s, when the Indian economy was liberalized, private sector banks have been instrumental in the growth of the rural sector Private sector banks in India play an important role along with public sector for overall financial sector reforms. The India Private Banking Market is expected to expand at a compound annual growth rate of more than 8%. The expansion of digital banking platforms, growing international banks operating in India, and increased disposable income are all factors driving the country's private banking industry. The introduction of multinational private sector banks in India increased the competition in Indian Banking Industry. Banks grow as the economy grows, and the economy grows as the banks grow. Both parties gain from this partnership. Sound banking conditions are necessary for economic expansion. According to recent data, private sector banks are gaining market share and outperforming PSBs in terms of business efficiency.

Key words: Management, Performance, Rural reach, Growth rate, priority sector lending

Introduction

In the year 1969 the Govt. of India nationalized 14 Indian commercial banks. This action has altered the banks' priority sector's paradigm shift from class banking to mass banking. The underprivileged segments of society should be served by banking. After the 14 private Indian commercial banks were nationalised in July 1969, a few more were not able to provide loans to the impoverished in both rural and urban areas or promote inclusive financial growth. In order to support additional financial expansion, the private banking sector entered the banking environment. The Indian economy's priority was to include the poorer segments of society in financial matters. This goal cannot be achieved by nationalised or cooperative sector banking

alone. As a result, private sector banks are essential to the growth of an Indian economy similar to our own. Currently, private sector banks are only operating in metropolitan or semi-urban areas; but, if they want to maintain and grow their company, they must expand into India's rural areas. Most marginalised and underprivileged groups that are shut out of structural financial institutions present a potential opportunity for banks. The banks need to design their policies and methods to reach out to the clients who are not allowed to use their services. The increased involvement of private sector banks to the Indian banking landscape will be facilitated by the need base banking produces. Expertise and technology are not the issues facing the Indian banking industry, particularly the private banking sector.

Six additional banks—Oriental Bank of Commerce, Vijaya Bank, Punjab and Sind Bank, New Bank of India, Corporation Bank, and Andhra Bank—were nationalised in 1980, marking the start of the second round of nationalisation. The main cause was the credit that was given to the Indian government.

The Banking Regulation Act of 1949 applies to banks in the private sector. The Banking Regulation Act's particular requirements, which apply exclusively to public sector banks, and their individual funding statuses control them. Conversely, the Urban Cooperative Banks are subject to the regulations stipulated in the state-specific cooperative societies act, as well as certain of the rules of the Banking Regulation Act. Pvt. banking is encouraged in India by government-introduced banking sector policies.

Role played by Indian Private Sector Banks in Rural Development:

Since the 1990s, when the Indian economy was liberalized, private sector banks have been instrumental in the growth of the rural sector. This is a synopsis of what they contributed:

Positive contributions:

Financial inclusion: Through branch development, micro-ATMs, and mobile banking programs, private banks have provided formal banking services to rural areas that were previously unbanked. For rural people and businesses, this has improved access to savings, credit, and insurance products.

Product diversification: Private banks provide more financial products that are suited to rural requirements than public sector banks do. Examples of these products include loans for agribusinesses, microfinance, microloans, and crop loans. This diversification has aided in addressing certain financial issues that the rural sector was facing.

Technological innovation: When it comes to integrating technology into financial services, private banks have led the way. They use fintech solutions—such as digital wallets, mobile banking apps, and Aadhaar-based authentication—to make financial services more quickly and easily accessible in remote locations.

Market-driven approach: Because they have a commercial motive, private banks are more customer-focused and efficient. Rural borrowers' profit from better loan offerings, quicker processing times, and enhanced customer service as a result.

Efficiency and competition: Private banks have boosted competition in the rural banking market, which has boosted innovation and enhanced service delivery for all institutions in the industry, including public sector banks.

Challenges and limitations:

Relatively poor branch network: Even with their growth, private bank branches in rural areas continue to lag behind public sector banks, which prevents some communities from having physical access.

High-interest rates: When opposed to public sector banks, private banks typically charge higher interest rates on loans, which makes some financial products less accessible to small farmers and rural companies.

Concentrate on lucrative markets: Private banks may overlook microbusinesses and marginal farmers in favour of lending to commercially successful rural operations.
Sustainability concerns: The profit-driven model can lead to short-term lending practices that are not always aligned with the long-term development needs of rural communities.

Prospects ahead:

Digitalization: In order to serve unbanked populations, there will probably be a continuous push for digital banking solutions that take advantage of smartphone adoption and internet availability in rural areas.

Partnerships: Working together with NGOs, government organizations, and fintech companies can assist private banks in creating better products and reaching underserved rural market segments.

Regulation and incentives: Private banks can increase their investments in rural development and guarantee the financial inclusion of the most disadvantaged populations by means of government policies and incentives.

Up till 2024, Indian private sector banks have contributed significantly to the growth of the rural economy. To guarantee sustained and equitable financial development in rural India, it would be imperative to tackle the obstacles and constraints via cooperative endeavours.

Achievement of Priority Sector Lending Targets (₹ crore)			
Financial Year	**Public Sector Banks**	**Private Sector Banks**	**Foreign Banks**
2021-22	26,49,180	16,85,806	2,08,107
	(42.90)	(43.71)	(42.65)
2022-23*	28,55,355	19,93,388	2,10,578
	(44.18)	(45.57)	(42.92)
*: Data are provisional. Note: Figures in parentheses are percentage to adjusted net bank credit (ANBC) or credit equivalent of off-balance sheet exposure (CEOBE), whichever is higher. Source: Priority sector returns submitted by SCBs.			

It can be seen from the above data that the private sector banks performance under priority sector lending is quite significant.

Contribution of Indian Private Sector Banks in India's Economy (2020-2023):

In recent times, Indian private sector banks have become vital growth drivers for the country's economy. Following is a brief account of their key contributions, backed by statistics from 2020-2023:

Development and Market Share:

Growth in Credit provided: When it comes to credit growth, private banks have continuously surpassed public sector banks. Private banks led the recovery during the pandemic (2020–21), with growth topping 12 percent, compared to public sector banks' roughly 5 percent increase. Overall credit growth was however muted. In 2022–2023, this pattern persisted, with private banks' lending growth averaging over 18%—much more than that of public sector banks. (Source: Data from CRISIL & RBI)

Market share: From over 35% of total deposits in 2020 to over 40% in 2023, private banks' market share has grown consistently. This illustrates how appealing they are becoming to both individuals and companies. (Source: RBI data)

Innovation and Product Diversity:

Adoption of Technology: In India, private banks have been in the forefront of the adoption of fintech solutions, providing blockchain-based solutions, digital wallets, AI-powered lending platforms, and mobile banking. Customers' convenience and financial inclusion have greatly increased as a result. (Source: EY FinTech Adoption Index)

Diversification of product range: Beyond traditional banking products, private banks offer a wider range of financial solutions tailored to specific segments, like MSME loans, agri-finance, wealth management products, and insurance. This caters to diverse needs and supports different sectors of the economy. (Source: Individual bank reports)

Efficiency and Profitability:

Operational efficiency: When opposed to public sector banks, private banks usually offer quicker response times and lower operational costs. They become more profitable as a result and become more competitive. (Source: CRISIL research reports)

Return on equity (ROE): The effective capital allocation and superior profitability of private banks are reflected in their consistently higher return on equity (ROE) than public sector banks. Private banks' average return on equity (ROE) in 2022–2023 was over 15%, whereas public sector banks found it difficult to achieve 10%. (Source: Bloomberg data)

Challenges and Concerns:

Concentration risk: The system is susceptible to possible systemic problems due to the market share of a few major private banks. It is essential to diversify the industry and support smaller businesses.

High-interest rates: Private banks typically offer higher interest rates than public sector banks, especially for unsecured loans. This may prevent some segments from obtaining credit.

Rural penetration: Public sector banks are still more prevalent in rural regions than private banks, notwithstanding their expansion. It is nevertheless imperative that this gap be closed for equitable financial development.

All things considered; Indian private sector banks have been instrumental in driving the country's economic expansion by:

- ❖ Expanding access to credit and promoting financial inclusion
- ❖ promoting product variety and innovation
- ❖ Increasing profitability and operational effectiveness

But realizing their full potential for inclusive and sustainable economic development will require tackling concentration risk, closing the gap between rural and urban areas, and making sure lending processes are ethical.

Overall performance of Private Sector Banks since 2020 to 2023

Year	Total Deposits (INR Crore)	Total Advances (INR Crore)	Total Profits (INR Crore)	Number of Branches
2020	41,59,044	37,70,013	58,242	58,210
2021	46,81,600	42,54,956	69,045	62,123
2022	54,34,568	50,69,235	84,231	68,345
2023	62,69,192	59,73,510	102,124	75,237

Source: Year book of Indian Banks Association for respective years.

Over the course of the previous ten or so years, private sector banks (PvSBs) have created more jobs than their public sector bank (PSB) counterparts, despite the PSB sector seeing branch closures and consolidation as well as a growing trend toward digitization of customer journeys and processes. For instance, according to RBI data, PvSBs added a net of 98,518 jobs in FY23 alone, while PSBs' head count decreased by 3,385.

Conclusion

Banks are the institutional organizations that take deposits, give credit to organizations, and are crucial to preserving a nation's economic standing. Any expanding economy's core is the banking sector. The economy expands as banks grow, and the banks grow as the economy grows. It's a relationship where both parties benefit. Economic expansion requires a sound banking environment. Recent data indicates that private sector banks are outperforming PSBs in terms of business efficiency and are gaining market share. Banking is now entirely technologically driven, offering cutting-edge services.

Throughout the forecast period, the India Private Banking Market is anticipated to grow at a compound annual growth rate of more than 8%. Growing foreign banks in India, rising digital banking platforms, and more disposable money are all contributing to the growth of the private banking sector in India. Individuals can receive personalized assistance with banking and investment matters through private banking. Client asset management is aided by private

banking. Private bankers provide a customized solution for the investment of an individual's financial assets and manage them holistically.

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Socio- emotional Development in Adolescence

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Srinivas Tumuluri

Keywords: Emotions, death, teens, teenage, adolescents, society, Environment, self-esteem, parents, pressure.

Introduction

The emotion plays an important role in everyone's life. This also leads into death, suicide if it is in the extreme level. This always brings a clear picture about the life clarity which is correlated with socio and involved with the life is ever green process. There are few people who always take situation in simple way and able to face the situation. But the emotional takes place into death and emotional part plays a very important role. One would rarely find people happily engaging in a conversation about death. Some people even say that 'talking about death, is like giving it an invitation. So no one ever wants to talk about death because death is sad. And when someone dies because they themselves choose to take their life it is devastating.

The socio-emotional leads in the major level for various reasons. The emotional bangs second leading cause for the improvement, growth and achievement in the life. On average, adolescents aged 15 to 19 years have an annual emotional adolescent rate is 500 in 10,000 people. Among youths 12 to 16 year of age, up to 30% of boys and 60% of girls have considered more emotional. Gay and lesbian adolescents are more likely to be emotional with higher their heterosexual peers.

Objects of the study

The teen years are excited, anxious and unsettling period as boys and girls face the difficulties of transition into adulthood. It is a time where the confusion, more bonding with friends and other relatives in the beginning stage. It is a period in life that is often confusing, leaving teens feeling isolated from family or peers. Unfortunately, some may at one point or another perceive suicide as a permanent answer to problems that are more often than not just temporary. The self-doubts, confusion, and pressures to succeed or conform can come at a high price for troubled adolescents.

The object of this study is to understand and correlate the reasons that push an adolescent towards emotional. Also, to highlight the warning signs and behavioral changes to watch out and gets affected or improved in day to day basis. Girls generally be more emotional than boys, but in some cases it goes vice versa like 4 to 5 times more than them. This is because the mental power and strangeness for the boys or men is higher than the girls. This will lead into higher level of thinking which creates the more mentality and higher capacity of the thought process with immediate action.

Importance/scope

Controlling & self-motivating the growing number of emotional among teenagers and other age groups is a big challenge for the family and society. The psychologists also expressed concerned that it is the result of is the result of high expectation from parents, relatives and neighbors are also involved indirectly. This can be created with good understanding power, alertness for emotional and social power and can reduce stress with various reason. A common observation for the variety in the mental process to create a higher level of thinking in the aspirations needed form the parents and other relatives.

More expectations like more affection which changes the aptitude and capability of the child and proves to be more fatal. On the same situation from parents beyond the aptitude and capability of the child also proves to be fatal. It also related with the pressure to perform well in studies with decent score and it is a reflected of an increasingly competitive society. This also correlate with many aspects like budding engineers and various graduates level are involved and concerned, where they became more emotional to their career and also with the life. The pressure that initially starts from stress where it is grows into a frustration and in extreme conditions turns into depression, prompting the youngsters, where it is connected towards emotional.

Review of literature

Many adolescents today have problems and are getting into trouble. After all, there are a lot of pressures with the emotional for kids to deal with among friends and family. For some youth, pressures include poverty, violence, parental problems, and gangs. Kids may also be concerned about significant issues such as religion, gender roles, values, or ethnicity. Some children are having difficulty dealing with past traumas they have experienced, like socio emotional adolescence. Parents and their teenagers are struggling between the youth's wanting

independence while still needing parental guidance to support the child or children at the time of adolescent period in the activity with emotional method. Sometimes all these conflicts result in behavior problems and it leads into emotional level where it reflects in the life or carrier.

Research methodology

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. Research is an academic activity and as such the term should be used in a technical sense. According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis

The secondary data, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process. The researcher would have to decide which sort of data he would be using (thus collecting) for his study and accordingly he will have to select one or the other method of data collection. The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection work is merely that of compilation.

Adolescents:

An adolescent is an individual who is in the transitional stage of physical and psychological human development in the age between 12 years to 19 years that generally occurs during the period from puberty to legal adulthood. In this period children feel more insecure, more alert and they are more attached with self-emotional part which affects or sometimes improve the situation. The period of adolescence is most closely associated with the teenage years though its physical, psychological and cultural expressions, emotional may begin earlier and end later.

Socio emotional:

Socio emotional which integrates the younger generation and along with various aspects which can be expressed or implemented in day to day life.

The important fact is on the age of every children where they get affected by some incident or situation related with the environment of socio emotional skills. The younger generation the

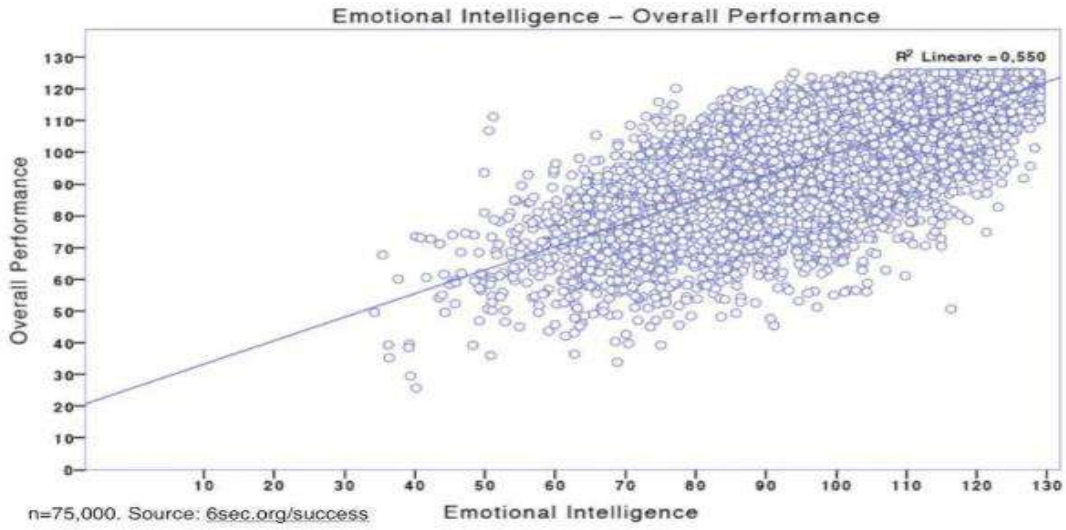
age between 12-14 years always have to understand this, we analyze whether the younger cohort, aged 12-14 years around the time of Reunification, and the elder cohort, aged between 15-17 years, were actively impacted differentially by Reunification, in the age with socio-emotional aspects. This also understands and intimates the younger generation to move fast in the higher level in their day to day life comparing the evolution in terms of their socioemotional skills over the same years (i.e., shortly before Reunification in October 1990 compared to shortly after). So these both cohorts are related over in the same environment, but hit by Reunification at various ages and levels.

Behavioral changes:

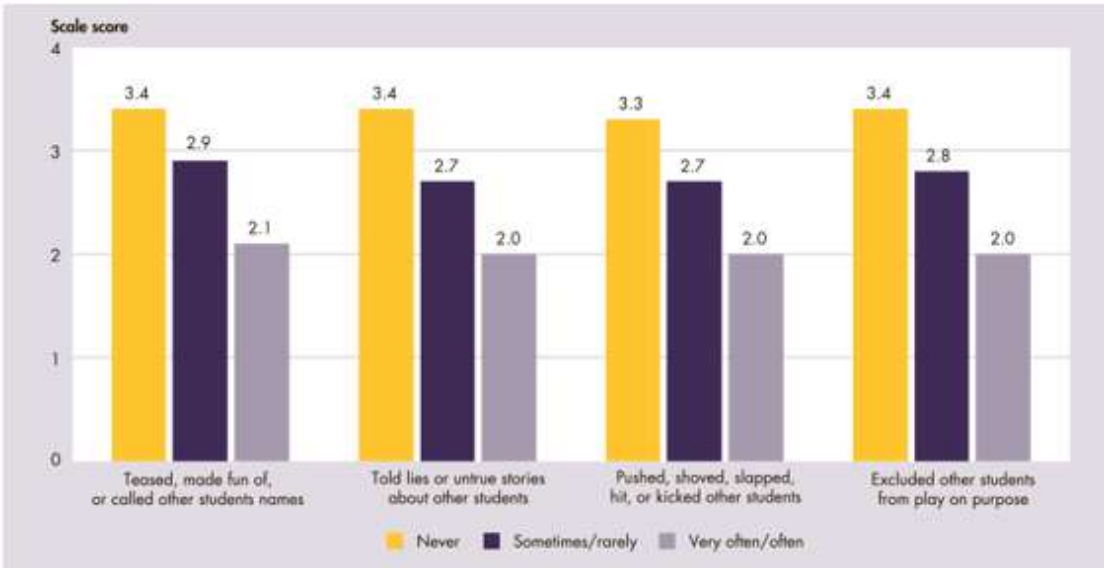
It shows the various changes in the socioemotional skills among adolescents with the resulting in the vague behavior and outcomes. The change in socio emotional skills also brings the outcomes more than 2 to 3 in younger generation. This changes in the behavior can also control the problems where it can lead to socio economic problems. The interest in the macro shock for the long run outcomes in the matters for the adjustment into various skills. The interest may affect the shock on the long run with the behavior along adjustment can be estimated during adolescence. The goal can be investigated with the impact of change in socioemotional skills which depends on the situation or place.

Major results suggest sometimes the negative impact of the reunification on many adolescents with socio emotional with negative effect with anxiety. The connection between socioemotional skills is always critical especially with growing concern with very close person where even the surroundings gets affected with various mental issues even behaviours gets affected sometimes it is alarm situation in the internalizing behaviours.

Data Analysis and Interpretation



The analysis is very important for every cycle because it is related with policy perspective in the causal link between the uncertainty of the economic and socio emotional development skills for the building the confidence and sometimes with short span of time duration which becomes cohort between reunification.



The findings and the significance of the timing has various changes in the adolescence substantially in the later stage. This also increases the important insights into gender differences in adolescent development in shocks in socioemotional skills with later behaviours and outcomes in various distinct ways.

Conclusion

To conclude the very important socioemotional development during adolescence. It also depends on the behaviors and wellbeing along with the mental health in the long term skills. The gain can be closely related to the feelings and sometimes with depression also. Good listening is always related to the judgement of feelings towards socio emotional methods in the higher level of activities with the higher level of distress of those emotions. The impact of the changes in socioemotional skills on various level of behavior to find out the changes for the adolescent age group. The impact of changes in socioemotional skills even in the economic outlook for the various levels of behavior.

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India’s Agricultural Trade with ASEAN Countries under WTO Regime withspecial reference to Maharashtra with commodities Onion and Uttar Pradeshwith commodity Jaggery

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Abstract

India has long been known as an agrarian country. In FY21, entire agricultural and integrated Exports of goods totaled US$ 41.25 billion., placing India within the world's topmost 15 agricultural exporting products. Total India’s agrarian exports grossed US$ 38.54 billion in FY19 and US$ 35.09 billion in FY20. Even though India is a predominantly agricultural economy, we find various gaps in work related to Indian agricultural trade in the context of both export and imports. This paper attempts to examine the performances of major Indian agricultural commodities both in terms of trade and exports and tries to attribute it to various policy measures like the impact of various factors on agriculture growth, India and ASEAN free trade agreement, WTO policies that help to increase trade, Strategies for expansion of agriculture trade in selected states, COVID 19 impact on agriculture trade and economy, etc. The paper is divided into sections such as an introduction,review of literature, objectives, gaps, research questions, findings, and so on. Various aspects and factors were considered when analyzing India's growth in agricultural commodity trade. The data for the current research paper on agricultural tradewas gathered from secondary sources such as government websites, annual reports from the APEDA, and so on. After collecting data and conducting analyses, it was discovered that the ASEAN countries are very important to India under its Act East policy. ASEAN's least developed countries can be looked to for Indian exports, and India can explore comparative and regional advantages from the set of developing and developed countries to expand agriculture trade.

INTRODUCTION

AGRICULTURE TRADE IN CONTEXT TO INDIA

Due to the industry's tremendous potential to add value, notably in the food processing sector. India's food and agriculture sector is characterised by massive expansion, increasing its contribution to the global food trade year after year. India had the sixth-largest food and grocery market in the world, with retail making up 70% of all transactions. One of the largest sectors in India, the food processing sector ranks fifth in terms of output, use,export, and anticipated growth. It represents 32% of the country's total food market.

Exports of agricultural and related products as a whole brought in US$41.25 billion in FY21. India is one of the top 15 exporters of agricultural goods worldwide. India exported agricultural goods of a combined US$38.54billion in 2019 and US$35.09 billion in 2018.. India rankssecond in the world in rice, wheat, sugarcane, cotton, groundnuts, and fruit and vegetable production. It produced 25% of the world's pulses until 2019, accordingto data from the previous decade. The total value of refined food product exports was Rs.43,798 crores (US$

6.02 billion) between April 2020 and February 2021. India exported a wide variety of products, milling goods, including pulses, cereal preparations, processed vegetables, , groundnuts, oil meals and processed fruits and juices.

Every year, the Indian food and agricultural industry grow significantly, expanding its contribution to the global food trade. In FY21, total agricultural and integrated product exports were $41.25 billion. India ranks second in the world in the production of rice, wheat, sugarcane, groundnuts, fruits, and vegetables.

The total value of processed food product exports between April 2020 and February 2021 was Rs. 43,798 crores (US$ 6.02 billion). Agriculture as a major driving force in India: The growth of India's agricultural sector isrelated to the country's industrial development and national profits. A 1% increment in agricultural growth leads to a 0.5% increase in industrial out-turn and a 0.7%India's national income has increased, according to assumptions. India's agricultural sector is rapidly developing following LPG (Liberalization, Privatization,and Globalization). According to World Trade Organization data, global agricultural and food exports and imports were $1.66 trillion and $1.82 trillion, respectively, in 2011.

- The following are some major agriculturalinvestments and developments:
- India received $1 billion in agritech funding from2017 to 2020.
- Investment in Indian agritech companies isexpected to reach $30-35 billion by 2025.
- In India, an investment of Rs.8500 crores (US$

1.19 billion) have been declared for the productionof ethanol.

ASEAN Countries (Association of Southeast Asian Nations)

ASEAN, or the Association of Southeast Asian Nations, was founded on August 8, 1967, in Bangkok, Thailand. Indonesia, Malaysia, the Philippines, Singapore, and Thailand are among the founding fathers of ASEAN.

- 7th January 1984: Brunei Darussalam
- 28th July 1995: Vietnam joined
- 23rd July 1997: Lao PDR and Myanmar
- 30th April 1999: Cambodia

ASEAN's goal is to achieve cooperation in economic, and other fields, as well as to encourage regional peace,and the "MOTTON of ASEAN" is "One Vision, One Identity, and One Community."

INDIA'S RELATION WITH ASEAN COUNTRIES

In 1996, India developed an ASEAN Dialogue Partner. According to preliminary ASEAN data, two-way trade between ASEAN and India grabbed USD 77.0 billion in 2019, with total FDI inflows from India totalling USD 2.0billion. Among ASEAN Dialogue Partners, India is the sixth largest trading partner and the eighth major source of Foreign Direct Investment termed as FDI.

The ASEAN-India Framework Agreement on Comprehensive Economic Cooperation was agreed at the second ASEAN-India summit in 2003. An ASEAN-India Free Trade Area (FTA) in commodities, services, and investment has a strong foundation thanks to the Framework Agreement.

On January 1, 2010, the ASEAN-India Trade in Goods Agreement (AITIGA) became effective. The signing of the AITIGA on August 13, 2009, in Bangkok, made the way for the establishment of one of the world's major freetrade zones, with over 1.9 billion people and a consolidated GDP of $5.36 trillion. All parties signed ASEAN-India Trade in Services Agreement onNovember 13, 2014, and it went into effect on July 1, 2015. As of today, all Parties have ratified the Agreement.Meanwhile, on November 12, 2014, all parties signed theASEAN-India Investment Agreement. The Agreement went into effect on July 1, 2015. Except for Cambodia, allParties have ratified it to date.

Benefits to Indian exporters under AIFTA (Asia India Free Trade Agreement):

Tariff preference for Indian products in all ten member nations. Tariff reductions for importing nations would result in lower product prices throughout ASEAN. Encourage larger market completeness to assist Indian items in gaining entry to a regional market with several significant advantages. As a result of decreased tariffs onraw materials used by the region's companies, ASEAN consumers benefit from lower product pricing. Due to tariff removal, certain ASEAN processing industries benefit from cheaper imported raw materials from India, lowering their manufacturing costs. ASEAN countries have merged into a single market, which is significant because the market is larger and more populous. Long- term potential is stronger in the export and investment industries. When compared to other regions, India's export complementarities with ASEAN nations are larger.

WTO AND INDIA'S AGRICULTURE TRADE

The World Trade Organization (WTO) is the sole international body concerned with global trade regulations. Its primary aim is to guarantee that commerceflows smoothly, reliably, and freely. The Uruguay Roundglobal trade discussions ended on December 15, 1993, after more than seven years of negotiations, and were formally approved in April 1994 in Marrakesh, Morocco.The WTO Agreement on Agriculture was one of many accords negotiated during the Uruguay Round. The Agriculture Agreement went into force on January 1, 1995. According to the Agreement's stipulations, industrialized nations had to fulfill their depletion commitments While developing countries' pledges were to be fulfilled within ten years, within six years, or by theyear 2000, i.e., by the year 2004. No reductions were necessary for the least developed nations. The World Trade Organization Agriculture Agreement establishes a framework for long-term reform of agricultural trade and domestic policy, intending to achieve fairer competition and a less distorted industry.

The Agreement covers:

- Market access entails the use of trade barriers, like taxes on imports.
- Domestic support is the use of assistance and other forms of assistance that directly promote production while distorting commerce.
- Export competition refers to the usage of export subsidies and other government initiatives that subsidize exports.

WTO members agree to "schedules," or lists of commitments, that restrict the tariffs countries can applyto particular items as well as the amounts of domestic support and export subsidies.

IMPACT OF WTO AGREEMENT ONAGRICULTURE.

Agriculture is the oldest culture in all of human history. Agriculture has been practiced in India for over ten thousand years.WTO is the inheritor of the General Agreement on Tariffs and Trade, which was formed in 1947. GATT hosted eight rounds in all. The WTO Agreement on Agriculture, often known as the "International Treaty," was one of the major accords negotiated during the Uruguay Round, in which 123 nations took part. The goals of WTO laws are to promotefree and liberal commerce. However, this principle was often misapplied. Exporting nations began dumping theirproducts in importing countries, posing a severe danger toemerging countries' economies, particularly India's agriculture. The Indian economy has changed dramatically since the establishment of the WTO. The WTO Agriculture Agreement has had a significant influence on Indian agriculture, which India has felt multiple times. The Competitive Agricultural Markets(CAM) hypothesis was incorrect. Agricultural exportswere dominated by a few major multinational corporations and trading agencies. Cheap imports have regularly flooded Indian markets, sending shockwaves through agricultural producers. Because of the lack of openness during discussions, the latter consequences of WTO rules were undemocratic. Other factors contribute to India's low productivity. Except for the rice industry, India is a minor player in the worldwide market. The WTO Agriculture Agreement has both positive and bad implications for Indian agriculture. Because agriculture employs over 70% of the Indian population, the entire export-import of agricultural goods is directly or indirectly influenced by WTO rules. As a result, WTO norms are critical to improving the socioeconomic conditions of India's rural people. In reality, WTO laws have an impact on the Indian economy, either directly or indirectly. The completion of the Uruguay Roundheralded the development of new prospects for developing nations to enhance agricultural exports. The GATT agreement is a watershed moment in agricultural commodity trading since it will help to design a new route for developing nations to grow agro-exports and improvetheir people's quality of life. (19017 Research paper)

SELECTED COMMODITIES CONCERNINGSELECTED STATES

Maharashtra: - Ahmednagar, Nashik, Amrawati,Akola.

Onion: - 07031010 (Harmonized Code (HS Code)

Uttar Pradesh: - Muzaffarnagar and Lucknow. Jaggery: - 17011410 (Harmonized Code (HS Code)

Literature Review

According to the International Trade Administration (2022), India has achieved export aggressiveness in specific particular items, constructing it the world's ninthbiggest exporter of agriculture and associated products. In2020, India will have a $15.8 billion trade surplus in agricultural, fisheries, and forestry commodities. Basmatirice, carabeef/beef frozen shrimp and prawns, cotton, andrefined sugar were the top exports. Shikha Singh (2021) discovered in her research that the ASEAN countries are also very important to India under its Act East policy. established members. Intermediate commodities are traded more extensively in Asian regions. It also looked at the scheduled tariff liberalization from both sides. In his analysis, Alexander Chipman Kotv (2021) determinedthat due to the differing degrees of development and economic policies within ASEAN, the Agreement appliestwo separate classes of tariff rates depending on whether or not they are WTO members. In reality, the Agreementgives less developed ASEAN nations with less liberalized economies, such as Myanmar and Laos, a longer timetable to lower tariffs. In her study, Yashoda Kapur(2021) demonstrated that there is ample opportunity for India and ASEAN to do business in this space - trade in food products, food processing instruments, investing in progressive industries, tapping into regional small and medium enterprises (SMEs), and participating in supply chains, among other things. India may easily enter this rapidly expanding market by linkingrising indigenous industrial capability with existing ASEAN networks. Exports have also occurred from various clusters for the first time, according to PIB Delhi(2021). For example, exports of fresh vegetables and mangoes from Varanasi and black rice from Chandauli support local farmers. Oranges from Nagpur, bananas from Theni and Anantapur, mangoes from Lucknow, andso forth have all been exported. Despite the pandemic, fresh horticultural output was exported via the multimodal method, and consignments were delivered tomany areas of the world. During the sample period, Mandeep Bharadwaj (2021) discovered that India's imports rose faster than exports in all sample nations except Singapore, Myanmar, and Lao De Republic. With RCEP (Regional Comprehensive Economic Partnership) nations, India has a highly disclosed comparative advantage in textile, consumer goods, chemicals, andfood items. Untapped potential in its specialized goods, such as ships and boats and floating buildings, can be exploited. Tamás Mizik and kos Szerletics (2020) noticedin their research that there is a scarcity of literature

devoted to the comparative benefits of agriculture and food goods. Previously, most research was conducted on industrialized nations, particularly Europe. Furthermore, it becomes clear that a country will not compete in international commerce with the same formation or type of agricultural goods that it had times before as the marketis changing rapidly. According to KPMG India (2019), India-ASEAN commerce has been steadily growing, withASEAN's least developed countries may be turned to for Indian exports, and India can investigate comparative andregional advantages among the bloc's developing and

ASEAN nations being India's fourth largest trading partner. To improve commercial relations, India and ASEAN nations have established a USD 200 billion tradeobjective for 2022. The main obstacles to realizing India'sand ASEAN nations' full economic potential have been trade restrictions and insufficient connectivity. Accordingto Pranesh Pandey's (2019) research, India is essentially an exporter of primary agricultural products due to the substantial percentage of such items. Furthermore, ASEAN exported processed and manufacturedagricultural goods to India. The notion is that ASEAN is more developed than India in terms of value-added and manufactured services.

RESEARCH OBJECTIVES

Changes in India's exports of two key agricultural commodities (onion, jaggery, to ASEAN nations following the adoption of India ASEAN Free Trade Agreement.

To investigate the influence of four elements on India's agricultural commerce (Agricultural Marketing, Digitalization in ASEAN agriculture, Geographic factors(Urban, Rural), and Environmental Factors).

RESEARCH GAPS

According to the literature review, studies on agriculturaltrade in the context of ASEAN countries leave a large scope for future research on agricultural Marketing, Digitalization in agriculture in ASEAN countries, Geographic factors (Terrain, climate, soil characteristics, and soil water are examples of urban, rural, and environmental factors that affect the extent of agriculturalagriculture. The conjunction of these four criteria allows various crops to be cultivated in specific parts of India. India needs to extend its collaboration and should prioritize the CLMV nations (Cambodia, Laos, Myanmar,and Vietnam) in its trade policy or devise some programsto stimulate agricultural trade between India and ASEAN. Efforts should be directed at promoting Indian exports such as onion, and jaggery in ASEAN

markets. There hasbeen little study into the effect of Covid 19 on agriculturalexports, trade, and the economic slump.

RESEARCH QUESTIONS

Q.1 What are the effects of the Free trade agreement onexports and trade between India and ASEAN countries?

Q.2. What is the effect of geographic and environmentalfactors on India's agricultural trade?

Q.3 What should be the strategies used for the expansionof agriculture trade concerning selected states of India?

Q.4 What was the impact of Covid 19 on India'sagriculture trade and export?

RESEARCH METHODOLOGY

The research methods used to attain the objectives are asfollows:

1. Information sources.
2. Method of data collecting.Data sources,

In this paper, both primary and secondary data wereobtained, however, the majority of the research is based on secondary data. Secondary data sources: Secondary data is obtained and assembled by several sources for another purpose. The following secondary data sources were used: • Websites / Web resources

- APEDA websites and portals
- Journals and articles.

FINDINGS

The findings disclose that there is a chance for conductingbusiness in this arena between India and ASEAN - commerce in food items, food processing equipment,funding in processing businesses, tapping into regional small and medium enterprises (SMEs), and building supply chains, among other things. India may easily enter this rapidly expanding market by combining its rising indigenous manufacturing capability with its existing networks in the ASEAN area.

Literature is scarce on the comparative benefits of agricultural and food goods. Earlier research focused on industrialized nations, particularly Europe. Furthermore, it becomes clear

that a country is unable to compete in international commerce with the common structure or types of agricultural goods that it had many years ago— the market is alternating quickly.ASEAN nations are India's fourth largest commercial partner, with commerce between the two countries growing steadily. To strengthen commercial connections,India and ASEAN nations have set a USD 200 billion trade objective by 2022. Trade obstacles and insufficient connectivity have been major impediments to realizing India's and ASEAN nations' full trade potential.

FUTURE SCOPE OF THE STUDY

The scope of the current study is to examine India's commercial connections with the ASEAN countries of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. The scope of the study is limited to trade value, geographical and environmental considerations, and an assessment of the impact of agricultural commerce in India on ASEANnations. Additionally, efforts should be made to promoteIndian goods such as, buonion, and jaggery in ASEAN markets.

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Banking sector with special reference to Pune with Respect to sample size for research.

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Abstract

Banking is a very important sector in the economy of a country. Pune has a very important place in the Industrial growth of India and in particular the role of Banking in the industrial growth of Pune region in Indian economy. Sample size is very important for the Ph.D. research study**.**

Index Terms: Banking, Pune, Private Sector Banking, Public Sector Banking, Industrial growth, India, Pune District. Sample size.

I. Introduction

Pune is the second-largest city in the state of Maharashtra and the seventh most populous city in India, with about 7.4 million as of 2020. Pune is widely regarded to be the second major IT hub and the most important automobile and manufacturing hub in India. Pandit Jawaharlal Nehru, while on a visit to the city in the late '50s, was very impressed with Pune's many high-quality educational institutions and he is the one who gave the city the sobriquet of "the Oxford of the East". Indian banking industry has recently witnessed the roll out of innovative banking models like payments and small finance banks. RBI’s new measures may go a long way in helping the restructuring of the domestic banking industry. As of September 2021, the total number of ATMs in India reached 213,145 out of which 47.5% are in rural and semi urban areas. In FY18-FY21, bank assets across sectors increased. Total assets across the banking sector (including public and private sector banks) increased to US$ 2.48 trillion in FY21. Like all other cities, the economy of Pune is also connected to banking sector. So, in Pune banking sector is also witnessing a boom since many years. Pune has several public sectors, Private sector, Co-operative, and foreign banks. The best

banking brands of the world have their branches in Pune. Sample size determination is the essential step of research methodology. It is an act of choosing the number of observers or replicates to include in a statistical sample. Sample sizes are judged based on the quality of the resulting estimates. Sample size determination helps in increasing the quality of evidence-based research.

II. **Pune**

Maharashtra is the second-most populous and industrially developed state in India. Pune is the seventh most populous city in India and the second-largest city in the state of Maharashtra, with an estimated population of 7.4 million as of 2020. Pune is widely regarded to be the second major IT hub and the most important automobile and manufacturing hub in India. The Pune city is a ultra-vibrating city and has an extensive history and numerous lively traditions which have been reflecting in as various communities live harmoniously together for years and more significantly, the people in this city have accomplished with some globally accepted great achievements, consequently the city is being called an information technology and educational hub and also industrial city.

Demography of Pune

Once the hometown of Marathas and a center of power for the Maratha Empire, the presence of the numerous edifices in Pune links to its rich and glorious past and now is an important city in terms of its economic and industrial growth. The district has geographical area of 15.642sq.km. Pune also has made its mark as the educational epicenter winning itself the sobriquet, ‘The Oxford of the East’. Not just that, it has a growing industrial hinterland with sector specific like information technology, engineering and automotive companies. The city is known for its cultural activities like classical music, spirituality, theatre, sports, arts and literature. Pune is a pleasant travel getaway destination to spend a quiet holiday. It lies on the foothills of Sahyadri Mountains. The landscape of Pune district is distributed triangularly in western Maharashtra at the foothills of the Sahyadri Mountains and is divided into three parts: “Ghatmatha”, “Maval” and “Desh”. Pune District’s Population according to 2011 Census Report Total: 9426259 Male: 4936362 Female:4490597. There are 14 tehsils like Haveli, Punecity, Maval, Mulshi, Shirur, Baramati, Indapur, Daund, Bhor, Velha, Purandar, Khed, Junnar, Ambegaon in Pune district with Bhima, Nira, Indrayani, Mula, Mutha, Ghod, Meena, Kukdi, Pushpavati, Pavna, Ramnadi rivers. Today Pune city is well connected with other parts of the country with rail, air and road. Pune is connected

directly with international destinations like Dubai, Germany etc. by air. Adequate transport facilities contribute in the development of industries, trade and commerce.

Industrial Development of Pune

The industrial development of Pune and its environs covers a span of last seventy years or so, though there had certainly been a few stray attempts to start industries in these cities earlier. The government established an Ammunition factory at Khadki in 1869. In 1885 Deccan Paper Mills was founded by Sardar Dorabjee Pudumjee and Sardar Nowrosjee Pudumjee while the Raja Bahadur Motilal Poona Mills was started in 1893. These attempts, however were essentially far and wide and therefore, did not really inaugurate this city. Pune's industrial scene in the 1940s was marked by a few large units on the one hand existing side by side with small scale units producing a variety of consumer goods like coarse cloth, copper and brass utensils and stationery on the other. The onset of the Second World War leads to a substantial increase in the production at the ammunition factory at Khadki. Still the process of industrialization of Pune had received little impetus until after the Second World War. The emergence of industrial Pune began with mechanical engineering industries putting up base. Pune's proximity to Mumbai, good climate and availability of talented human resources made it preferred destination to large and medium scale industries. The establishment of Kirloskar Oil Engines Limited in 1946 at Khadki can be said to have initiated Pune's post war industrial expansion in the true sense. Subsequently a number of large units settled in the region, consolidating the base for the region's industrialization. Some of the large-scale industrial units established in this region later are Advani Oerlikon (1951), Hindustan Antibiotics (1954), Ruston and Hornsby (1955), Thyssenkrupp Ltd. (1957), Garware Nylon (1957), Bajaj Tempo (1958), Mather and Platt (1959), Sandvik Asia (1960), KSB Pumps (1960), Elpro International (1962), SKF Bearing (1962), Alfa Laval (1962), Century Enka (1965), Thermax (1980), Tata Motors and Bajaj Auto etc. Establishment of a large number of micro, small and medium scale units serving as feeders in the various large units around in the area followed. Subsequently, great number of large-scale industries came to be established in the areas surrounding Pune, setting the region apace toward rapid industrialization. One agency closely involved with it from the initial stages was the Maratha Chamber of Commerce, Industries and Agriculture. As early as 1935, it promoted the Bank of Maharashtra to finance local entrepreneurs; today it runs useful advisory consultancy and other services. Today, Pune has a diverse industrial population. It is one of India's most important automotive hubs, with some domestic and

international giants manufacturing here such as Tata Motors, Bajaj Auto Ltd., Force Motors (Bajaj Tempo), Volkswagen, General Motors, New Holland India, Fiat, Kinetic, Premier Automobiles, Jaguar & Land Rover, Mercedese-Benz, Mahindra Navistar etc. Pune also has hundreds of large- and small-scale IT companies. It is the largest hub in India for German companies. According to the Indo-German Chamber of Commerce, Pune is the single largest hub for German companies for last 70-80 years. Over 200+ German companies have setup their businesses in Pune. India is one of the best auto hubs in the world and has the world's best auto manufacturing facilities in India. The city might be the IT industry's favored destination, but Pune still retains its original title as the Detroit of India, according to a just published study of the new manufacturing capacities in the city since 2001, conducted by the Mahratta Chamber of Commerce, Industry and Agriculture. The Pune of the 1960s was transformed completely from the pensioner's paradise and became a center for education and the administrative institutions and turned into the industrial city - a growing contribution of global reputation. This is also the social overhead capital in the city – its complex of research institutions. The industrial area in Pune district is however mainly confined to Pune urban agglomeration covering Pune city and Haveli tehsil. Today, the city boasts of annual export turnover to the tune of Rs. 15000 crores, the highest in the region and growth of nearly 60% to 70% per year. Pune has also become a prominent place for Business Process Outsourcing (BPO), Information Technology organizations. There is also a tremendous increase in construction sector in Pune. The quick erection of plazas, arcades, apartments, and the cooperative housing societies have been considered as the fact-lifting improvement in the conservativeness of these cities. It is a district headquarters and has diversified economy. At present the Pune city is hustling with economic activities.

Education in Pune

Pandit Jawaharlal Nehru, while on a visit to the city in the late '50s, was very impressed with Pune's many high-quality educational institutions and he is the one who gave the city the sobriquet of "the Oxford of the East". Pune is the main educational center not only for Maharashtra but also for students from many parts of India and the world. It is quite safe and peaceful city as compared to other educational centers in India. The climate of Pune is pleasant and good for health. The city of Pune houses many well-known, established institutes and colleges. Pune has many reputed Universities and educational institutes such as – Savitribai Phule Pune University [one of the premier universities in India with NIRF Overall Top 20 list of Higher Educational Institutes in India; – In the bracket of 541-550 in

the QS Ranking of 2023], MIT World Peace University, Flame University, MIT – ADT University, Bharati Vidyapeeth University, Dr DY Patil Vidyapeeth, Spicer Adventist University, Symbiosis International University, Ajeenkya DY Patil University, Symbiosis Skill & Professional University, SNDT University, National Institute of Construction Management and Research University, Tilak Maharashtra Vidyapeeth, Vishwakarma University to name a few. There are other deemed to be university & Institute of National Importance like Film and Television Institute of India (FTII), Gokhale Institute of Politics and Economics, National Defence Academy (NDA), College of Engineering – Pune, Deccan College, Ferguson College, National Chemical Laboratory (NCL), Vaikunth Mehta Institute of Cooperative Management, Defence Research & Development Organization, The Indian Institute of Science Education and Research, Tolani Maritime Institute, Indian Institute of Information Technology, College of Military Engineering, Armed Forces Medical College, Vasantdada Sugar Institute, Agriculture College etc. to name a few in Pune.

III. **Banking Sector in Pune**

Like all other cities, the economy of Pune is also connected to banking sector. So, in Pune, banking sector is also witnessing a boom for many years. Pune has a number of public sectors, Private sector, Co-operative and foreign banks. The best banking brands of the world are having branches in Pune. The banking community all over doing a lot of investment in Pune. The Backbone of Pune services or commercial sector is provided by the banking sector. The Indian banking system consists of 12 public sector banks, 22 private sector banks, 46 foreign banks, 56 regional rural banks, 1485 urban cooperative banks and 96,000 rural cooperative banks in addition to cooperative credit institutions. Pune has all types of banks like Small Finance Banks, Cooperative Banks, Regional Rural Banks, Payment Bank, Nationalized banks including SBI associates, private banks & foreign banks. There are also financial institutions (i.e. NABARD), banking related data centers of banks (i.e. HDFC Bank) or other agencies, foreign banks , private companies (like SBI Global Factors Limited, Aditya Birla Finance Limited, LIC Housing Finance, Tata Finance, Muthoot Finance, Edelweiss Financial Services, Bajaj Finance Ltd., BNY Mellon International Operations India, Barclays, Citi, HSBC, Credit Suisse etc.). The Tables below will show the details of Banks in India, in Maharashtra, in Pune District & in Pune Metro area. The table also gives details with bank type. While the next table shows details of banks

in India, Maharashtra & in Pune district with its presence in Rural, Semi Urban, Urban & Metro areas. The tables are very clear in its message about the banking in Pune area.

DETAILS OF BANKS [BANKING TYPE WISE] IN PUNE DISTRICT

SN	BANK TYPE	India	Maharashtra	Pune Dist.	Pune Metro
1	Small Finance Bank	5817	726	94	66
2	Regional Rural Bank	22338	751	22	1
3	Private Sector Bank	38788	4367	700	483
4	Payment Bank	738	62	5	3
5	Foreign Bank	907	139	12	12
6	SBI Associate	24792	1970	152	104
7	Nationalized	65455	6050	805	503
Grand Total		**158835**	**14065**	**1790**	**1172**

Source - https://dbie.rbi.org.in

DETAILS OF BANKS [AREA WISE] IN INDIA, MAHARASHTRA & PUNE DISTRICT

SN	Bank Area	India		Maharashtra		Pune Dist.	
		No	%	No	%	No	%
1	Metro	31182	19.63	5806	41.28	1172	65.47
2	Urban	30624	19.28	1838	13.07		
3	Semi Urban	43687	27.50	3209	22.82	340	18.99
4	Rural	53342	33.58	3212	22.84	278	15.53
Grand Total		**158835**	**100.00**	**14065**	**100.00**	**1790**	**100.00**

Source - https://dbie.rbi.org.in

Banking in Pune area gets the benefits like Technology Support, skilled manpower support, connectivity & customer support.

IV. IMPORTANCE OF SAMPLES

Sample size can be defined as the subset of a population required to ensure that there is a sufficient amount of information to draw conclusions (Sekaran & Bougie, 2010). Kumar et al. (2013) described sample size in terms of the "total number of subjects in the sample" (p. 122). Simply, it refers to the number of respondents or observations to be included in a study. There are several factors to be considered when estimating an appropriate sample size. These factors include the research approach, analytical method, number of variables or model complexity, time and resources, completion rate, research supervisor, sample size used for similar studies, and data analysis programme. One has to have a sampling strategy since it is not always possible to collect data from every unit of the population (Kumar et al., 2013; Sekaran, 2003). Sample size determination is the essential step of research methodology. It is an act of choosing the number of observers or replicates to include in a statistical sample. In some situations, an increase in precision for a larger sample size is minimal or even nonexistent. Sample sizes are judged based on the quality of the resulting estimates. Sample size determination in descriptive studies is different than experimental studies. Sample size determination helps in increasing the quality of evidence-based research. Determining an appropriate sample size is vital in drawing realistic conclusions from research findings. Although there are several widely adopted rules of thumb to calculate sample size, researchers remain unclear about which one to consider when determining sample size in their respective studies. 'How large should the sample be?' is one the most frequently asked questions in survey research. The objective of this editorial is three-fold. First, we discuss the factors that influence sample size decisions. Second, we review existing rules of thumb related to the calculation of sample size. Third, we present the guidelines to perform power analysis using the G*Power programme. There is, however, a caveat: we urge researchers not to blindly follow these rules. Such rules or guidelines should be understood in their specific contexts and under the conditions in which they were prescribed. We hope that this editorial does not only provide researchers a fundamental understanding of sample size and its associated issues, but also facilitates their consideration of sample size determination in their own studies. That's why determining an appropriate sample size is vital to draw valid conclusions from research findings. Also, it is often

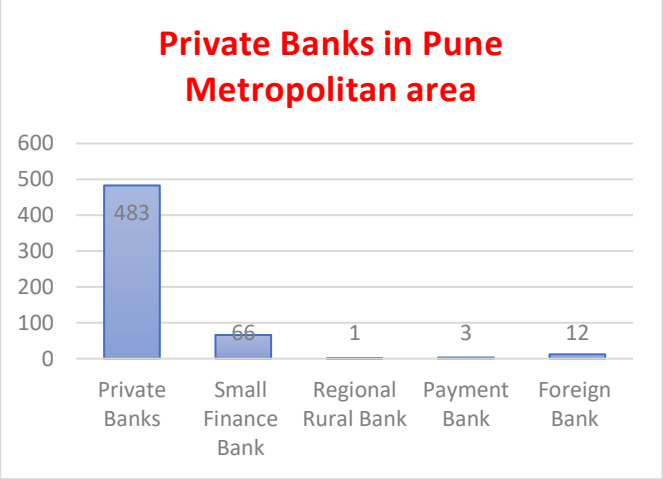
considered a difficult step in the design of empirical research (Dattalo, 2008). In the Ph.D. research if the sample is not calculated correctly then the results received will be wrong and the total research will fail. So, in Ph.D. research & study of the subject the sample size calculation is the most critical point.

V. **Justification of Sample Selection**

The research topic I have selected is "A Study on the role of Emotion Management of Employees in Organizations with special reference to Banking Industry" and the scope in the Private Sector Banks in the Pune Metropolitan area. As per the Reserve Bank of India website there are 565 Non-Public - Private Banks in Pune Metropolitan area as per details below –

SN	**Bank Type**	**Banks**
1	Private Banks	483
2	Small Finance Bank	66
3	Regional Rural Bank	1
4	Payment Bank	3
5	Foreign Bank	12
	Total	**565**

Source: Reserve Bank of India website



Researcher has selected private banks in Pune Metropolitan area; to examine the impacts of real representation of Emotion Management in private sector bank employees. Selection of sample from the population is based on the statistical method in which for 565 population sample works out to 225. Hence the sample size considered for this study as 225 private sector banks situated in Pune Metropolitan region has been selected. Sample size was determined using sample size determination by mean method. The mean method was used because variables in study were measured using a 5-point measurement scale. Formula:

$$N = \frac{z^2 * s^2}{e^2}$$

Where, 'z' is the standard score associated with confidence level (95% in the current case). Hence standard scores equal to 1.96 (borrowed from normal table). 'S' is the variability in the data set, computed as a ratio of range / 6. Range is equal to 5-1 = 4 (the difference between minimum and maximum value in the 5-point scale). 6 refer to ±3 standard deviation values on the X axis of the standard normal curve, which takes in all the data set in study. Hence S = 4/6 = 0.66. E is the tolerable error = 9% (in the current study).

Sample size $N = \frac{1.96^2 * 0.66^2}{0.09^2} = 205.9$.

In order to deal with non - response approximately 10% of the sample size was taken as a buffer. 205*10%=20. 205+20=225. Hence sample size was freeze at 225. The selection was thus of 225 private banks with various types of employees in it like Manager, Officer, Clerical etc.

VI. **Conclusion**

Banking sector in Pune is very important for the supporting role to the industry in this area and the industry plays an important role as a customer to the banking industry. Same is the case with the Education Sector which is a very important aspect of Pune's identity. The Technology support through engineering & Information Technology is strongly available to the Banking sector in Pune compared to other areas of India. Thus, Pune and the Banking Sector are both complimenting each other and helping each other in its growth story. The determination of sample size for the Ph.D. research in Pune Metropolitan area is very important and thus we could get the sample size of 225 in the population of 565 private banks.

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Empowering Success: The Vital Role of Mentoring in the Digital Age

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Abstract

In the digital age, characterized by rapid technological advancements, mentoring emerges as a pivotal force in empowering individuals and organizations to thrive amidst change and uncertainty. It explores the transformative impact of mentoring in navigating the complexities of today's technology-driven world. This paper tries to look into the insights of mentoring which serves as a catalyst for individual growth and organizational success, fostering digital literacy, adaptability, and innovation. By facilitating knowledge exchange, skill development, and personal growth, mentoring enables individuals to harness the full potential of digital tools and platforms. Moreover, mentoring promotes diversity, inclusion, and collaboration, cultivating resilient and agile professionals capable of navigating disruption and seizing emerging opportunities. Through the real-world examples and insights, it underscores the indispensable role of mentoring in shaping the future of work, fostering leadership development, and cultivating a culture of continuous learning. It highlights mentoring as a cornerstone for unlocking potential, driving innovation, and achieving sustainable success in today's dynamic digitalization era.

Key words: personal growth, technology-driven world, organizational success

Introduction

Mentoring in the digital age represents a paradigm shift in how mentorship is conceived, facilitated, and experienced. By harnessing the power of digital technologies, mentorship becomes more accessible, flexible, and personalized, transcending traditional barriers and fostering meaningful learning and growth opportunities for individuals worldwide. However, navigating the complexities of the digital era requires careful consideration of ethical, cultural, and practical considerations to ensure that digital mentorship initiatives are inclusive, impactful, and sustainable in the long term.

In the rapidly evolving of the digital age, traditional methods of mentorship are being redefined and revitalized. The emergence of digital technologies has not only transformed how we

communicate and interact but has also revolutionized the way mentorship is conceptualized and practiced. Today, mentoring in the digital age is characterized by unprecedented accessibility, flexibility, and scalability, enabling individuals to engage in mentorship relationships across geographical boundaries and time zones with ease.

In the fast-paced and constantly evolving IT era, mentoring plays a crucial role in shaping the success and growth of individuals and organizations. Mentoring enhances for our development in multi-faceted dimensions.

Knowledge Transfer: Mentoring facilitates the transfer of technical skills, industry knowledge, and best practices from experienced professionals to mentees, accelerating their learning curve.

Career Guidance: Mentors provide invaluable insights and guidance to mentees, helping them navigate career paths, set goals, and make informed decisions about their professional development.

Personalized Support: Mentoring offers personalized support tailored to the individual needs of mentees, fostering their confidence and resilience in tackling challenges.

Networking Opportunities: Mentors often provide access to valuable networks and connections within the IT industry, opening doors to new opportunities and collaborations.

Skill Development: Mentoring enables mentees to acquire not only technical skills but also soft skills such as communication, leadership, and teamwork, which are essential for success in IT roles.

Innovation and Creativity: Mentoring encourages mentees to think innovatively and creatively, fostering a culture of continuous improvement and problem-solving within organizations.

Succession Planning: Mentoring helps organizations identify and develop future leaders and key talent, ensuring a smooth transition of knowledge and expertise as senior professionals retire or move on.

Employee Engagement: Mentoring enhances employee engagement and retention by fostering a sense of belonging, purpose, and personal growth among mentees.

Continuous Learning Culture: By instilling a culture of mentoring, organizations promote continuous learning and development, ensuring their workforce remains adaptive and competitive in the dynamic IT landscape.

Contribution of mentoring by various author for enhancement of career

Mentoring has been widely recognized by various authors for its significant contribution to career enhancement. Here are some key contributions highlighted by authors:Megginson and Clutterbuck: Although there may be multiple authors with these names, David A. Megginson and David Clutterbuck, prominent figures in mentoring literature, published "Mentoring in Action: A Practical Guide" in 2005, which emphasizes the importance of mentoring in facilitating career progression and personal development.

Kram: Kathleen E. Kram's seminal work on mentoring, particularly focusing on the concept of "mentoring circles" and the role of multiple mentors in career development, was published in her book "Mentoring at Work: Developmental Relationships in Organizational Life" in 1988.

Levinson et al.: The concept of the "psychological contract" in mentoring relationships, introduced by Daniel J. Levinson and his colleagues, including Charlotte D. Darrow, Edward Klein, Maria H. Levinson, and Brigitte Marlowe, was first outlined in their book "The Seasons of a Man's Life" published in 1978.

Bozionelos: While there are multiple authors with similar names, if you're referring to Christos Bozionelos, his research on mentoring for career adaptability and employability has been published in various articles over the years, but a specific publication year for his work may vary depending on the specific study or article referenced.

Ragins: Belle Rose Ragins has conducted extensive research on mentoring, including the benefits of same-gender and cross-gender mentoring relationships. A specific publication year for her work may vary, as she has published numerous articles and studies on the topic over the years.

Higgins and Kram: The specific publication year for the work of Higgins and Kram emphasizing the role of mentoring in promoting self-awareness and identity development may vary depending on the partic**ular study or article referenced.** Kathleen E. Kram, as mentioned earlier, published her significant work on mentoring in 1988.

Some points where mentoring helps ,but names differs like

(i) Different types of mentoring relationships (e.g., formal, informal, peer, reverse mentoring)

(ii) Specific mentoring activities (e.g., coaching, feedback, skill development)

(iii) Career enhancement outcomes (e.g., skill acquisition, promotions, job satisfaction)

Review of Literature

Kram (1988) introduced the concept of mentoring circles and emphasized the importance of multiple mentors in career development.

Ragins (1997) highlighted the benefits of same-gender and cross-gender mentoring relationships in fostering career success.

Megginson and Clutterbuck (2005) emphasized the significance of mentoring in facilitating career progression and personal development.

Levinson et al. (1978) introduced the concept of the psychological contract in mentoring relationships, emphasizing mutual obligations.

Bozionelos (various years) emphasized the role of mentoring in career adaptability and employability.

Higgins and Kram (various years) emphasized mentoring's role in promoting self-awareness and identity development.

Allen and Eby (2003) explored the impact of mentoring on career outcomes, including job satisfaction and organizational commitment.

Eby et al. (2008) investigated the role of mentoring in career self-management and employability.

Feldman and Dreher (2012) analyzed the impact of mentoring on proteges' career mobility and advancement.

Wanberg et al. (2006) explored the effects of mentoring on proteges' career attitudes and psychological well-being.

Chao et al. (1992) investigated the influence of mentoring on proteges' job performance and satisfaction.

Noe (1988) discussed the benefits of mentoring in skill development and knowledge transfer.

Wanberg and Kammeyer-Mueller (2000) investigated the impact of mentoring on proteges' career decision-making and adjustment.

Allen et al. (2004) explored the effects of mentoring on proteges' job performance and organizational citizenship behaviors.

These studies collectively highlight the multifaceted impact of mentoring on career development, personal growth, and organizational success in the digital age.

Objectives of the study

1.To study the Role of Mentoring in the Digital Age

2.To study the importance of mentoring in facilitating career progression and personal development

3. To understand how Mentoring at Work and Develops a positive Relationships towards Organizational Life.

4. To analyse how mentoring helps in career adaptability and employability

5. To study the role of mentoring in promoting self-awareness and identity development

Research Methodology

This paper is Secondary research which involves gathering information from sources such as books, journals, articles, and online databases to gain insights into a specific topic. It helps in validating findings, exploring different perspectives, and building on existing knowledge. By analysing data collected by others, researchers can formulate current trends helping for mentoring, and draw conclusions without conducting primary research themselves.

In the digital age, mentoring serves as navigating the complexities of rapidly evolving technologies and industries. Mentoring fosters digital literacy and adaptability, equipping individuals with the skills needed to thrive in a tech-driven world. It facilitates knowledge transfer and innovation, bridging the gap between experienced professionals and emerging talent. Mentors provide guidance on leveraging digital tools and platforms for productivity and collaboration, enhancing organizational efficiency. Mentoring in the digital age promotes diversity and inclusion, fostering a culture of learning and growth for individuals from diverse backgrounds.

Mentoring plays a pivotal role in facilitating career progression and personal development across various professional domains. Here's an explanation outlining its importance:

Guidance and Direction: Mentors provide invaluable guidance, helping mentees in their career paths by sharing insights, experiences, and industry knowledge.

Skill Development: Mentoring facilitates skill development by offering opportunities for mentees to learn new techniques, best practices, and problem-solving strategies from experienced professionals.

Confidence Boost: Through encouragement and constructive feedback, mentors help mentees build confidence in their abilities, empowering them to take on new challenges and pursue ambitious career goals.

Networking Opportunities: Mentoring relationships often provide access to valuable networks and connections within the industry, opening doors to new career opportunities, collaborations, and professional growth.

Personalized Support: Mentors offer personalized support tailored to the individual needs and aspirations of mentees, fostering a sense of belonging and empowerment in their professional journey.

Role Modeling: Mentors serve as role models for mentees, demonstrating professionalism, integrity, and resilience in the face of adversity, thereby inspiring mentees to emulate these qualities in their own careers.

Feedback and Reflection: Mentoring encourages regular feedback and reflection, enabling mentees to identify areas for improvement, capitalize on strengths, and develop a growth mindset essential for career advancement. Innovation and Creativity: Mentoring fosters a culture of innovation and creativity by encouraging mentees to think critically, challenge the status quo, and explore new ideas and approaches in their work.

Continuous Learning: Mentoring promotes a lifelong learning mindset by encouraging mentees to seek out new learning opportunities, stay updated on industry trends, and invest in their professional development.

Employee Engagement: Mentoring enhances employee engagement and retention by fostering meaningful connections and a sense of belonging among mentees, leading to greater job satisfaction and loyalty to the organization.

Legacy Building: Mentoring allows experienced professionals to leave a lasting legacy by sharing their knowledge, wisdom, and experiences with future generations, making a positive impact on the careers and lives of others.

Overall, mentoring serves as a cornerstone for career progression and personal development, providing invaluable support, guidance, and inspiration to individuals as they navigate their professional journeys.

Mentoring at work fosters positive relationships within organizational life by nurturing trust, communication, and collaboration among employees. For example, in Indian workplaces, senior employees often mentor junior counterparts, creating a supportive environment where knowledge sharing and skill development thrive. These mentoring relationships promote loyalty and commitment to the organization, as mentees feel valued and supported in their professional growth. Additionally, mentors in Indian organizations often play a crucial role in transmitting cultural values and organizational norms to mentees, enhancing their sense of belonging and alignment with the company's goals. Overall, mentoring contributes to a harmonious and productive work culture, benefiting both individuals and the organization as a whole in the Indian context.

Mentoring plays a crucial role in enhancing career adaptability and employability by providing individuals with the guidance, support, and resources needed to navigate the evolving job market. Here's how mentoring contributes to career adaptability and employability, along with examples:

Skill Development: Mentors help mentees identify and develop relevant skills that are in demand in the current job market, such as digital literacy, problem-solving, and adaptability. Example: A mentor in the technology sector might guide a mentee in learning new programming languages or mastering emerging technologies like artificial intelligence or block chain.

Industry Insights: Mentors offer valuable insights into industry trends, market demands, and emerging opportunities, enabling mentees to stay abreast of changes and proactively adapt their skills and career strategies. Example: A mentor in the finance industry might provide guidance on shifting market dynamics or regulatory changes impacting the sector, helping a mentee make informed career decisions.

Networking Opportunities: Mentoring relationships often provide access to professional networks, job referrals, and career-enhancing connections, expanding mentees' opportunities for career advancement and employment. Example: A mentor in marketing may introduce a mentee to influential professionals in the field, opening doors to job opportunities or collaborations with industry leaders.

Career Exploration: Mentors encourage mentees to explore diverse career paths, industries, and roles, fostering adaptability and versatility in their career trajectories. Example: A mentor in healthcare might encourage a mentee to explore roles in healthcare administration, clinical research, or healthcare consulting, based on their interests and strengths.

Feedback and Reflection: Mentors offer constructive feedback and guidance to mentees, facilitating self-reflection and continuous improvement in their skills, performance, and career choices. Example: A mentor in education might provide feedback on lesson planning or classroom management techniques, helping a mentee refine their teaching skills and enhance their employability.

Adaptation to Change: Mentors support mentees in navigating career transitions, such as job changes, relocations, or industry shifts, by providing guidance and encouragement during periods of uncertainty. Example: A mentor in the IT sector may assist a mentee in transitioning from software development to project management, offering advice on acquiring relevant certifications or skills for the new role.

Resilience Building: Mentors help mentees develop resilience and coping strategies to overcome setbacks, challenges, or career disruptions, fostering adaptability in the face of adversity. Example: A mentor in the hospitality industry may mentor a mentee who faced job loss due to the COVID-19 pandemic, helping them explore alternative career paths or retrain for new opportunities in related fields.

Lifelong Learning Mindset: Mentors promote a lifelong learning mindset in mentees, encouraging them to pursue continuous education, professional development, and skill enhancement throughout their careers. Example: A mentor in the legal profession might encourage a mentee to attend workshops, webinars, or online courses to stay updated on changes in laws, regulations, and legal practices.

Cultural and Organizational Fit: Mentors assist mentees in understanding organizational cultures, values, and expectations, facilitating their integration into new workplaces and

enhancing their employability. Example: A mentor in a multinational corporation may provide insights into the company's corporate culture, team dynamics, and communication norms, helping a mentee adapt and thrive in the organization.

Personal Branding and Marketing: Mentors guide mentees in building their personal brand, showcasing their skills, achievements, and unique value propositions to prospective employers or clients, boosting their employability. Example: A mentor in the creative industries may advise a mentee on creating an online portfolio, networking on professional platforms like LinkedIn, and showcasing their work to attract freelance opportunities or job offers.

Overall, mentoring serves as a catalyst for career adaptability and employability, empowering individuals to proactively navigate career transitions, acquire new skills, and seize opportunities for professional growth and advancement in a rapidly changing job market.

Mentoring plays a crucial role in promoting self-awareness and identity development among mentees by providing them with guidance, feedback, and support to explore their strengths, values, and personal aspirations. Here's how mentoring contributes to self-awareness and identity development, along with examples:

Reflection and Feedback: Mentors encourage mentees to reflect on their experiences, skills, and goals, facilitating self-discovery and awareness of their strengths and areas for growth. Example: A mentor might ask probing questions to help a mentee reflect on their career aspirations, values, and priorities, leading to greater self-awareness and clarity about their professional identity.

Values Alignment: Mentoring helps mentees identify their core values and beliefs, aligning them with their career choices and personal aspirations, fostering authenticity and integrity in their professional identities. Example: A mentor might guide a mentee in exploring their values related to work-life balance, social responsibility, or innovation, assisting them in finding career paths that resonate with their beliefs.

Strengths-Based Development: Mentors help mentees recognize and leverage their strengths, talents, and unique qualities, boosting their confidence and self-esteem in pursuing their career goals. Example: A mentor might conduct a strengths assessment with a mentee and provide feedback on their top strengths, suggesting how they can apply these strengths in their current role or future career endeavours.

Identity Exploration: Mentoring provides a safe space for mentees to explore different aspects of their identity, including cultural background, interests, and personal passions, fostering self-acceptance and authenticity. Example: A mentor from a similar cultural background might share their own experiences of navigating cultural identity in the workplace, empowering a mentee to embrace their cultural heritage and identity in their career journey.

Goal Setting and Clarity: Mentors assist mentees in setting clear and meaningful goals aligned with their values and aspirations, guiding them in creating a roadmap for personal and professional development. Example: A mentor might help a mentee articulate their long-term career vision and break it down into actionable short-term goals, providing accountability and support to achieve their objectives.

Emotional Intelligence: Mentoring helps mentees develop emotional intelligence and self-regulation skills, enhancing their ability to understand and manage their emotions in various professional contexts. Example: A mentor might coach a mentee on effective communication strategies or conflict resolution techniques, enabling them to navigate challenging situations with empathy and composure.

Confidence Building: Mentors empower mentees to recognize their worth and potential, building their confidence and self-assurance in pursuing career opportunities and taking on leadership roles. Example: A mentor might challenge a mentee to step outside their comfort zone and volunteer for leadership projects or public speaking opportunities, boosting their confidence and visibility in the workplace.

Cultural and Diversity Awareness: Mentoring exposes mentees to diverse perspectives, cultures, and experiences, broadening their understanding of identity and promoting inclusivity in the workplace. Example: A mentor from a different cultural background might share insights into cultural norms, customs, and communication styles, helping a mentee develop cultural competence and adaptability in multicultural environments.

Boundary Setting: Mentors assist mentees in setting healthy boundaries and managing expectations in their professional and personal lives, fostering self-care and well-being. Example: A mentor might advise a mentee on prioritizing their time and energy, setting boundaries around work commitments, and maintaining work-life balance to prevent burnout and maintain overall well-being.

Continuous Growth and Development: Mentoring encourages mentees to embrace a growth mindset and lifelong learning, empowering them to adapt, evolve, and reinvent themselves throughout their careers. Example: A mentor might challenge a mentee to seek out new learning opportunities, pursue certifications or advanced degrees, and continuously invest in their personal and professional development to stay relevant and competitive in their field.

Overall, mentoring serves as a catalyst for promoting self-awareness and identity development by providing mentees with the guidance, support, and encouragement needed to explore their strengths, values, and personal identities in the context of their careers and lives.

Findings

1.It facilitates mentorship opportunities regardless of geographical location, enhancing access for individuals in remote areas.

2. It provides diverse communication channels such as video conferencing, messaging, and email, accommodating different preferences and schedules.

3.Mentoring can quickly, reaching larger audiences and addressing the demand for mentorship in various domains.

4.It bridges the generational gaps, facilitating knowledge transfer between seasoned professionals and younger generations.

5 It fosters the connections between individuals worldwide, enabling diverse perspectives and cross-cultural exchanges.

Conclusion

In the digital age, the vital role of mentoring in shaping individual and organizational success cannot be overstated. Mentoring serves as a guiding light amidst the complexities of rapidly evolving technologies and industries, providing individuals with the support, guidance, and resources needed to navigate the digital landscape with confidence and competence. By fostering digital literacy, adaptability, and innovation, mentoring empowers individuals to harness the full potential of digital tools and platforms, driving professional growth and organizational success. Moreover, mentoring promotes diversity, inclusion, and collaboration, fostering a culture of continuous learning and innovation essential for thriving in today's dynamic digital environment. Through meaningful relationships and knowledge exchange, mentors inspire mentees to embrace change, seize opportunities, and cultivate resilience in the face of uncertainty.

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Economic Analysis of Arrivals and Prices of Tomato in Gultekadi Market of Pune.

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ABSTRACT

The study was undertaken with a view to examine pattern of price behaviour between market arrivals and prices in selected market. This study is based on the secondary data of 10 years from 2014-15 to 2022-23 which was collected from Gultekadi APMC in Pune district. For the analyzing, the data exponential types of equation were used and the trends in arrivals and prices were calculated. During the study period, in Gultekadi market, arrival was the highest arrivals in the month of February and the lowest arrivals was in the month of November. In terms of prices, Gultekadi market witnessed maximum price per quintal in July whereas minimum price per quintal in March. Gultekadi market witnessed negative growth rate during the study period in terms of arrivals. In terms of prices, positive compound growth rate observed.

Keywords: Trends, Arrivals, Prices, Growth rate, Gultekadi

Highlights:

- **Gultekadi Market** witnessed negative growth rate during the study period in terms of arrivals.
- In terms of prices, Gultekadi Market shows positive compound growth rate which was statistically significant.

In India, Total horticulture production in the year 2022-23 is estimated to be 351.92 million tonnes, an increase of about 4.74 million tonnes (1.37%) as compared to the last year i.e. 2021-22. India is the 2nd largest vegetable producer country in the world after China. Tomato rank third whereas potato and onion rank first and second respectively. (Department of Agriculture & Farmers Welfare). During 2022-23 , total production of vegetable was 351.395 million tonnes on 28.2 million hectare area. (Ministry of Agriculture & Farmers

Welfare).. In terms of production, India is the world's second leading producer of tomato whereas in India the major Tomato producing States in the country are Andhra Pradesh, Madhya Pradesh, Karnataka, Gujarat, Odisha, West Bengal, Maharashtra, Chhattisgarh, Bihar, Telangana, Uttar Pradesh, Haryana and Tamil Nadu. These States are account for 91% of the total production of the country. In Maharashtra, tomato is mainly cultivated in Pune, Nashik, Ahmednagar, Aurangabad, Solapur and Nagpur districts (Hindustan Times) .

MATERIALS AND METHODS

The time series data on market arrivals and prices were collected over a period of 10 years from 2013-2014 to 2022-2023. In Pune city, there are a total of 6 functioning Agricultural Produce Market Committee (APMC). The secondary data were collected from one major APMC that is Gultekadi APMC. To attain conclusion from the study, data was analysed by using simple tabular analytical tools such as mean, frequencies, ratios, percentages and functional analysis such as trend and compound growth rate in market arrivals and prices. The analytical techniques employed in the study are explained in the following sections.

Trend in market arrivals and prices:

Agarwal *et al*., (2018) and Daundkar *et al*., (2015) studied the behaviour and relationship between arrivals and prices. The statistical tools employed includes, exponential function.

The following form of equation was utilised.

$$\mathbf{Y = a . b^t}$$

Where,

Y=Monthly arrivals/prices a= Constant

b= Trend coefficient t= Time period

Annual compound growth rate (CGR) in percentage was calculated as,

$$\mathbf{CGR}(\%) = (\mathbf{Antilog\ of\ b} - \mathbf{1}) \times \mathbf{100}$$

To carry out accurate and efficient analysis and processing with regard to trend in arrivals and prices of Tomato, R statistical software which is a free software environment for statistical computing was employed.

RESULTS AND DISCUSSION

The main aim of the study was to analyse the trend in arrivals and prices of tomato in Pune district, it is presented as follows-

Monthly average of Arrivals of Tomato at Gultekadi APMC, Pune:

The total and the mean arrivals of Tomato in the selected markets during the study period were worked out and the results are presented in Table 1.

Table 1: Marketwise monthly average of Arrivals of Tomato(2013-14 to 2022-23)

Sr.No	Month	Total Arrivals(qtls)	Monthly Average (qtls)
1	January	2715.88	294.198
2	February	3406.72	359.305
3	March	3265.17	346.427
4	April	2860.4	308.39
5	May	2395.179048	260.8879048

6	June	2763.831667	294.7151667
7	July	2523.39	264.763
8	August	2713.74	286.944
9	September	2681.04	289.434
10	October	3059.75	328.975
11	November	1497.16	168.176
12	December	3038.81	327.421

(Note: Simple average was used to find out monthly average arrival)

The results in Table 1 revealed that during the study period, in Gultekadi market, **highest total** arrival was in the month of **February** (3406.72 quintals) and **lowest** arrival was recorded in the month of **November** (1497.16 quintals). The results are in correlation with the findings of Jahangir *et al*., (2018) and Thakare *et al*., (2017).

Monthly average of Prices of Tomato at Gultekadi APMC, Pune

Likewise, price per quintal of Tomato in the selected market was compiled. The total prices per quintal and the monthly averages of prices per quintal were calculated and the results are presented in Table 2. According to table 2, the **maximum price** per quintal was in the **month of July** (Rs 22631.48/qtls) whereas **minimum price** per quintal was in the **month of March** (Rs.8248.93/qtls). Similar results were found by Andhalkar *et al*., (2011)

Table 2 :Monthly average of Prices of Tomato at Gultekadi APMC, Pune(2013-14 to 2022-23)

Sr.No	Month	Price (qtls)	Monthly Average Price (qtls)
1	January	9673.46	967.346
2	February	8360.61	836.061
3	March	8248.93	824.893

4	April	8305.37	830.537
5	May	11886.34	1188.634
6	June	17230.76	1723.076
7	July	22631.48	2263.148
8	August	15832.36	1583.236
9	September	10905.41	1090.541
10	October	13286.05	1328.605
11	November	13688.1	1368.81
12	December	12437.58	1243.758

(Note: Simple average was used to find out monthly average prices)

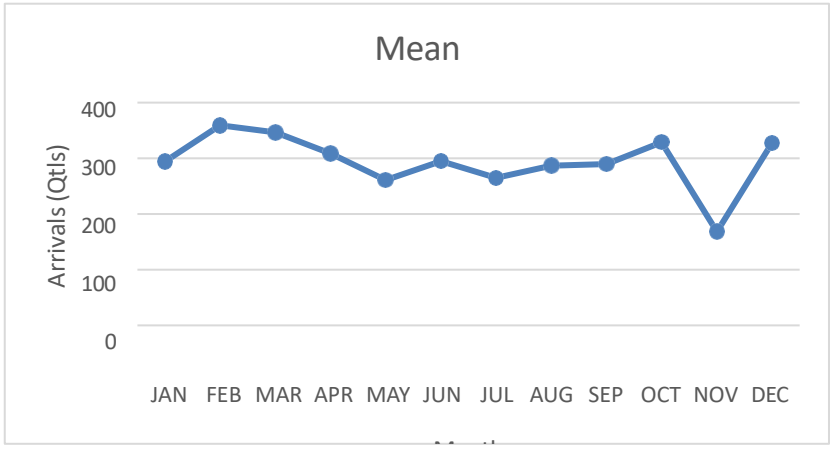

Figure 1: Graphical representation of Mean of arrivals of Tomato in Gultekadi market

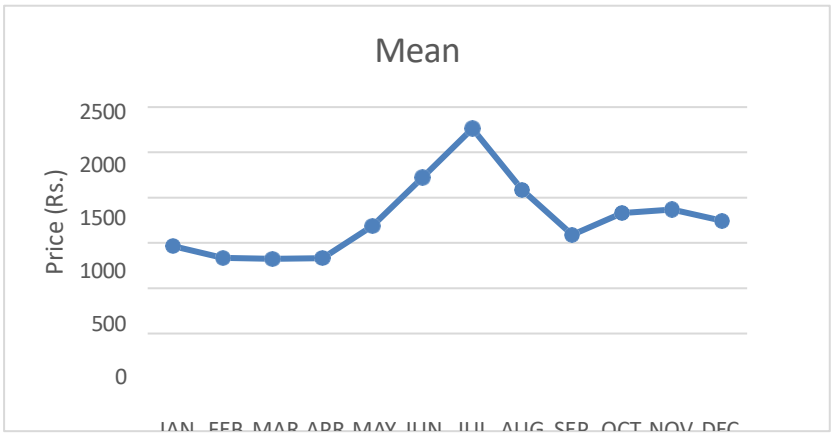

Figure 2: Graphical representation of Mean of prices of Tomato in Gultekadi market

Trend in arrivals and prices of Tomato:

The time series data on monthly arrivals and prices of tomato covering the time period of ten years (2014 to 2023) was collected from APMC, Gultekadi Pune.

Tomato Arrivals:

Annual Compound Growth Rate with respect to arrival was calculated for Gultekadi APMC and the results are presented in Table 3.

Table 3: Compound growth rate of arrivals of Tomato

Particulars	**Gultekadi APMC**
b	-0.01
R^2	0.10
t-value	-0.92
CGR(%)	-0.47

(**** denotes non significant at 1% level of significance*)

The results revealed that Gultekadi APMC witnessed negative growth during the study period that is -0.47 per cent. This result found to be statistically non-significant.

Tomato Prices:

Annual Compound Growth Rate with respect to price was calculated for Gultekadi APMC and the results are presented in Table 4.

Table 4: Compound growth rate of prices of Tomato

Particulars	Gultekadi Market
b	31.31
R^2	0.026
t-value	0.47
CGR(%)	1.71

(*** *denotes significant at both 5 % and 1% level of significance*)

Table 4 revealed that price in Gultekadi APMC witnessed comparatively higher compound growth rate of 1.71 per cent per annum over the period of time which was statistically significant at one per cent level of significance.

CONCLUSIONS

The present study in Pune district concluded that in Gultekadi market, the highest arrivals in the month of February and the lowest arrivals was in the month of November. The price of Tomato was recorded to be highest in the month of July and lowest in the month of March. Analysis of the growth rate of arrivals and prices of tomato in Gultekadi market suggested that with respect to arrivals market shows negative and non-significant growth rates during the study period. But with respect to tomato price it shows positive and significant growth rates.

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"A Study on perception and inclination of management students towards start-ups as a career option after Covid crisis."

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Abstract:

The discovery of Corona virus and its spread all over the world led many countries to implement strict measures like lockdown. This lockdown has disrupted many businesses, drastic drop in global demand results in to lay off for many organizations. Lakhs of people have lost their jobs during this pandemic. It was a shock to economic actors includes big giants as well as start-ups. Pandemic came with many challenges for businesses and people in common. But at the same time it also came with several opportunities in the form of start-ups. Government of India also put one step ahead to support the start-ups. Current study made an attempt to understand how management students take this opportunity by choosing start-up as a career option. A survey was conducted among management students pursuing their masters under Pune University. It was aimed to study their perception and preferences for start-ups, motivating factors and Government initiatives taken during pandemic period to boost start-ups. Study reveals that there is a positive inclination among management students to choose start-up as a career option. Management students prefer more to jobs but still there is a significant percentage of the respondents willing to start their own venture also.

Keywords:

Start-up, Entrepreneurship, Pandemic, Employment, Management students, Challenges and opportunities in start-ups etc.

1. Introduction:

Small businesses and entrepreneurship plays an important role in Indian economy. They contribute approximately one third to the India's GDP. Corona Pandemic that emerged during 2019 had a profound impact on all the sectors of global business. Huge number of business players faced and suffered ruthless losses in their businesses in the form of- loss of customers, logistical barriers, operational stagnation and problems of bankruptcy. This led to mass layoffs and unemployment. The biggest problem that plagued the young population of the world was unemployment & underemployment during the pandemic. Young people especially between the age group of 20 to 30 suffered a lot by losing a stable source of income. Globally the rate of unemployment increased and it reached its all-time high, 8.7%. College students were the most affected segment because of this pandemic and it exposed them to severe unemployment problems.

Indian's usually opt for a stable corporate job after their education. But since the startup culture has set in, student's have realised that they have a chance at working for themselves without a high entry or exit barrier. This had made more people take up entrepreneurship over the traditional jobs. Post pandemic this percentage increased as mass layoffs and unemployment triggered the entrepreneurial ideology even more & in turn flourished the startup ecosystem.

Now the mentality of all the stakeholders like students, parents, society, colleges and universities has been change drastically and now they are thinking about the start-up and entrepreneurial activities. We can see pandemic from both side. One is darker at the same time it bought some opportunities too. Many of the sectors of the business have flourished like anything during this pandemic period. Start-ups like online education and tutoring, infotainment, food services, e- commerce,

telemedicine's etc. It motivated the management students for thinking about to start their own venture. Due to restrictions during pandemic all the college students academic get affected and same reflected in the job creation too. This has changed the way college students, teachers; parents all the stake holders think about to initiate their own venture. This result in to replacement of traditional job seekers to contemporary job giving attitude. There are various factors that contributed for nurturing start-up ecosystem in India. Hence through this study an attempt has been made to understand the change in the mind set of management students for having their own start-ups, their opinion and attitude towards the start-ups and to understand various barriers and challenges they face during their start-up.

2. Objectives and Scope

Following are the objectives of the research work.

1. To understand the change in attitude of students with respect to start-ups and entrepreneurship after Covid-19.
2. To determine the impact of Covid-19 pandemic on start-up culture.
3. To understand various factors that motivates the management students for choosing start- up as a career.
4. To determine the role of government in motivating the management students for choosing start-up as their career.

Scope:-

Current research work is limited to the respondents belonging to Pune city. Management student's pursuing their education under Pune University is considered for the research study. Functional scope of the research work is related with variables like impact of pandemic on start- up culture, Change in management student's attitude towards start-ups, role of institutes and syllabus, etc.

3. Hypotheses:-

H0: Pandemic Covid 19 has no impact on management student's inclination towards start-ups.

H1: Pandemic Covid 19 has a positive impact on management student's inclination towards start-ups.

H0: Government schemes and initiatives does not motivates management students for choosing entrepreneurial activities after their education.

H2: Government schemes and initiatives motivating management students for choosing entrepreneurial activities after their education.

4. Literature Review

The global pandemic in last two years came with multiple opportunities for start-ups. Actually it bought a true boom and surge in start-ups during Covid pandemic. Many of the start-ups are started by the people who were laid off from their employer.

Following are the different literature reviewed in the research work.

1) Ritesh Dwivedi (2019)[1] investigated the various challenges and vulnerabilities that are faced by start-ups in India. According to his findings before pandemic governments support and stringent start-up policies were the major difficulties to start-ups. Complicated procedures and regulations are also need to change and made it as convenient as possible. Researcher also observed that Start-up India will definitely boost the number of startups coming in the next few years.

2) Zhengda Xu and Heqi Jia (2022)[2] Researcher has conducted the study with the objective of understanding the impact of Covid pandemic on entrepreneurs psychology and well being. He has observed that this pandemic left the long lasting impact on start-ups and entrepreneurs. It has double negative impact i.e. their health problems as well as decrease in business and profits. High level of anxiety was observed among the entrepreneurs.

3) World Bank Blog (2022)[3] has studied the causes and major drivers of job losses during pandemic situation. According to blogger business closures, declined in demand, supply disruptions are the major factors that shock to world employment.

4) The Hindu (2nd July 2021)[4] Article talks about the challenges of re-employment after the first wave of Covid-19 pandemic. According to article almost 40% of the people who lost their jobs in first wave had been unable to get other job opportunities even after a year of national lockdown. It revealed that 52% of the urban employees went at least a months without work, pay or financial assistance etc. It also explored that near 14% of the employed people during Corona period were paid at the minimum wage level or half of their salaries. Younger's between the age group of 25 to 30 suffered more in the pandemic.

5) Government Schemes[5]: During lock down, government of India has taken proactive steps to boost and motivate the start-ups that are impacted during Covid lockdown. SIDBI has launched CSAS i.e. COVID-19 Startup Assistance Scheme to provide working capital loans with minimum interest rate. It helps the youngsters to reduce the problems of cash flows and liquidity. Along with this government has launched other schemes like SBI covid-19 funding schemes, Atal Innovation Mission, tax filing deadline extension, Atal Bimit Vyakti kalian yojana schemes, MSME Ideal portal, Increase in insolvency threshold for MSME's etc.

6) Forbes Magazine (2021)[6] stated that pandemic has bought the true boom in start-up across the world. A huge surge in start-ups witnessed in many countries recorded high after the backdrop of Corona Virus Pandemic situation. In US there is an increase of 95% in startups compared to 2019 statistics before pandemic. In France there is an increase in start-ups with 20% as well as in Japan 14%. Most of the star-ups are coming in IT industry. Digitalization is playing an important role in upcoming start-up ideas. Forbes survey observed that many of the start-ups are being opened by the people who were laid off during pandemic situation. Analyst predicted that this growth in start-ups will be continue in the future too.

5. Research Methodology

Sr. No.	Content	Description
1	Research Approach	Descriptive Research
2	Sampling Technique	Convenience non Random sampling.
3	Sample Size	240 Management Students
4	Data Collection	**Primary data** collected through **questionnaire.** **Secondary data** was colleceted through reviewing **research papers, blogs, news article etc.**

6. Data Analysis

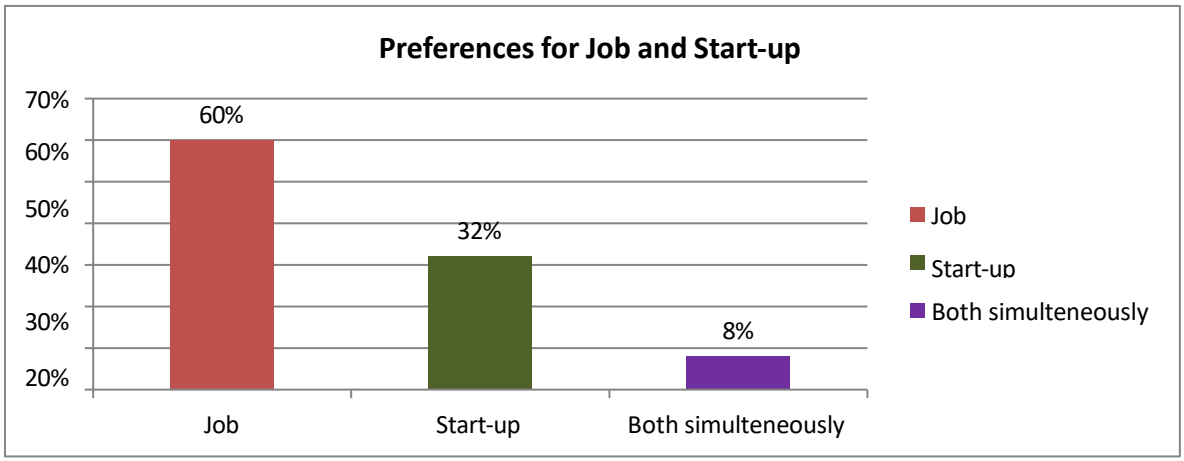
Table No.1: Demographic Information of the respondents

Demographic Information of the respondents		
Gender	Male	138
	Female	102
Management Course	MBA	163
	MCA	77
Parents Occupation	Service	93
	Business	46
	Farmer	38
	Other	63

Interpretation:- From the above table it has been observed that survey includes students pursuing their masters in management (MBA & MCA) in Pune University. There were 138 male and 102 were female management students appeared. 163 respondents pursuing their MBA and 77 pursuing MCA. Parent's occupation has a

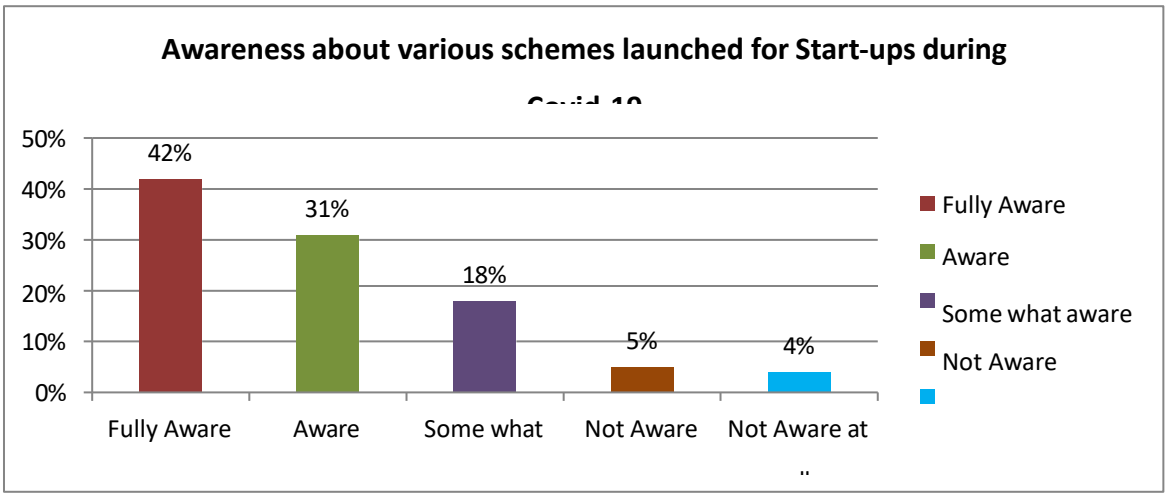
significant relationship with student's inclination for start-ups. Hence parent's occupation studied and survey includes 93 parents were service holders, 46 parents were from business background, 38 were from farming back ground and 63 were from other profession.

Graph No.1: Preference for job and Start-up after completion of Masters



Interpretation:- Above graph shows that 60% of the management students prefers job afer completion of their masters. Surprisingly it has been observed that there is a huge surge in preferences for start-up with 32%. There were 8% of the respondents looking for both job as well as star-up as they don't wanted to take a risk and get some corporate experience that will help them in future for the progression in entrepreneurship.

Graph No.2:- Awareness of government schemes launched during Covid-19 for start-ups.



Hypothesis Testing

H1: Pandemic Covid 19 has a positive impact on management student's inclination towards start-ups.

Chi-Square Tests		
Impact of Covid 19 Pandemic*Inclination towards Start-ups	Value	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.526a	0.001
Likelihood Ratio	2.527	0.015
N of Valid Cases	240	

Interpretation:- Respondents were asked about the effect of covid-19 pandemic on choice of start-up as a career. Chi-square test was run with a 95% of confidence level and 5% of significance level. From the analysis observed that p-value 0.001 which is less than 0.05. Hence it does not support the null hypothesis and therefore alternative hypothesis is accepted. Therefore it can be conclude that Covid-19 pandemic has a positive effect and came with many opportunities for start-ups.

H0: Government schemes and initiatives does not motivates management students for choosing entrepreneurial activities after their education.

H2: Government schemes and initiatives motivate management students for choosing entrepreneurial activities after their education.

Statement	**Mean Value**	**Standard Deviation**	**T-Value**	**Sig. Value (p-value)**
Government schemes and initiatives taken during Covid-19 pandemic influences us for choosing start-up as a career option.	4.23	0.46	33.42	0.0032

Interpretation:- Respondents were asked about influence of government schemes and initiatives for start-ups during Covid 19 to Choose start-up as a career option. Responses were collected on a five likert scale. (1-No Influence to 5-High Influence). Mean value 4.23 depicting a great extent of influence of government schemes and initiatives on student's inclination towards start- up. Standard deviation explores that there is a less deviation between the mean value and actual observation. T-Test was run and result shows that p-value is less than 0.05. Hence it fails to prove the null hypothesis therefore alternative hypothesis is accepted.

7. Findings:-

Following are the findings drawn on the basis of data analysis.

- Research was dominated by male respondents as compared to female respondents.
- Data shows that 163 respondents were from MBA and 77 respondents were from MCA course.
- It can be inferred from the data that parent's occupation has no relation with student's inclination towards start-ups.
- Data shows that there is a significant awareness among the management students about the various schemes and initiatives launched by the government after breakout of Covid pandemic.
- 32% of the respondents want to become entrepreneur after completion of their masters in management. It shows their positive entrepreneurial attitude.
- Study observed that students showing their inclination toward star-ups have novel, critical, and disruptive ideas.
- Survey found that management students, entrepreneurship are often motivated by personal pursuits, traits, attitude and interest etc. Government Policy support also observed significant in choosing entrepreneurship as a career option.
- Fear of failure also observed significant in choice of start-up as a career option and hence most of the respondents (60%) don't wants to take any risk and shown their interest in job.
- Respondents were asked how likely they are to start their own venture in the future.

Result shows that around 60% of the respondents are having their own ideas to convert in start-up.

❖ **Suggestions:-**

-Management institutes are suggested to start innovation and incubation centres to motivate the students for start-up as well as to create entrepreneurial culture in the institutes.

-Government should have a tie-up with the institutes as well as universities for creating awareness of their different start-up policies.

-Management students are suggested o go through different success and failure stories of start-ups that will help them to develop right ideas for start-ups.

8. Limitations:-

- Current research is concludes its results on the basis of management students feedback.

Hence these results applicability to other streams students is a questionable.

- Pandemic severity was varying from country to country and hence has varied impact on economy, employment and other things. As the current research conducted only in India –Maharashtra hence its applicability in other countries may be reduced.
- For future scope of the research it can further be surveyed among the different streams of the universities as well as different places like other states and other countries.

9. Conclusion:-

On the basis of survey among management students under Pune University, the article explored the student's inclination towards start-up as the career especially after Covid 19 pandemic.

Various factors were studied in the research like students demographic profile, their awareness about various government schemes for start-ups, their preferences for job and entrepreneurship and fear of failure etc. Empirical data was collected and results were drawn. Results shows that pandemic has a significant and positive impact on student's preferences for start-ups as a career option. Government schemes and support policies motivates them for choosing start-up as a career option.

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Exploring managerial tacit knowledge

A literature review on its role in addressing businesschallenges in manufacturing industry

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Guide, Dr Asita Ghewari

Tacit knowledge in the context of managerial decision-making Tacit knowledge is a concept that has been studied & investigated by many scholars however following two definitions from Michael Polanyi and Nonaka and Takeuchi are well-known and widely accepted

MICHAEL POLANYI'S DEFINITION:

Michael Polanyi, a Hungarian-British polymath, introduced the concept of tacit knowledge. He described it as "we can know more than we can tell." According to Polanyi, tacit knowledge is personal, difficult to formalize, and often rooted in personal experience. It includes skills, intuitions,and understanding that individuals possess but may find challenging to articulate explicitly.

NONAKA AND TAKEUCHI'S DEFINITION:

Nonaka and Takeuchi, Japanese organizational theorists, expanded on the concept of tacit knowledge in the context of organizational learning. They defined it as "knowledge that is not easilyvisible and expressible, highly personal, and hard to formalize." According to them, tacit knowledge is subjective and is deeply embedded in individuals' experiences, insights, and intuitions. It is often shared through socialization and internalization processes within an organization.

Both definitions highlight the personal and often unarticulated nature of tacit knowledge, emphasizing its role in shaping individuals' skills, judgments, and expertise. The distinction between tacit and explicit knowledge is fundamental to understanding how knowledge is created, shared, and applied in various contexts

In the context of managerial decision-making, tacit knowledge plays a crucial role in shaping the judgment, intuition, and expertise that managers employ in various situations.

Key points to understand the concept of tacit knowledge in managerial decision-making:

Tacit knowledge encompasses the skills, insights, and understanding that individuals acquire through experience, practice, and exposure to different situations. This knowledge is not explicitlydocumented and is often internalized by individuals.

Managers often rely on tacit knowledge when making decisions by drawing on their intuition and judgment. This intuitive decision-making is informed by years of experience and a deep understanding of the business environment.

Tacit knowledge is highly context-specific, meaning it is closely tied to the particular circumstances,industry nuances, and organizational culture. It is knowledge that is difficult to transfer to others without direct experience.

Tacit knowledge is shaped by social interactions and personal experiences. It includes insights gained through collaboration, mentorship, and observation, making it a product of the manager's social and professional environment.

Unlike explicit knowledge, which can be codified into manuals, procedures, or databases, tacit knowledge is challenging to formalize. It is often transferred informally through storytelling, apprenticeship, and shared experiences.

In complex and ambiguous situations, where explicit knowledge may be insufficient, managers heavily rely on tacit knowledge to navigate uncertainties and make informed decisions.

Tacit knowledge is dynamic and evolves over time. Managers continuously learn from their experiences, adapting their tacit knowledge to changing circumstances and new challenges.

Understanding and leveraging tacit knowledge in managerial decision-making is essential for effective leadership, as it allows managers to draw on their rich reservoir of experience to address complex and dynamic business scenarios. Recognizing the importance of tacit knowledge can enhance decision-making processes and contribute to organizational success

SIGNIFICANCE OF TACIT KNOWLEDGE IN MANUFACTURING

Tacit knowledge plays a significant role in addressing complex business issues in the manufacturing sector, contributing to innovation, problem-solving, and overall organizational success. Tacit knowledge refers to the implicit, experiential, and often unspoken knowledge that individuals

accumulate through their personal experiences, insights, and skills. In the manufacturing sector, where technology, processes, and market dynamics constantly evolve, tapping into tacit knowledge becomes essential for addressing complex challenges. Here are several ways in which tacit knowledge is crucial in this context:

Problem-solving and Troubleshooting- Manufacturing processes often encounter unforeseen challenges and disruptions. Tacit knowledge, gained through hands-on experience, enables employees to quickly identify and address issues that may not be explicitly documented in procedures or manuals.

Experienced workers can draw on their tacit knowledge to troubleshoot machinery, resolve production bottlenecks, and optimize processes in real-time, contributing to increased efficiency and reduced downtime.

Innovation and Continuous Improvement- Tacit knowledge fuels innovation in manufacturing by fostering a culture of continuous improvement. Experienced workers, with their implicit understanding of processes, can suggest innovative solutions, new techniques, or improvements in existing methods to enhance product quality and production efficiency.

This type of knowledge is often the driving force behind incremental improvements and breakthrough innovations in manufacturing operations.

Tacit knowledge is inherently embedded in the skills and expertise of experienced employees. Facilitating the transfer of this knowledge to newer or less experienced staff through mentorship or training programs is crucial for maintaining operational excellence.

By sharing tacit knowledge, organizations can ensure that best practices are passed down through generations of workers, preserving institutional expertise and preventing knowledge gaps.

Adaptation to Change-The manufacturing sector is subject to rapid technological advancements, changes in market demands, and global economic shifts. Tacit knowledge enables organizations to adapt to these changes by leveraging the insights and expertise of their workforce.

Employees with tacit knowledge can guide the organization through transitions, such as adopting new technologies or implementing changes in production methods, with a better understanding of potential challenges and opportunities.

Decision-Making and Risk Management-Tacit knowledge contributes to informed decision-makingby providing a nuanced understanding of various factors influencing manufacturing processes. This deep understanding allows leaders to make well-informed decisions, particularly in situations where explicit data may be limited or ambiguous.

In risk management, tacit knowledge aids in anticipating and mitigating potential challenges, as individuals draw on their past experiences to assess and address risks effectively.

In conclusion, the critical role of tacit knowledge in the manufacturing sector lies in its ability to enhance problem-solving, drive innovation, facilitate skill transfer, adapt to change, and inform decision-making. Organizations that recognize and leverage tacit knowledge are better positioned to navigate the complexities of the manufacturing landscape and maintain a competitive edge in the industry.

Tacit knowledge plays a significant role in problem-solving and decision-making by providing individuals with the intuitive, experiential, and context-specific insights necessary to navigate complex situations. Here's a closer look at how tacit knowledge contributes to these crucial aspectsof organizational functioning:

INTUITIVE UNDERSTANDING:

Tacit knowledge is often described as "knowing without knowing how you know." It allows individuals to develop an intuitive understanding of situations based on their experiences. In problem-solving, this intuitive grasp can guide individuals towards effective solutions without relying solely on explicit, codified information.

Decision-makers drawing on tacit knowledge can make quicker and more informed judgments, especially when facing novel or ambiguous situations where conventional approaches may not beapplicable.

PATTERN RECOGNITION:

Tacit knowledge enables individuals to recognize patterns and trends that may not be immediately evident through explicit information. This skill is particularly valuable in problem-solving, where identifying underlying issues or recurring challenges is essential.

Decision-makers can use their tacit knowledge to discern patterns in data, behaviors, or processes,helping them address root causes rather than merely treating symptoms.

CONTEXTUAL SENSITIVITY:

Tacit knowledge is highly context-specific, reflecting the nuances and subtleties of particular situations. In problem-solving, this contextual sensitivity allows individuals to consider unique factors and variables that may impact the outcome.

Decision-makers leveraging tacit knowledge are better equipped to tailor solutions to the specific circumstances, accounting for variables that may not be explicitly documented or considered in standardized procedures.

EXPERIENTIAL LEARNING:

Tacit knowledge is often acquired through hands-on experience and learning from past successes and failures. This experiential learning is invaluable in problem-solving, as it provides a reservoir ofinsights that individuals can tap into when facing similar challenges.

Decision-makers can draw on their own or others' experiences to anticipate potential consequences, assess risks, and choose the most effective course of action.

INFORMED RISK-TAKING:

In decision-making, tacit knowledge contributes to informed risk-taking by helping individuals evaluate potential outcomes based on past experiences. This nuanced understanding of risks and uncertainties allows decision-makers to weigh the pros and cons of different options.

Tacit knowledge enables individuals to make decisions that align with organizational goals while minimizing unforeseen negative consequences.

HOLISTIC PROBLEM FRAMING:

Tacit knowledge often involves a holistic understanding of a situation, taking into account various interconnected elements. In problem-solving, this holistic perspective aids individuals in framing issues comprehensively, considering both immediate and long-term implications.

Decision-makers leveraging tacit knowledge are better equipped to make strategic decisions that align with the overall goals and vision of the organization.

In summary, tacit knowledge contributes to problem-solving and decision-making by providing an intuitive understanding, aiding in pattern recognition, offering contextual

sensitivity, facilitating experiential learning, supporting informed risk-taking, and promoting a holistic problem-solving approach. Organizations that recognize and harness the power of tacit knowledge are better positioned to address complex challenges and make effective decisions in dynamic and uncertain environments.

A. Review of Managerial Tacit Knowledge Mode

While there isn't a singular, universally accepted model specifically dedicated to the acquisition, transfer, and application of managerial tacit knowledge, various frameworks and theories exist that shed light on these processes. Here are some notable models and perspectives that contribute to understanding how managerial tacit knowledge is acquired, transferred, and applied:

NONAKA AND TAKEUCHI'S SECI MODEL:

The SECI model, developed by Ikujiro Nonaka and Hirotaka Takeuchi, outlines the conversion processes of knowledge within organizations: Socialization, Externalization, Combination, and Internalization. While the model doesn't explicitly focus on tacit knowledge, it illustrates how tacitknowledge is converted into explicit knowledge and vice versa. Socialization, in particular, involves the sharing of tacit knowledge through direct person-to-person interactions.

POLANYI'S TACIT KNOWLEDGE THEORY:

Michael Polanyi's theory distinguishes between tacit and explicit knowledge, emphasizing the personal and subjective nature of tacit knowledge. According to Polanyi, tacit knowledge is often challenging to articulate explicitly but is essential for skillful performance. While not a model per se, Polanyi's insights provide a foundational understanding of the nature of tacit knowledge.

DIXON'S KNOWLEDGE MANAGEMENT SPIRAL:

Karl-Erik Sveiby and Dorothy Leonard-Barton expanded on Nonaka and Takeuchi's model, introducing the concept of a knowledge management spiral. This model emphasizes the cyclical nature of knowledge creation, with tacit knowledge playing a crucial role in the process. Ithighlights the continuous interaction between tacit and explicit knowledge.

BROWN AND DUGUID'S SOCIAL LEARNING THEORY:

John Seely Brown and Paul Duguid propose a social learning theory that underscores the importance of communities of practice in the development and transfer of tacit knowledge. They argue that tacit knowledge is often embedded in social contexts and is best learned through participation in communities where practitioners share experiences.

SZULANSKI'S STICKY KNOWLEDGE FRAMEWORK:

The Sticky Knowledge Framework by Andrzej Szulanski identifies factors that influence knowledge transfer within organizations. Tacit knowledge is often described as "sticky," meaning it is challenging to transfer. The framework explores various factors, such as the source, recipient, and context, that affect the transferability of tacit knowledge.

HUBER'S ORGANIZATIONAL LEARNING MODEL:James Huber's model focuses on organizational learning and emphasizes the role of tacit knowledge in shaping an organization's absorptive capacity. It suggests that organizations need to acquire, assimilate, transform, and exploit new knowledge, with tacit knowledge being a critical component in the assimilation and transformation stages.

EASTERBY-SMITH AND LYLES' KNOWLEDGE ACQUISITION MODES:

This model suggests four modes of knowledge acquisition: externalization, internalization, combination, and socialization. Internalization, similar to Nonaka and Takeuchi's concept, involves the learning of tacit knowledge through personal experience and reflection.

While these models and frameworks do not exclusively center on managerial tacit knowledge, they provide valuable insights into the broader dynamics of knowledge acquisition, transfer, and application within organizations. Combining elements from these perspectives can offer a more comprehensive understanding of how managerial tacit knowledge operates in real-world business contexts.

While there are several tacit knowledge transfer models available, not all of them may be directly applicable to managerial tacit knowledge transfer.

B. Perspectives on Tacit Knowledge in the context of Indian industry

Cultural factors play a significant role in influencing the development and utilization of tacit knowledge in the managerial context, and India, with its rich and diverse cultural tapestry, offers a compelling case for exploration. Several cultural dimensions impact how tacit knowledge is created, shared, and leveraged among managers in Indian organizations:

COLLECTIVISM:

Influence: India is often characterized by a collectivist culture where group harmony and collaboration are valued. This orientation can influence the development of tacit knowledge, as individuals may draw upon shared experiences and insights within the collective, fostering collaborative problem-solving and decision-making among managers.

HIERARCHY AND RESPECT FOR AUTHORITY:

Influence: India has a traditional hierarchical structure, emphasizing respect for authority figures. This can impact how tacit knowledge is utilized, as subordinates may be hesitant to challenge or question managerial decisions, potentially hindering the free flow of tacit knowledge.

COMMUNICATION STYLES:

Influence: India is a diverse country with multiple languages and communication styles. The communication style, which can be indirect and implicit, influences how tacit knowledge is sharedamong managers. Non-verbal cues and contextual understanding are often crucial for effective communication of tacit knowledge.

LONG-TERM ORIENTATION:

Influence: Indian culture often emphasizes a long-term orientation, valuing traditions and experience. Managers may rely on tacit knowledge gained through years of experience, and theremight be a preference for stability over rapid changes in managerial approaches.

UNCERTAINTY AVOIDANCE:

Influence: While India is often considered moderately tolerant of uncertainty, there can be variations across regions and industries. The level of uncertainty avoidance can impact how managers deal with ambiguity and how willing they are to experiment and share innovative tacit knowledge.

CONTEXTUAL SENSITIVITY:

Influence: India's cultural context places a high value on contextual sensitivity. Managers may develop tacit knowledge that is deeply rooted in understanding the nuances of specific situations.This contextual awareness is crucial for effective decision-making and problem-solving in the managerial realm.

RELATIONSHIP ORIENTATION:

Influence: Indian culture places a strong emphasis on building relationships, and this relational orientation influences how tacit knowledge is shared and utilized. Strong interpersonal relationships among managers can facilitate the informal transfer of tacit knowledge through trustand shared experiences.

HIGH POWER DISTANCE:

Influence: India tends to have a high power distance culture, meaning there is an acceptance of hierarchical order and unequal power distribution. This can impact how tacit knowledge flows within an organization, with lower-level managers potentially being more hesitant to share insightswith higher-level managers.

LEARNING ORIENTATION:

Influence: Indian culture places a high value on education and learning. Managers may actively seekto acquire tacit knowledge through continuous learning, mentorship, and experiential opportunities, contributing to the development of a learning-oriented managerial culture.

CULTURAL SENSITIVITY AND INCLUSIVITY:

Influence: The cultural sensitivity in India often translates into a need for inclusivity. Managers may develop tacit knowledge that involves understanding and appreciating diverse perspectives, contributing to a more holistic and culturally sensitive approach in decision-making.

Understanding these cultural factors is crucial for organizations seeking to leverage managerial tacit knowledge effectively in the Indian context. Strategies for promoting knowledge-sharing cultures, fostering open communication, and recognizing the impact of cultural nuances can contribute to the successful development and utilization of tacit knowledge among managers in India.

C. CHALLENGES & PAIN POINTS FOR TACIT KNOWLEDGE TRANSFER IN INDIAN MANUFACTURING

While there are several tacit knowledge transfer models available, not all of them may be directly applicable to managerial tacit knowledge transfer. Here are some reasons why existing models may not be entirely suitable for the specific context of transferring tacit knowledge among managers:

COMPLEXITY OF MANAGERIAL TACIT KNOWLEDGE:

Managerial tacit knowledge often involves a high degree of complexity, combining leadership skills, decision-making strategies, and industry-specific insights. Existing models may not adequately capture the multifaceted nature of managerial tacit knowledge, leading to oversimplification or neglect of critical components.

CONTEXT-SPECIFIC NATURE OF MANAGERIAL TACIT KNOWLEDGE:

Managerial tacit knowledge is highly context-specific and influenced by organizational culture, industry dynamics, and individual experiences. Models that do not account for the unique contextual factors in managerial roles may fail to provide actionable guidance for effective knowledge transfer.

SOCIAL DYNAMICS AND RELATIONSHIPS:

Managerial tacit knowledge often relies on social interactions and relationships. Existing models may not sufficiently emphasize the importance of interpersonal dynamics, mentorship, and collaborative learning that are integral to the transfer of managerial tacit knowledge.

HIERARCHICAL STRUCTURES AND POWER DYNAMICS:

Managerial roles are often embedded within hierarchical structures, and power dynamics play a significant role. Models that do not consider the impact of hierarchies and power differentials may overlook challenges related to the willingness of managers at different levels to share tacit knowledge.

ORGANIZATIONAL CULTURE AND VALUES:

The organizational culture and values influence how tacit knowledge is developed, shared, and utilized. Existing models may not address the alignment of managerial tacit knowledge with the specific culture and values of an organization, hindering successful knowledge transfer.

SKILL SET VARIATION AMONG MANAGERS:

Managers possess diverse skill sets and expertise based on their roles and responsibilities. Existing models may not account for the variability in skill sets among managers, making it challenging to develop a one-size-fits-all approach for transferring managerial tacit knowledge.

DYNAMIC NATURE OF LEADERSHIP:

Leadership, a key component of managerial tacit knowledge, is dynamic and evolves over time. Models that do not incorporate the dynamic nature of leadership may become outdated and fail to address the changing requirements of effective managerial knowledge transfer.

LIMITED FOCUS ON EXPERIENTIAL LEARNING:

Managerial tacit knowledge is often gained through hands-on experience and learning from real- world situations. Models that prioritize theoretical frameworks and neglect experiential learning may not effectively capture the essence of managerial tacit knowledge transfer.

GLOBALIZATION AND CULTURAL DIVERSITY:

In an era of globalization, organizations often operate in diverse cultural contexts. Existing modelsmay not adequately address the challenges of transferring managerial tacit knowledge across different cultural settings, potentially leading to difficulties in implementation.

TECHNOLOGICAL ADVANCEMENTS:

The impact of technology on managerial roles and knowledge transfer is significant. Models that do not consider the influence of emerging technologies may lack relevance in the digital age, where virtual collaboration, online platforms, and remote work play pivotal roles in knowledge exchange. In summary, the inherent complexity, context-specific nature, social dynamics, organizational culture, and other unique characteristics of managerial tacit knowledge necessitate a tailored approach that may not be fully addressed by existing tacit knowledge transfer models. Developing models specifically designed for the transfer of managerial tacit knowledge requires a nuanced understanding of the managerial context and its intricacies

CONCLUSION AND PROPOSED WAY FORWARD

The existing models and frameworks discussed provide valuable insights into knowledge acquisition, transfer, and application, but there is a noticeable research gap when it comes to explicitly addressing managerial tacit knowledge. The research gap can be framed as follows: Limited Focus on Managerial Tacit Knowledge Integration : While existing models acknowledge the importance of tacit knowledge in organizational learning and knowledge management, there is a specific lack of emphasis on the unique nature of managerial tacit knowledge. Managerial tacit knowledge encompasses the experiential and context-specific insights held by managers, which are critical for effective decision-making, leadership, and strategic planning.

The identified research gap can be characterized by the following points:

Managerial Tacit Knowledge Dynamics: Existing models often treat tacit knowledge as a general concept without delving into the distinctive features of managerial tacit knowledge. There is a needfor research that specifically explores how managers acquire, transfer, and apply tacit knowledge in their roles, considering the specific challenges and opportunities associated with managerial decision-making and leadership.

Influence on Organizational Performance: While some models touch upon the impact of tacit knowledge on organizational performance, there is a research gap in understanding the direct link between managerial tacit knowledge and organizational outcomes. Exploring how managerial tacit knowledge contributes to strategic success, innovation, and overall organizational effectiveness remains an underdeveloped area.

Tacit Knowledge Transfer Mechanisms in Management: The mechanisms through which managerial tacit knowledge is transferred within organizations need more in-depth investigation. Research could focus on identifying effective strategies and platforms for the transfer of tacit knowledge among managers, considering factors such as mentorship, leadership development programs, and collaborative decision-making processes.

Cultural and Contextual Factors: The cultural and contextual dimensions that shape the acquisitionand application of managerial tacit knowledge have not been sufficiently explored. Research should delve into how organizational culture, industry specifics, and contextual factors influence the creation, sharing, and utilization of tacit knowledge at the managerial level.

Integration with Emerging Technologies: Given the evolving landscape of technology in the workplace, there is a gap in understanding how emerging technologies, such as artificial intelligence and collaboration platforms, impact the dynamics of managerial tacit knowledge. Research could explore how these technologies facilitate or hinder the sharing and utilization of tacit knowledge among managers.

Addressing this research gap is crucial for developing a more nuanced understanding of managerial tacit knowledge, which is essential for enhancing leadership effectiveness, decision-making processes, and overall organizational performance. Future research

endeavors should focus on bridging this gap by exploring the unique dimensions and implications of managerial tacit knowledge within the broader context of organizational learning and knowledge management.

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Forensic audit is the key of investigation and prevention of fraud.

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ABSTRACT

In international market are highly competitive This day due to the globalization of the industry. companies might manipulate this competition to gain some advantages. Also, technologyhas been the main force behind business growth in the past decade. The widespread use of technology and globalization also increases financial increase financial crimes. Accordingly, the audit profession has entered into the process of institutionalization and embedded itself within institution due to the enhanced complexity of fraud, corruption and manipulation. One of the developments that have been happened in the field of audit is the emergence of the " forensic auditing" profession.

The impact of forensic auditing on fraud investigation and prevention in corporate and financial performance is the subject of this study. The necessity for forensic auditors arose from the ongoing financial fraud that caused company collapse and the statuary audit's inability to identify and stop fraudulent activity that resulted in investor impoverishment. According to the form studies used for this paper, forensic auditors have increased management accountability, strengthened the independence of external auditors, and helped audit committee members carry out their oversight duties by giving them confidence on internal audit reports. These actions havehad a positive impact on corporate governance, which has decreased corporate failure and investorimpoverishment.

Key words - corporate fraud, forensic audit, fraud detection

INTRODUCTION

International markets are fiercely competitive. Due to the industry's globalization, businesses maynow influence competition to their advantage. In the last ten years, technology has also been the primary driver of business expansion. Globalization and the pervasive use of

technology also contribute to an increase in financial crimes. Due to the increased complexity of fraud, corruption, and manipulation, the audit profession has thus begun the process of institutionalization and implanted itself into the institution. The profession of "forensic auditing" has emerged as one of the developments in the auditing industry.

In this review article, we delve into the critical realm of forensic audit—a meticulous examinationthat goes beyond traditional financial audits. Unraveling the complexities of investigative accounting, we explore its methodologies, significance in uncovering financial irregularities, andits evolving role in maintaining transparency and accountability. Join us on a journey through theintricacies of forensic audit, where financial puzzles are pieced together to reveal the untold storieshidden within the numbers.

Forensic audits involve the examination of financial records, transactions, and other evidence to uncover fraud, embezzlement, or other financial misconduct. They are often conducted by forensic accountants or auditors with specialized skills in investigating financial irregularities. Keyelements include document analysis, interviews, and the use of specialized tools to trace and analyze financial data. The goal is to provide accurate, reliable evidence that can be used in legalproceedings.

OBJECTIVE OF THE STUDY

1. To study forensic audit focus on the detecting and preventing fraudulent activities.
2. To study the role of forensic auditing as tool and techniques used in finding the financial fraudin India.

DATA COLLECTION AND METHODOLOGY

This study main aim is to understand impact of forensic audit towards investigation and preventionfraud in any financial performance or corporate companies. This data is based on the informationcollected by secondary sources such as newspaper, article, annual report, online journal, websites.History of forensic audit in India:

Forensic audit in India gained prominence in the early 2000s with the growing need for transparentfinancial practices. The Satyam scandal in 2009 marked a significant turning point, prompting increased focus on forensic auditing to detect and prevent financial fraud.

The Companies Act, 2013, empowered the Institute of Chartered Accountants of India (ICAI) to investigate and conduct forensic audits. Additionally, regulatory bodies like the Securities and Exchange Board of India (SEBI) have played a role in promoting forensic auditing as a tool for ensuring corporate governance.

Over the years, forensic audit has been applied in various high-profile cases involving financial irregularities and corporate fraud, contributing to the evolving landscape of financial accountability in India.

Procedure for forensic audit Define the Scope and clearly outline the objectives and scope of the forensic audit. Identify the specific issues or areas to be investigated.

1.**Gather Information:** Collect relevant documents, financial records, and any other evidence related to the audit. Ensure the information is complete and accurate.

2.**Identify Risks and Red Flags:** Assess potential risks and indicators of fraud or irregularities. Look for inconsistencies, unusual transactions, or patterns that may raise suspicion.

3.**Plan the Investigation:** Develop a detailed plan outlining the steps and procedures for theforensic audit. Consider the timeline, resources, and personnel required.

4.**Conduct Interviews:** Interview key personnel, stakeholders, and individuals with knowledge of the situation. Document statements and gather additional information from these interactions.

5.**Data Analysis:** Utilize forensic tools and techniques to analyze financial data, electronic records, and any other relevant information. Look for anomalies or patterns that may indicate fraud.

6.**Document Findings:** Thoroughly document all findings, including supporting evidence. Maintain a chain of custody for any physical or electronic evidence.

7.**Evaluate Controls and Processes:** Assess internal controls and processes to identify weaknesses that may have allowed the issues to occur. Provide recommendations for improvement.

8.**Legal Considerations:** Ensure the investigation adheres to legal and ethical standards. Consult with legal experts to understand and address any legal implications.

9.**Prepare the Report:** Compile a comprehensive report detailing the findings, methodologies used, and recommendations. Clearly present the evidence and conclusionsin a logical and understandable manner.

10.**Communication**: Communicate the findings to relevant stakeholders, including management, legal teams, and regulatory authorities. Be prepared to answer questions and provide additional information as needed.

11.**Follow-up Actions:** Collaborate with management to implement recommended changes, improve controls, and prevent similar issues in the future. Monitor the effectiveness of these measures.

Remember, the process may vary based on the nature and complexity of the forensic audit, and it'sessential to adapt the approach to the specific circumstances of each case.

SIGNIFICANCE OF FORENSIC AUDITING

Forensic auditing is crucial for uncovering financial irregularities, fraud, and misconduct within organizations. It involves a detailed examination of financial records, transactions, and statementsto provide evidence suitable for legal proceedings. This process helps ensure transparency,accountability, and the integrity of financial systems. Additionally, forensic auditing plays a vitalrole in preventing and detecting financial crimes, ultimately contributing to maintaining trust in business and financial institutions.

Forensic audit, also known as international or cross-border audit, is important for several reasons. It helps ensure compliance with international financial reporting standards, enhances transparency in global business operations, and facilitates investment by providing reliable financial information to stakeholders across borders. Forensic audits also contribute to building trust in multinational corporations, as they demonstrate commitment to ethical and sound financialpractices. Additionally, these audits assist in identifying and mitigating risks associated with diverse regulatory environments, ultimately fostering a more stable and interconnected global economy.

Fraud Detection and Prevention: Identifying and preventing fraudulent activities within anorganization or financial transactions.

Legal Compliance: Ensuring adherence to legal regulations and standards to avoid legal consequences.

Investigations: Uncovering financial irregularities and providing evidence for legal investigationsor litigation.

Risk Management: Assessing and mitigating financial risks to protect the organization's assetsand reputation.

Dispute Resolution: Resolving financial disputes by providing accurate and reliable financialinformation.

Due Diligence: Conducting thorough examinations before business transactions, mergers, oracquisitions to assess financial integrity.

Internal Controls: Evaluating and enhancing internal controls to prevent financial mismanagement and irregularities.

Insurance Claims: Verifying the legitimacy of insurance claims related to financial losses. Overall, forensic auditing is essential for maintaining financial integrity, preventing fraud, andensuring legal compliance within organizations.

ROLE OF FORENSIC AUDIT

Forensic audit plays a crucial role in uncovering financial irregularities, fraud, and misconduct within an organization. It involves a detailed examination of financial records, transactions, and other relevant data to detect and prevent fraudulent activities. Forensic auditors use investigative techniques to analyze evidence and provide accurate, admissible findings for legal proceedings. This process helps ensure financial integrity, compliance with regulations, and safeguards againstdeceptive practices.

Forensic audit serves several detailed roles in investigating financial irregularities and fraud:

1.**Fraud Detection**: Forensic auditors use specialized techniques to identify and uncover fraudulent activities within an organization. This includes analyzing transactions, examining financial statements, and scrutinizing accounting practices.

2.**Evidentiary Support:** Forensic audits are conducted with the aim of providing evidence that can be used in legal proceedings. The findings are presented in a way that is

admissiblein court, helping build a strong case against individuals involved in financial wrongdoing.

3.**Asset Tracing:** Forensic auditors trace and identify assets that may be associated with fraudulent activities. This can involve following the flow of funds, uncovering hidden assets, and determining the true ownership of resources.

4.**Compliance Verification**: Forensic audits ensure that an organization is in compliance with relevant laws, regulations, and internal policies. This includes assessing whether financial transactions adhere to accounting standards and legal requirements.

5.**Quantification of Losses:** Forensic auditors quantify the financial losses incurred due to fraudulent activities. This involves assessing the impact on financial statements, valuing assets, and determining the extent of financial harm caused by the fraud.

6.**Interviews and Interrogations:** Forensic auditors often conduct interviews with key individuals to gather information and insights. They may also participate in interrogations to extract details related to financial misconduct.

7.**Preventive Measures:** Beyond investigation, forensic audit helps organizations implement preventive measures to mitigate the risk of future fraud. Recommendations may include strengthening internal controls, improving monitoring systems, and enhancing overall governance.

8**Expert Testimony:** Forensic auditors may be called upon as expert witnesses in legal proceedings. Their testimony provides the court with a professional and informed perspective on financial matters, aiding in the understanding of complex financial evidence.

9.**Whistleblower Support:** Forensic audits can be prompted by tips from whistleblowers. Forensic auditors work to validate these tips, protecting and encouraging individuals whocome forward with information about potential financial misconduct.

In essence, forensic audit is a multifaceted process that combines accounting expertise with investigative skills to uncover, analyze, and address financial fraud and irregularities. Its

detailedapproach contributes to the maintenance of financial integrity and accountability within organizations.

CONCLUSION

In conclusion, a thorough forensic audit is essential for ensuring financial transparency, regulatorycompliance, and risk mitigation. By conducting a comprehensive examination of financial recordsand practices, businesses can instill confidence in stakeholders, identify areas for improvement, and enhance overall governance. The insights gained from a forensic audit contribute to informed decision-making, fostering trust and accountability in the global business landscape.

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Exploring the Future of Information Technology (IT) and Electronic Human Resources (E-HR): Trends, Innovations, and Implications

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Abstract

The rapid advancements in Information Technology (IT) have profoundly impacted various aspects of human resource management, leading to the emergence of Electronic Human Resources (E-HR) as a transformative force in HR practices. This study investigates the future of IT and E-HR, examining emerging trends, innovative technologies, and their implications for the HR landscape. Drawing on a comprehensive review of literature and case studies, this paper explores key trends shaping the future of IT and E-HR, including artificial intelligence (AI), machine learning, data analytics, cloud computing, robotic process automation (RPA), and virtual reality (VR) technologies. It examines how these technologies are revolutionizing HR functions such as recruitment and selection, talent management, performance appraisal, learning and development, and employee engagement.

Furthermore, the study delves into innovative applications of IT in E-HR, such as chatbots for HR assistance, predictive analytics for talent management, gamification for employee training, virtual reality simulations for onboarding, and blockchain technology for secure HR data management. It assesses the potential benefits, challenges, and ethical considerations associated with the adoption of these technologies in HR practices.

Moreover, the paper explores the implications of the future of IT and E-HR for HR professionals, organizations, and the workforce at large. It discusses the evolving role of HR professionals as strategic partners and data-driven decision-makers, the impact of technology on job roles and skill requirements, and the importance of fostering a digital-ready workforce through upskilling and reskilling initiatives.

Through a forward-looking analysis, this study offers insights into the future direction of IT and E-HR, highlighting opportunities for HR innovation, organizational transformation, and enhanced employee experiences. It concludes by discussing the strategic imperatives for organizations to embrace digital HR transformation and stay ahead in the dynamic landscape of HR management in the digital age.

Keywords: Information Technology (IT), Electronic Human Resources (E-HR), HR Technology, Future of Work, Artificial Intelligence (AI), Machine Learning, Data Analytics, Cloud Computing, Robotic Process Automation (RPA), Virtual Reality (VR), HR Innovation, Digital Transformation.

Introduction:

The landscape of human resource management is undergoing a profound transformation fueled by rapid advancements in Information Technology (IT). The emergence of Electronic Human Resources (E-HR) represents a paradigm shift in HR practices, leveraging digital technologies to revolutionize the way organizations manage their workforce. As organizations navigate the complexities of the digital age, understanding the future of IT and E-HR has become imperative for HR professionals, organizational leaders, and policymakers alike.

This study aims to explore the future of IT and E-HR by examining emerging trends, innovative technologies, and their implications for HR management. By delving into the intersection of IT and HR, this research seeks to uncover the opportunities, challenges, and strategic imperatives shaping the future of HR practices in the digital era.

The introduction sets the stage for the study by providing an overview of the evolving landscape of HR management and the role of IT in driving this transformation. It outlines the objectives, scope, and significance of the study, highlighting the need to understand the future of IT and E-HR in navigating the dynamic challenges and opportunities of the digital age.

Key themes to be explored in the study include the impact of artificial intelligence (AI), machine learning, data analytics, cloud computing, robotic process automation (RPA), and virtual reality (VR) technologies on HR functions such as recruitment, talent management, performance appraisal, learning and development, and employee engagement. Additionally,

the study will investigate innovative applications of IT in E-HR and their implications for HR professionals, organizations, and the workforce.

Through a comprehensive review of literature, case studies, and expert insights, this research aims to provide valuable insights into the future direction of IT and E-HR. By examining emerging trends, identifying key challenges, and discussing strategic imperatives, this study seeks to empower HR professionals and organizational leaders to embrace digital HR transformation and navigate the complexities of HR management in the digital age.

Overall, this research sets out to shed light on the future of IT and E-HR, offering a roadmap for organizations to leverage digital technologies effectively, enhance HR practices, and drive organizational success in the dynamic and ever-evolving landscape of the digital era.

Objectives:

1. To examine emerging trends in Information Technology (IT) and their implications for Human Resource (HR) management.
2. To explore innovative technologies shaping the future of Electronic Human Resources (E-HR) practices.
3. To analyze the impact of AI, machine learning, data analytics, cloud computing, RPA, and VR technologies on HR functions such as recruitment, talent management, performance appraisal, learning and development, and employee engagement.
4. To investigate the potential benefits, challenges, and ethical considerations associated with the adoption of IT in E-HR.
5. To assess the implications of the future of IT and E-HR for HR professionals, organizations, and the workforce, including the evolving role of HR professionals, workforce dynamics, and skill requirements.
6. To discuss strategic imperatives for organizations to embrace digital HR transformation and stay ahead in the dynamic landscape of HR management in the digital age.

By achieving these objectives, this study aims to provide valuable insights into the future of IT and E-HR, empowering HR professionals, organizational leaders, and policymakers to navigate the complexities of HR management in the digital era and drive organizational success.

Literature Review:

1. Information Technology Clusters in India – Innovation, Knowledge, Research Papers

Published: November 2007, Volume 14, pages 355–378, (2007)

The Indian information technology (IT) industry is deeply entrenched in the key metros of India, giving rise to seven large IT clusters. The country's tier I cities Bangalore, Delhi, Chennai, Hyderabad, Pune, Mumbai, and Kolkata have all emerged as significant IT hubs. The seven IT clusters are different in their history, economic weight, activity base, anchor companies, business models, government role, and other driving forces. However, even as these cities are attracting IT investments and creating employment for thousands of citizens, the drawbacks of overstressed infrastructure, escalating real estate costs, and shortage of skilled IT professionals represent challenges for IT organizations. The paper substantiates the inevitability of the hardware and software sectors linked development at this stage. It is the first attempt to study the IT industry in India through the prism of the country wise cluster development and combination of IT sectors – hardware design and manufacturing, IT services, software and research and development, and IT-enabled services for business process offshoring.

2. The Role of Electronic Human Resource Management in Contemporary Human Resource Management - Li Ma, Maolin Ye Vol.03 No.04(2015), Article ID:55377,7 pages 10.4236/jss.2015.34009

More and more organizations have been replacing face-to-face human resource management activities with electronic human resource management, E-HRM for short. E-HRM facilitates the HR function to create dynamic and operational capabilities and contributes greatly on HRM effective- ness. This article elaborates on E-HRM in detail on the following aspects: Introduction of E-HRM, types of E-HRM, role of E-HRM, factors influencing utility, effectiveness of E-HRM, determinants of attitude towards E-HRM and the context for E-HRM in China, and it is expected to help people understand E-HRM more comprehensively and systematically.

3. The impact of electronic human resource management on the role of human resource managers- De Alwis, A. Chamaru ISSN: 1212-3609 (Print) 2336-5604 (Online)
This study examined the impact of the adoption of electronic Human Resource Management (e-HRM) on the Human Resource Management function and how much it has affected to change the role of Human Resource Managers. In addition to that, it was intended to study the level and types of technologies that are used in HR in Sri Lanka and the drivers of adoption of technology in the Sri Lankan context. The study was initially supported through relevant literature in relation to e-HRM. This research was conducted on a sample of 30 large companies randomly selected across various industries and the primary technique of data collection was through a descriptive questionnaire distributed through e-mail or personal visits to companies. Out of the sample, 70 % of the companies have a moderate knowledge and usage of e-HR and a 30 % have a very high knowledge. The role played by HR professionals also changed from "Administrative Expert" to "Strategic Agent". There were several reasons for driving organizations towards the adoption of e-HRM in Sri Lanka and the most common of which was the desire to be the leading edge. The critical success factors behind the successful implementation were employee attitudes, organizational culture, characteristics and the way of collaborating those with HR and IT. This adoption should not be done in an ad hoc way and it should be planned and implemented in a proper manner. Organization should identify the suitability of the selected software through proper evaluation, because it critically affects the post-performance of the whole system.

4. The Evolution of the field of Human Resource Information Systems: Co-Evolution of Technology and HR Processes - Richard D. Johnson, *State University of New York*
In this paper, we review the professional and academic development of the human resource information systems (HRIS) field to assess its progress and suggest ways for moving research forward. To do so, we examine the interplay between the evolution of technology and the HR field through four key eras of technology: 1) mainframe, 2) client server, 3) ERP and Web-based systems, and 4) cloud-based systems. In each era, we discuss how HR practices and requirements drove the need for the use of these

systems and how these systems allowed the HR field to evolve. In addition, we trace the HRIS subfield and its relation to the technological evolutions occurring in the HR field. Somewhat surprisingly, we found that much of the research on the use of technology to support HR has occurred only in the last 15-20 years as a response to the use of the Web as a medium for delivering HRIS. We conclude by discussing how scholars from the information systems and human resources fields can come together to help advance HRIS.

Broad areas in which EHRM can be used in IT:

Electronic Human Resource Management (EHRM) can be utilized in various broad areas within the Information Technology (IT) sector. Some of these areas include:

1. Recruitment and Talent Acquisition:

- E-HRM systems can streamline the recruitment process by automating job postings, applicant tracking, and resume screening.
- AI-powered E-HRM tools can assist in sourcing candidates, analyzing resumes, and identifying top talent through advanced algorithms and natural language processing.

2. Employee Onboarding and Orientation:

- E-HRM platforms can facilitate the onboarding process by providing new hires with access to digital orientation materials, training modules, and company policies.
- Virtual reality (VR) technology can be used to create immersive onboarding experiences, allowing new employees to familiarize themselves with the organization's culture, values, and work environment.

3. Performance Management and Appraisal:

- E-HRM systems enable continuous feedback and performance evaluation through digital performance management tools and employee self-assessment modules.
- Data analytics in E-HRM can provide insights into employee performance trends, identify areas for improvement, and support data-driven decision-making in performance appraisals.

4. Learning and Development:

- E-HRM platforms offer online learning management systems (LMS) that deliver training courses, webinars, and educational resources to employees.

- Personalized learning paths and skill development plans can be created using E-HRM systems based on employee performance data and career aspirations.

5. Employee Engagement and Communication:

- E-HRM tools facilitate internal communication and collaboration among employees through digital communication channels, intranet portals, and social collaboration platforms.
- Employee engagement surveys, feedback mechanisms, and recognition programs can be integrated into E-HRM systems to measure and improve employee engagement levels.

6. Compensation and Benefits Administration:

- E-HRM systems automate payroll processing, benefits administration, and employee compensation management, ensuring accuracy and compliance with regulatory requirements.
- Employee self-service portals allow employees to view and manage their compensation and benefits information, including pay stubs, tax forms, and insurance coverage.

7. Workforce Planning and Analytics:

- E-HRM platforms provide workforce planning tools that enable organizations to forecast staffing needs, identify talent gaps, and optimize workforce allocation.
- HR analytics and predictive modeling in E-HRM systems leverage data insights to support strategic workforce planning decisions, talent acquisition strategies, and succession planning.

8. Employee Well-being and Work-Life Balance:

- E-HRM systems incorporate features to support employee well-being initiatives, including wellness programs, health tracking tools, and flexible work arrangements.
- Employee assistance programs (EAPs) and mental health resources can be integrated into E-HRM platforms to promote work-life balance and support employee wellness.

These are some of the broad areas within the IT sector where Electronic Human Resource Management (EHRM) can be effectively utilized to optimize HR processes, enhance employee experiences, and drive organizational success.

Employee Concerns and privacy:

Employee concerns regarding privacy in the context of Electronic Human Resource Management (E-HRM) systems are significant and should be addressed to ensure trust, transparency, and compliance with privacy regulations. Some common employee concerns include:

1. Data Security: Employees may be concerned about the security of their personal and sensitive information stored in E-HRM systems. They worry about the risk of data breaches, unauthorized access, or misuse of their personal data.

2. Access Control: Employees may worry about who has access to their personal information within the organization. They may be concerned about unauthorized individuals, including colleagues or supervisors, accessing their HR records without their consent.

3. Data Usage: Employees may be concerned about how their personal data is being used by the organization. They may worry about their data being used for purposes other than HR management, such as marketing or profiling.

4. Transparency: Employees may seek transparency regarding the types of data collected, the purposes for which it is collected, and how it will be used or shared within the organization. Lack of transparency can lead to mistrust and concerns about privacy violations.

5. Consent and Control: Employees may want more control over their personal data and how it is used within E-HRM systems. They may seek mechanisms to provide informed consent for data collection, processing, and sharing, as well as options to update or delete their data when necessary.

6. Monitoring and Surveillance: Employees may feel uncomfortable with the level of monitoring or surveillance enabled by E-HRM systems, such as time tracking, productivity monitoring, or employee surveillance tools. They may perceive it as invasive or intrusive.

7. Compliance with Regulations: Employees may expect organizations to comply with relevant privacy regulations, such as the General Data Protection Regulation (GDPR) in the European Union or the California Consumer Privacy Act (CCPA) in the United States. They may seek assurances that their privacy rights are respected and protected.

8. To address these concerns and safeguard employee privacy in E-HRM systems, organizations can take several measures:

1. Implement Robust Security Measures: Employ encryption, access controls, authentication mechanisms, and other security measures to protect employee data from unauthorized access, breaches, or cyberattacks.

2. Provide Transparency: Clearly communicate to employees the types of data collected, the purposes for which it is collected, how it will be used, and any third parties with whom it may be shared. Ensure transparency in data processing practices.

3. Obtain Informed Consent: Seek informed consent from employees for the collection, processing, and sharing of their personal data within E-HRM systems. Allow employees to review and agree to privacy policies and data processing agreements.

4. Establish Data Governance Policies: Develop and enforce data governance policies that outline procedures for data collection, processing, retention, sharing, and disposal. Ensure that these policies comply with relevant privacy regulations.

5. Offer Data Subject Rights: Provide employees with rights to access, rectify, delete, or restrict the processing of their personal data within E-HRM systems. Establish procedures for handling data subject requests and inquiries.

6. Conduct Privacy Impact Assessments: Assess the potential privacy risks and impacts associated with E-HRM systems through Privacy Impact Assessments (PIAs) or Data Protection Impact Assessments (DPIAs). Mitigate risks and implement appropriate safeguards.

7. Provide Employee Training: Educate employees about their privacy rights, data protection practices, and security measures implemented within E-HRM systems. Empower employees to make informed decisions about their personal data.

8. Monitor Compliance: Regularly audit and monitor compliance with privacy regulations, internal policies, and industry best practices related to employee privacy in E-HRM systems. Take corrective actions as needed to address non-compliance issues.

By addressing employee concerns and proactively safeguarding privacy in E-HRM systems, organizations can build trust, enhance employee satisfaction, and ensure compliance with privacy regulations, ultimately contributing to a positive workplace environment.

Findings:

1. Emerging Trends in IT: The study identified several emerging trends in Information Technology (IT), including artificial intelligence (AI), machine learning, data analytics, cloud computing, robotic process automation (RPA), and virtual reality (VR) technologies. These trends are reshaping the HR landscape and have the potential to revolutionize HR functions such as recruitment, talent management, performance appraisal, learning and development, and employee engagement.

2. Innovative Applications of IT in E-HR: The study explored innovative applications of IT in Electronic Human Resources (E-HR), such as AI-powered recruitment tools, VR-based training simulations, and data-driven performance management systems. These technologies offer new opportunities to enhance HR practices, improve organizational efficiency, and drive strategic HR decision-making.

3. Employee Concerns Regarding Privacy: The study identified significant employee concerns regarding privacy in the context of E-HR systems. Employees are worried about data security, access control, data usage, transparency, consent and control, monitoring and surveillance, and compliance with regulations. Addressing these concerns is essential to maintain trust, transparency, and compliance with privacy regulations in E-HR practices.

Recommendations:

1. Prioritize Employee Privacy: Organizations should prioritize employee privacy rights and take proactive measures to safeguard personal and sensitive information stored in E-HR systems. This includes implementing robust security measures, providing transparency in data processing practices, obtaining informed consent from employees, and ensuring compliance with privacy regulations.

2. Invest in Training and Education: Organizations should invest in employee training and education to raise awareness about privacy rights, data protection practices, and security

measures implemented within E-HR systems. This will empower employees to make informed decisions about their personal data and contribute to a culture of trust and transparency within the organization.

3. Conduct Privacy Impact Assessments: Organizations should conduct Privacy Impact Assessments (PIAs) or Data Protection Impact Assessments (DPIAs) to assess the potential privacy risks and impacts associated with E-HR systems. This will help identify areas for improvement, mitigate privacy risks, and ensure compliance with privacy regulations.

4. Enhance Transparency and Communication: Organizations should enhance transparency in data processing practices and improve communication with employees regarding the types of data collected, the purposes for which it is collected, and how it will be used or shared within the organization. Clear communication will build trust and confidence among employees regarding their privacy rights and data protection practices.

5. Foster a Culture of Privacy and Trust: Organizations should foster a culture of privacy and trust by promoting ethical data handling practices, respecting employee privacy rights, and encouraging open dialogue about privacy concerns. This will create a positive workplace environment and strengthen employee engagement and loyalty.

By implementing these recommendations, organizations can effectively address employee concerns regarding privacy in E-HR systems, maintain trust and transparency in HR practices, and ensure compliance with privacy regulations in the digital age.

Conclusion:

In conclusion, the exploration of the future of Information Technology (IT) and Electronic Human Resources (E-HR) has provided valuable insights into the trends, innovations, and implications shaping the HR landscape in the digital age.

Throughout this paper, we have examined emerging trends in IT, including artificial intelligence (AI), machine learning, data analytics, cloud computing, robotic process automation (RPA), and virtual reality (VR) technologies, and their impact on E-HR practices. These technologies hold the potential to revolutionize HR functions such as recruitment, talent management, performance appraisal, learning and development, and employee engagement, leading to increased efficiency, effectiveness, and strategic value in HR management.

Furthermore, we have explored innovative applications of IT in E-HR, such as AI-powered recruitment tools, VR-based training simulations, and data-driven performance management

systems, highlighting the transformative potential of these technologies in enhancing HR practices and driving organizational success.

However, alongside the promises of technological advancements, we have also discussed the importance of addressing employee concerns regarding privacy, data security, transparency, and ethical considerations in the adoption of E-HR systems. It is crucial for organizations to prioritize employee privacy rights, build trust, and ensure compliance with privacy regulations to foster a positive workplace environment and maintain ethical HR practices.

Looking ahead, the future of IT and E-HR will be characterized by continued innovation, integration, and adaptation to the evolving needs and challenges of the digital era. HR professionals and organizational leaders must embrace digital HR transformation, leverage technology strategically, and invest in employee-centric solutions to stay ahead in the dynamic landscape of HR management.

In conclusion, the future of IT and E-HR holds immense potential to reshape HR practices, optimize organizational performance, and enhance employee experiences in the digital age. By embracing technological innovations, addressing ethical considerations, and prioritizing employee well-being, organizations can unlock new opportunities and drive sustainable growth and success in the future of HR management.

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"Study on Infrastructural Facilities provided by Government of Maharashtra with special reference to role played by MIDC Pune District"

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Abstract:

This study examines the infrastructural facilities provided by the Government of Maharashtra, with a special focus on the role played by the Maharashtra Industrial Development Corporation (MIDC) in Pune District. The infrastructure in Pune District, a key economic hub in Maharashtra, plays a crucial role in supporting industrial growth, attracting investment, and fostering economic development in the region. The study aims to assess the adequacy, effectiveness, and impact of infrastructural facilities, including transportation, power supply, water resources, telecommunications, and social infrastructure, provided by the government and MIDC in Pune District.

Using a mixed-methods approach, including qualitative interviews, surveys, and quantitative data analysis, the study examines various dimensions of infrastructural development in Pune District. It assesses the availability and quality of infrastructural facilities, identifies gaps and challenges in infrastructure provision, and explores the role of MIDC in facilitating infrastructure development and industrial growth in the region.

The findings of the study reveal the importance of robust infrastructural facilities in driving industrialization, promoting business activities, and enhancing the overall competitiveness of Pune District. While the government and MIDC have made significant investments in infrastructural development, challenges such as inadequate

transportation networks, intermittent power supply, water scarcity, and insufficient social infrastructure persist in some areas.

OVERVIEW

Infrastructure is an umbrella term for many activities referred to as "social overhead capital by such development economists as Paul Rosenstein Rodan Nurkse and Albert Hischman. Neither term is precisely defined but both encompass activities that share technical features such as economies of scale and economic feature (such as spillovers from users), like Public utilities - power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection disposal and piped gas.

Public works - roads and major dam and canal works for irrigation and drainage.
Other transport sectors urban and interurban railways, urban transport, ports and waterways and airports."!

IMPORTANCE OF INFRASTRUCTURE?

As per the World Bank:

"Infrastructure can deliver major benefits in economic growth alleviation and environmental sustainability but only when it provides services that respond to effective demand and does so efficiently. Services is the goal and the measure of development in infrastructure. Major investments have been made in infrastructure stocks, but in too many developing countries these assets are not generating the quantity or the quality of services demanded. The cost of this waste in forgone economic growth and lost opportunities for poverty reduction and environmental improvement - are high and unacceptable."

CHARACTERISTICS OF INFRASTRUCTURE

All definitions are conventions the most literal definition of infrastructure, which refers to fixed facilities or installations, does not provide a sufficient basis for deciding from

an operational point of view, which sectors to include. The Bank's administrative organization into infrastructure divisions or departments reflects historical convenience or accident and does not provide a workable approach for deciding on this matter. Few, if any governments use infrastructure as a way of organizing their administrative services. However, the test of the usefulness of a definition is whether there is a group of sectors, which share common characteristics, and problems to sufficient degree of justify their being lumped together for analytical purposes. Not all the sectors chosen need to share all the characteristics or problems, but there should be significant elements of commonality. The services provided in the following five sectors have been included:

(i) Electric power
(ii) Irrigation
(iii) Telecommunications
(iv) Transport
(v) Water supply and sanitation, both in the urban and rural dimensions.

CHALLENGE IN INFRASTRUCTURE DEVELOPMENT

One characteristic common to mature, developing and undeveloped nations in today's global economy is the necessity to construct, repair, refurbish and modernize their infrastructures. Economic infrastructure is made up to public utilities such as power, plants, telecommunications, piped water supply, sanitation and sewage facilities, arrangements for solid waste collection and disposal and gas pipelines. Public works such as roads, dams, canals, urban and interurban rail systems, ports, waterways, and airports round out the investments known as infrastructure. The composition of a country's infrastructure changes according to income levels.

INTRODUCTION

INDUSTRY & INFRASTRUCTURE

Development Commissioner, Small Scale Industries, Govt. of India, New Delhi, published in February 1968 a special volume on 'Small Scale Industries in India', discussing various infrastructural facilities. According to it, Organizational set-up has been considered as a primary facility. Other facilities which have been discussed therein include-

1) Technical Assistance
2) Credit Facilities
3) Hire Purchase of Machinery
4) Industrial Estates
5) Ancillary Industries
6) Rural Industrial Centers
7) Growth Centers
8) Marketing Assistance Programme
9) Export Promotion Assistance
10) Raw Material Availability
11) Economic Intelligence Service
12) Publications and Public Relations
13) Industrial Design Services
14) Intensive Development Programme
15) Prototype Production Cum Training Centre
16) State Directorate of Industries
17) Small Industry Extension Training Institute
18) Physical Facilities like
Roads and Buildings
19)Auxiliary Services
20)Small Scale Industries Board.

ORGANIZATIONAL SET-UP

Development of Small Scale Industries in all the developing countries face similar types of problems. They also have a similar type of role to play in the developmental planning

of the country. Balanced regional development and dispersal of industrial activity are very much inter-related. Per capital income of underdeveloped backward region is very low, there is a need for providing avenues of employment other than agricultural avenues.Organizational set-up administrative and institutional assistance at various levels is very important for SSI. 10 In order to carry out various programmes and policies of the Government of India relating to the development of SSI, an organization was set- up at the national level with Development Commissioner, Small Sale Industries as its head. It is both a coordinating and executive agency. It maintains close liaison with the State Governments and different organizations and industries at the Central and State levels concerned with the development of Small Scale Industries. It functions through the Small Scale Industries Service Institutions.

Research methodology

The chapter of Introduction has given the background of the thesis. They describe the different aspects as regards to the status, state and conditions of infrastructure facilities for industries in Pune District.

This study is related to the industries in the area of Pune district where the fieldwork is carried out. In all there are 10,775 industries in Pune district.

It is the matter of interest for any student to undertake the study with certain objectives, which are outlined hereunder. The relationship between these two factors has been providing a background of nature for the study. Pune district is a growing industrial belt mainly backed up by agricultural and other industries. It is to point out that in MIDC Pune district there are industries which are supporting the large industries for the production of commodities, which are used as inputs for other industries like automobile, heavy engineering, information technology etc.

OBJECTIVES

The study is undertaken with the following objectives.

1) To undertake the review of infrastructural facilities provided by MIDC in Pune District
2) To judge the level of expectations of the entrepreneurs and adequacy as regards to the survival and growth of industries in the sample area.
3) To study the profile of industries set up in MIDC Pune district, which includes the study of physical and human resources facilities?
4) To study the present infrastructural facilities available to industries as regards different areas such as finance, working capital, availability of land, technological support, transport facilities, warehousing, and availability of power, marketing, training, and entrepreneurship development.
5) To analyze the information along with observations and to arrive at the conclusions related to the relationship between infrastructure facilities and the progress of industries in Pune district.
6) To make suggestions to different role partners in this context, who are central government, state government, corporations, MIDC and other agencies like bank, financial institutions, associations of industries and individual small entrepreneurs relating to factors covered by point no - 4, academicians and the institutes imparting management education.

Objectives are provided the main frame of the present study and the information collected would receive the direction from these points. Similarly, the interaction, which has taken place with various industrialists, had the context of these points, during the entire course of research.

HYPOTHESES

In this regards the different statements are being stated which shall form the part of the hypotheses. These statements reflect the student's primary perception about industries in Pune district. The researcher was the resident of Talegaon, District Pune. Therefore, it is natural that he has developed certain perception about these industries. However, these perceptions do not carry any bias or prejudice in their formation and the study. These hypotheses are subject to be proved or disproved depending upon what study reveals. It

is the assumption of the researcher right from the beginning. In data analysis part and the inferences adequately take care in maintaining rationality about their correctness. The following statements form the hypotheses part of the study and hereafter shall be referred as H1, H2...

H1) The availability of infrastructural facilities is the key factor for attracting and setting up industries in the field area-i.e. Pune district MIDC

H2) Industrialist believes that infrastructural facility and their development is the sole responsibility of the government.

Ha) Industries do not have innovative plans of partnering or alliances as regards developing infrastructure facilities internally.

PRIMARY & SECONDARY DATA AND SAMPLING:

(a) Primary Data

The study is aimed at understanding the perceptions regarding what is if, their current availability, expectations of the units regarding ifs, the gap. It also intended to cover the impact of non-availability on the survival, growth and development of the units.

The sample selection was a difficult task as the scope of the subject is too wide frame its significant point of view and the impact of globalization, however it was possible to go for a sample to seek the responses about the said aspects.

In order to avoid errors in transmission and to improve reliability, validity and sensitivity of the study a detailed questionnaire was prepared running into twenty pages. The said questionnaire. Annexed as Annexure - 1)

The first part contains nine questions for details of the units, therefore the following is the table of parts of the question and number of questions

Section of the questionnaire,

Section of the questionnaire.

Particulars	No. of Questions
A) General Information	08
B) Financial Infrastructure	09
C) Education and Training Infrastructural facillities	06 01 (a,b & c) 04
D) Human Resource	10
E) Marketing	
F) Production Infrastructure	

Certain questions were little difficult to respond and therefore the clues were given in the form of examples to improve the reliability.

Similarly, under certain questions sufficient space was provided, which has resulted into increase in the number of pages.

Thus primary data was collected from the units by administering them the questionnaires personally and this gave an opportunity to the students to interact thoroughly by way of discussions and meetings providing long time period. Since the student has often and often approached the units could have vast coverage of the information regarding the subject matter of the study.

Secondary Data

The following organizations were contacted to collect the secondary data, which is reflected at various chapters of the thesis.

(i) District Industrial Centre. Pune.
(ii) Maratha Chamber of Commerce Industries and Agriculture. Pune.
(iii) National Informatics Centre. Pune.

However, the data is not available in a large quantity. An attempt was made to search in different libraries by accessing different periodicals and publishing articles buy they do not comprehensively fulfill the need for secondary data.

Selection of Sample

The research should not follow the absolute figures and rather only relative figures are important from the sense of realistic figures.

Therefore, the population of 30 units is considered for the purpose of selecting the sample size. The reader would concede that such an approach does not compromise with both the quality and the quantity making the sample representative.

Similarly, as the units registered with DIC and MCCI & A has been used as a deciding parameter for the sample units.

Discussion and Results:

1. Technical support for preparation of Project Report.
2. Information on sources of machinery & Equipment.
3. Priority in Power supply/Telephone connection.
4. Promotion of new Industrial Estates/ Growth Centres.
5. Land/ Shed in Industrial Estate.
6. Approval of Project Reports of special types.
7. Promotion of Electronic Industries.
8. Govt. Margin Money Loan under Additional Employment Programme.
9. Training through Entrepreneurship Development Programme.
10. Assistance under State Incentives Scheme.
11. Allotment of Raw Materials.
12. Financial Assistance under Self Employment Schemes.
13. Financial assistance through Bank/ WBFC/WBSIC/NSIC.
14. Assistance under Equipment Leasing Scheme through NSIC.
15. Marketing linkage with Central Govt. State Govt. organizations/ undertakings.
16. Marketing assistance through WBSIC/NSIC/CEO.
17. Ancillary Industry tie-up with Govt. undertakings.
18. Marketing information.
19. Marketing assistance through participation in Exhibitions/ Trade Fairs/ Buyers-Sellers

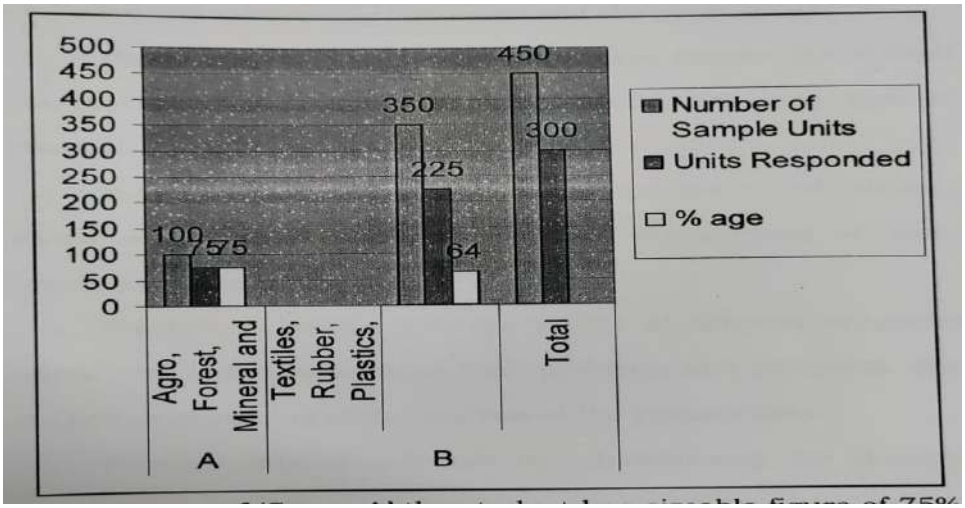
Meet etc.

20. Marketing assistance to Handicrafts Artisans through participation in Handicrafts Expo and Exhibition inside/ outside of the state.

21. Linkage with organizations like WBHDC/ WB State Handicrafts Co-operative Society Ltd. / Development Commissioners (Handicrafts).

Group	Category of Industries	Number of Sample Units	Units Responded	Percentage
A	Agro, Forest, Mineral and Food based	100	075	75.00
B	Textiles, Rubber, Plastics, Chemical, Metal base, Electrical, Electronics, Non-Metal and others	350	225	64.00
Total		450	300	

Inference:



In case of 'Group A' the student has sizeable figure of 75%, which has encouraged him for acquiring more meaningful inferences.

In case of 'Group B' though the figure should have been more it does not diminishes its worth from research work point of view as many times these units are not enthusiastic in giving information and such culture has yet to come in industrial sector of the country.

Similarly the units are reluctant and posses many limitations for an enquiry of the kind of such researches.

Conclusions:

A healthy infrastructure portends an economically healthy nation. A deteriorating and neglected infrastructure portends a declining and deteriorating economy.

Infrastructure development has been the responsibility of public agencies, and taxes collected by local and central governments have provided the funds by which the infrastructure projects have been built. However, the traditional role of government as the sole provider of railroads, bridges, tunnels, telecommunications networks, and power generation and transmission facilities is no longer feasible.

Private developers have access to vast amounts of investment capital and in many cases they have better management skills than government workers and so they are beginning to challenge government's traditional role and faced with severe restraints, governments are starting to encourage private investors to participate in a number of infrastructure projects.

They are enacting legislation to create new Public/Private Partnerships in these fields.

Now the time has come by different role players to join hands and build a superior infrastructure for the development of industry.

This chapter deals with the conclusion and useful suggestions for the creation of infrastructural facilities for the development of industries in Maharashtra in general and the industry in Pune district in particular.

PART - I CONCLUSIONS

The summary of findings derived from the data analysis, general observations and interaction with various role players, which is as follows:

1) It has been observed that infrastructural facilities play vital role in the location of industries as compared to cash incentives, sales tax exemption, subsidies, etc

2) Physical infrastructure in the form of availability of land and labour at less cost, availability of raw material and nearness of market contributes for the development and expansion of industrial unit

3) Social infrastructure which covers educational, recreational, medical, technical and other facilities, which are very essential for maintaining the standard of living, equally affects the location decision and dispersal and de centralization of industries.

4) Octroi and other tariffs lead to concentration of industrial units in the Municipal region which creates pollution, transport, warehousing, security and other social problems in the congested area like Pune Muncipal Corporation and Pimpri Chinchwad Municipal Corporation.

5) It is the tendency of industries in Pune District to cluster at the fringe of PMC or PCMC region in order to take the advantage of good infrastructure.

6) MIDC established industrial estates all over the state since 1962, however majority of the industrial estates have been located in Western Maharashtra because of which there is unbalanced growth of Maharashtra. Vidharbha and Maharatawad regions are lagging behind only because of inadequate and insufficient infrastructure.

7) At the time of establishment of MIDC it was well known that there is imbalanced regional growth of Maharashtra, however MIDC authorities concentrated their attention and funds in the Western Maharashtra only. However MIDC is successful in developing growth centres at Nashik, Aurangabad, Amhednagar, Nagpur, Kolhapur etc

8) The units stressed on ease in availability of finance, for modernizing and automation and low rate of interest.

9) The units here again have confined their suggestion to the areas of basic nature of infrastructure and do not reflect the future requirements.

10) The rate of interest on loan is a major factor of dissatisfaction.

11) In conclusion it may be said that Pune City has most of the infrastructural facilities that are required by the industry. At least in this matter the MIDC, Pune, Central and State Governments have not neglected it.

12) Almost all the schemes, which have been formulated by the concerned authorities of the MIDC, Pune, Central and the State Government for helping the industry, are being implemented in the city area but not in urban parts of Pune district

13) During the course of study, it has been a painful feeling that great improvement is needed in its implementation of these infrastructural facilities.

14) There is a tremendous increase in the number of industrial units in Pune District but as compared to the growth the infrastructural facilities are not growing in proportionate to the requirement.

The hypothesis set for the said research work has been proved on the basis of data analysis and the conclusions drawn as above.

Suggestion and Recommendations:

During the course of the research the data analysis, interaction with employees, owners and other role players and the observations have revealed many areas where there is ample scope to offer suggestions.

Attempt is made to bring in feasibility, prescriptiveness and backward linkage to data analysis, observations, and findings as far as possible.

1) The time is demanding that the industry should not rely on traditional infrastructure but they should change according to the environment and do not rely on others and become competent, taking their futuristic requirements into consideration, they should think innovatively and prepare strategy to build the infrastructure internally or partnering with different role players.

2) In order to disperse the industries from congested area special efforts should be taken by the State and Central Government to establish separate Development Corporation for each region. Infrastructure Instead of providing cash incentives on the basis of capital investment in plant and machinery, incentives should be given on the basis of recruitment of workers (skilled and unskilled) in the industrial unit, which is established in under developed area of Maharashtra.

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A Study of Expectations of Small-Scale Industrial Units for the survival and Growth in Globalization and Downturn in Pimpri Chinchwad MIDC Area Pune.

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ABSTRACT

Economic globalization is the increasing economic interdependence of national economies across the world through a rapid increase in cross-border movement of goods, service, technology and capital. Whereas globalization is centered on the rapid development of science and technology and increasing cross-border division of labour, economic globalization is propelled by the rapid growing significance of information in all types of productive activities and marketization; the advance of science and technologies. It provides several things to several people with removal of all trade barriers among countries. Globalization happens through three channels: trade in goods and services, movement of capital and flow of finance. Globalization in India is generally taken to mean 'integrating' the economy of the country with the world economy. The real thrust to the globalization process was provided by the new economic policy introduced by the Government of India in July 1991 at the behest of the IMF andthe World Bank. The current paper is an attempt to critically analyze of the impact of globalization on Indian Small-Scale Industries. The main theme of the paper is to evaluate the performance of SSI, after globalization and to know the impact of Globalization on the performance of SSI.

Keywords: Globalization, Small Scale Industries (SSI), Employment, etc.

Introduction

Globalization is the metamorphosis of the individual nations into an integrated entity by means of their interconnection on an economic, social and cultural level, fueled by easy transport and communication among them. It is the modern renaissance that makes ideas, goods, services, trade, technology and culture permeate into the entire geography of the world thus turning it into a global village. While globalization is a large scale phenomenon, small scale enterprises are a local phenomenon but having effects of dimensions as large as it's global 'friend and foe'. Friend- because both globalization and small scale industries are the two wheels of the vehicle of economic growth and prosperity; foe- because some argue that given the developing nation that India is, Small Scale Industries(SSIs) can suffer and strangulate to death by the fierce competition put up by globalization.

In order to impart more vitality and growth to small scale sector, a separate policy statement has been announced for small, tiny and village enterprises on 6th August, 1991. This policy statement was a leap- forward because it was the first time that Government had issued a separate policy statement for the small and decentralized sector. This policy statement proposed some path- breaking measures to mitigate the handicaps that were faced up by small enterprises in respect. Government of India introduced a large number of innovative promotional measures to uplift the growth of small scale sector.

Major features of the Small Industrial policy of 1991:

- Emphasis to shift from cheap credit to adequate credit.
- Equity participation by other undertakings (both domestic and foreign) up to 24 percent.
- Introducing of factoring services by banks.
- Marketing of mass consumption goods under common brand name.
- Setting up of sub- contracting exchanges.
- Establishment of technology development cell.
- Opening of quality counseling and technology information centers.
- New technology up gradation.

Globalization:

For the purpose of the argument in this paper, as well as understanding some of the responses to globalization, it is important to define what is mean by globalization. Globalization is the process ofintegrating various economies of the world without creating any hindrances in the free flow of goods and services, technology, capital and even labour or human capital. The term globalization has, therefore, four parameters:

i. Reduction of trade barriers to permit free flow of goods and services among nation-states;

ii. Creation of environment in which free flow of capital can take place among nation-stated;

iii. Creation of environment, permitting free flow of technology; and

iv. Foundation of environment in which free movement of labour can take place in different countries of the world.

Small scale industries in India:

With the advent of planned economy from 1951 and the subsequent industrial policy followed by Government of India, both planners and Government earmarked a special role for small-scale industries and medium scale industries in the Indian economy. Due protection was accorded to both sectors, and particularly for small scale industries from 1951 to 1991, till the nation adopted a policy of liberalization and globalization. SMEs always represented the model of socio-economic policies of Government of India which emphasized judicious use of foreign exchange for import of capital goods and input labour intensive mode of production; employment generation; non concentration of diffusion of economic power in the hands of few (as in the case of big houses); discouraging monopolistic practices of production and marketing; and finally effective contribution to foreign exchange earning of the nation with low import-intensive operations. SMEs developed in a manner, which made it possible for them to achieve the following Objectives:

- ❖ High contribution to domestic production

- ❖ Significant export earnings
- ❖ Low investment requirements
- ❖ Operational flexibility
- ❖ Location wise mobility
- ❖ Low intensive imports
- ❖ Capacities to develop appropriate indigenous technology
- ❖ Import substitution
- ❖ Contribution towards defense production
- ❖ Technology – oriented industries

SMALL SCALE INDUSTRY AND ITS IMPORTANCE

Economic development of a country is directly related to the level of industrial growth. The competition has become intense in every field. Nations fight with game plan to sustain their economy, by introducing new policies and announcing incentives to support mainly their economic- indicators. After the world economy was open to attack, the Indian economy has initiate to concentrate on the development of small industrial base, which had contribute positively to the India's GDP; India's GDP growth is better than other developing countries with the developed small scale industrial sector. In order to impart more vitality and growth to small scale sector, a separate policy statement has been announced for small, tiny and village enterprises on 6th August, 1991. This policy statement was a leap-forward because it was the first time that Government had issued a separate policy statement for the small and decentralized sector. Government of India introduceda large number of innovative promotional measures to uplift the growth of small scale sector. Major features of the Small Industrial policy of 1991:

1. Emphasis to shift from cheap credit to adequate credit.
2. Equity participation by other undertakings (both domestic and foreign) up to 24

percent.

3. Introducing of factoring services by banks.
4. Marketing of mass consumption goods under common brand name.
5. Setting up of sub- contracting exchanges.
6. Establishment of technology development cell.
7. Opening of quality counseling and technology information centres.
8. New technology up gradation programmes.

The definition of small scale sector is broadened from small-scale industries to small scale enterprises that include all business enterprises in the services sector which provide service to industrial sector in addition to small scale industries taking into account all these factors, at present, Reserve Bank of India uses an expanded definition of small scale industries which include:(i) Small scale industrial undertaking which are engaged in the manufacturing, processing and preservation of goods in which the investment in plant and machinery not to exceed Rs. 5crore. These would include units engaged in mining or quarrying servicing and repairing of machinery. (ii) Tiny enterprises whose investment in plant and machinery do not exceed Rs.25 lacks. (iii) Power looms. (iv) Traditional industries which require high workmanship and techniques and also village and household industries producing common goods of consumption predominantly by using simple tools. (v) The decentralized and informal sector like handlooms and handicrafts. (vi) The industry related to services/ business enterprises. (vii) Food and agro-based industries. (viii) Software industry. The development of small scale industries is being given due importance by the Government in order to achieve the following objectives:

a) To provide additional employment opportunities.
b) To mobilize resources of capital and skill from various parts of the country.
c) To provide a more equitable distribution of national income.
d) To provide a helping hand to large industries and facilitate them in their work.

OBJECTIVE OF THE STUDY

The major objectives of the study are as follows:

1. To find out SSIs contribution to the economy in India.
2. To analyse the Bright and dark spots of Small scale industries in India during the globalization period.
3. To study the impact of globalization on Small scale industries in terms of growth rate of the employment.

METHODOLOGY

The present study is based upon the secondary data analysis by referring annual reports of SSI issues by Ministry of small scale industries and RBI. The main objective of the present study is to analyse the impact of globalization on the performance of small scale industries.

GROWTH OF SMALL SCALE INDUSTRIES IN INDIA:

PRE AND POST GLOBALIZATION

The small scale industries play a significant role in boosting the overall economic growth of an economy. The small scale industries set-up by the entrepreneurs in different states and Union Territories of India have contributed to the increased shares in overall production, fixed investment, exports, Employment and capacity Utilization of SSI Units, etc. The importance of SSI sector in providing large scale employment is ofparamount importance. The policy framework right from the first plan has highlighted the need for the development of SSI sector keeping in view its strategic importance in the overall economic development of India. The impact of Industrial Globalisation and deregulatory policies on the growth of small scale industries has been captured by computing and subsequently comparing the growth rates between pre andpost globalization period. In this section, the overall performance of SSI sector has been examined in depthon the basis of the different parameters such as number of units, production, employment and exports.

AVERAGE GROWTH RATE OF SSIs IN PRE AND POST GLOBALISED PERIOD

- Growth rate of SSIs in pre Globalised era was 4.07 on the contrary on the post Globalised era it is 9.36.
- Production in SSIs in pre Globalised era was 19.45 on the one hand; on the other hand on the post Globalised it is reduced to 13.57.
- In pre globalised era, the employment growth rate in SSIs was 7.25, which is declined to 4.26 on the post globalised era.

Flow of credit to MSMEs sector:

The Government of India has been extending liberal financial support to MSMEs through banks and financial institutions. The credit flow to MSMEs is regularly monitored by State Level Bankers' Committee (SLBC) Meeting at the State level. At the District level the same is monitored by the District Level Bankers' Committee Meeting with District Collector as its Chairman. The flow of credit for the MSMEs during the XI Plan period is given below:-

Institutional Support for Small Scale Industries

- ❖ Small Industries Development Organization (SIDO)
- ❖ National Small Industries Corporation (NSIC)
- ❖ National Institute of Small Industry Extension Training (NISIET)
- ❖ National Institute for Entrepreneurship & Small Business Development (NIESBUD)
- ❖ National Research Development Corporation (NRDC)
- ❖ Small Industrial Bank of India (SIDBI)

Bright and Dark spots in the economy

Positive Effects

Delicensing, removal of government restrictions on industries and liberalization of foreign investments have reduced the time and money spent in formal procedures for obtaining approvals from the government. This has shifted the focus of enterprises to the actual business of production thus lowering project costs.

Exports have increased so also has the volume of trade.

Policies in areas of foreign investments have attracted inflow of foreign capital especially in sectors like electrical equipment, services and telecommunication. Indian industries and financial institutions have undertaken investments abroad. Several Indian companies have entered into joint ventures with foreign companies. They are becoming internationally competitive.

India is increasing its export orientation through setting up of SEZs (Special Economic Zones) and they are making their international presence felt through mergers and acquisitions.

Industrial labour has become more efficient and skilled due to increased competition and inflow of foreign knowledge. There is a rise in industrial productivity which is reflected in higher industrial wages .Instances of industrial sickness has gone down.

The goods produced by Indian industries in this competitive scenario, sold at competitive prices give higher levels of satisfaction to the Indian consumers as they are of superior quality. The small scale sector is growing more robust with preferential loans, microfinance and other forms of credit being made available. Some SSEs have grown into medium scale operations.

Negative Effects:

Certain sectors that were already well established when opened to foreign investment led to exploitation of their resources by dominating MNCs and stifle their own R and D efforts. Use of foreign technology may not be adaptable to Indian conditions. Sometimes MNCs deliberately use less sophisticated technology in their subsidiaries. There’s excessive competition in the market that puts too much pressure on domestic companies to raise productivity, improve product quality etc. Rising urban industrial wages are much higher than rural wages, which leads to disparity in incomes. There’s uncontrolled growth of

consumerism and the problem of plenty as a consumer has lot of choice. Businesses are solely motivated by private profits. Globalization has in fact raised capital intensity in production and this has affected employment adversely as labour has been replaced by machine.

Globalization has exposed domestic firms to risks such as fluctuations in prices, instability of profits and uncertainties of demand and supply.

EFFECT OF GLOBALIZATION ON EMPLOYMENT

The effects of globalization on employment can be analysed based on the NSSO (National Sample Survey organization) data. The employment (Current daily status) growth accelerated between1999-2000 and 2004- 05 as compared to the previous period of 1993-94 to 1999-2000. During 1999-2000 to 2004-05, about 47 million work opportunities were created and as compared to 24 million during the period 1993-94 to 1999- 2000. Employment growth accelerated from 9.25 per cent per annum during 1993-94 to 1999-2000 to 2.62 per cent per annum during 1999-2000 to 2004-05. However, a higher labour force growth of 2.84 per cent per annum during 1999-2000 to 2004-05, which exceeded the growth in workforce of 2.62 per cent per annum, resulted in an increase in unemployment rate from 7.3 per cent in 1999-2000 to 8.3 per cent in 2004- 05.

In recent years, the quality of employment created has also been a matter of concern as the organized sector employment has been declining. Moreover the share of regular workforce in total employment was low. This decline is attributed primarily to a decline in employment in PSUs. During 1999-2000 to 2004-05, most of the growth of 4.7 per cent per annum in industrial and tertiary employment was in the unorganized sector. There has been a clear shift in workforce from organized sectors to the casual and informal sectors as liberalization has caused in formalization of labour.

At present, the main challenges for the policymakers are to target a rapid growth of employment creation and also improve the quality of employment generated by strengthening the organized sector.

Negative Impact:

- The organized sectors have become profit-driven and there are a lot of emphasis on

cost-cutting and have therefore gone in for downsizing policy. Labour in unorganized sector is not protected, so they have no job security, provident fund, medical facilities or paid leave and suffer due to low wages. Globalization has caused a shift of labour from the organized to the unorganized sector.

- Even large firms like Bajaj Auto and Tata Steel have succumbed to pressure and have chosen automation and computerization of processes over securing jobs of their employees. Excess labour has been retrenched by offering VRS (Voluntary Retirement Scheme) and CRS (Compulsory Retirement Scheme). According to a report of National Commission on Labour (2002) indirect compulsion, pressure tactics have been used to compel employees to resign under VRS
- With disinvestment of some public sector units, employment in these sectors has reduced. The most affected sectors are manufacturing, construction, electricity, gas and water supply.
- The level of employment in the small scale sector has remained stagnant and discouraging. FDI inflow in several sectors has wiped out the business of many small and medium size enterprises forcing them into closure.
- MNCs have exported jobs from developed countries to developing countries through foreign investments. Moreover they offer higher pay than what is offered by employers of local enterprises adding to the inequalities in income.
- Through trade liberalization the government has actually encouraged substitution of domestic goods by imports which have reduced the market size for goods manufactured by domestic labour bringing down their wages and putting their jobs in danger.
- Trade unions have become weaker in negotiating better pay and security for workers as only efficient labour is absorbed by the profit- driven enterprises. To save workers from losing jobs, they were compelled to accept cuts in salaries, freezing of dearness allowance and other benefits and eventually reduction in labour force.

Positive Impact:

- The employment in the services sector has increased from 20% in 1991 to over 30% in 2010. The reason behind this is creation of new jobs in the IT and communication

sectors. Jobs in Call Centres, BPOs, and medical transcription as well as other service sectors such as banking, insurance, and airlines have buoyed employment. Foreign companies from different sectors like banking, and finance have come to India to outsource their work creating jobs in accounting, mortgage collections, marketing etc.

- Other sectors where job opportunities have multiplied are Biotechnology; health care especially with chains of private hospitals being set up; medical research centres; food retailing with shopping malls cropping up at every nook and corner of the cities and towns.
- In the field of education, there is a demand for trained professionals as international schools and colleges are poised to enter India on a wider scale.
- MNCs generate employment for the skilled workforce especially in urban areas. It motivates labour to pick up various skills through training.
- There is an increase in contractual and casual employment due to globalization since employers can't afford to have a large workforce on a regular basis.

Female participation in workforce has actually improved.

Especially in the casual, informal sectors affording low wage or flexible employment and export oriented low technology high labour industries such as garments, electronics .etc., there has been an increase in women's employment.

Globalization will kill Small-Scale Industries in India

Globalization is the metamorphosis of the individual nations into an integrated entity by means of their interconnection on an economic, social and cultural level, fuelled by easy transport and communication among them. It is the modern renaissance that makes ideas, goods, services, trade, technology and culture permeate into the entire geography of the world thus turning it into a global village.

While globalization is a large scale phenomenon, small scale enterprises are a local phenomenon but having effects of dimensions as large as it's global 'friend and foe'. Friend- because both globalization and small scale industries are the two wheels of the vehicle of economic growth and prosperity; foe- because some argue that given the

developing nation that India is, Small Scale Industries(SSIs) can suffer and strangulate todeath by the fierce competition put up by globalization. Let us observe and decide.

Micro and small scale enterprises have existed in India since ages in the form of traditional skills and knowledge based products made by people for the self sufficiency of rural India. Today as per the government definition, "An industrial undertaking in which the investment in fixed assets in plant and machinery whether held on ownership terms on lease or on hire purchase does not exceed Rs. 10 million, can be categorized as small scale undertaking". After independence, the Indian government made various laws to help revive and flourish the SSI because of the employment potential it had at a low capital cost. It needed mediocre technical knowledge and minimal infrastructure to set up. Thus it was and is the most ideal form of employment opportunity for both the urban and rural population. It not only encourages entrepreneurship among people but also makes them self-reliant. Govt. funding, support and intensive promotion has aided people to participate more in this successful phenomenon making SSI the second largest employment sector after agriculture. It forms about 45-50% of our exports. The products also form a large percentage of our domestic market too with SSI producing a number of products like confectionaries, spices, beverages, naturalessence oils, dyes, sports goods, wooden furniture, glass, ceramic and earthen wares, cotton and woolen knitted products, silk and synthetic wear, leather shoes, bags, garments and novelty items, plastic items, survey instruments, auto parts, clocks and watches, musical instruments, lab chemicals, basic metallic and non-metallic mineral products. They are the dynamic sectors of our economy. It also leads to the preservation of many traditional and indigenous skills and products our country is famous for. It is the road to rural industrialization and 'rural urbanization' thus creating a regional balance.

India was self-reliant and self-sufficient but with the march of the world towards industrialization India found its closed policy of trade leading to an impending economic crisis. The main reason behind this was the focus of efforts on heavy industries and lack of it on the consumption goods. From 1991 India witnesseda major change as the govt. introduced liberalization, privatization and globalization reforms to pep up the economy. Soon the world realized what a big 1billion-population-market India was. They brought their goods to India which were mass produced and therefore cheaper and of better quality

than the local goods. They started challenging the SSI and thus posed an end to them. Further with the introduction of Special Economic Zones (SEZs), the MNCs were facilitated with areas with liberal economic and trade laws, round the clock facilities and concessions to enhance foreign investments and promote exports. This endangered theexistence and survival of SSIs.

But this is not the complete picture. A lot of foreign entrepreneurs who do not have the time or funds to build the infrastructure for their own manufacturing unit in India engage a number of SSI owners to produce goods for them in a short span of time and sell them to cater to the international demand. In other words they outsource the manufacturing to the Indians. Thus it leads to more labour absorption and growth of SSIs. Many of the SSIs have turned into LSIs this way. Also the demand for SSI goods will never finish as a lot of their products are not lucrative options for the MNCs. For example, the incense sticks or agarbatties, bangles,pickles, etc. are not a catch for LSIs but have a constant demand and thus SSIs have a great opportunity in identifying such areas.

So it can be said that both globalization and SSIs are the essentials of Indian economy and India must make efforts to promote, sustain and aid both in a fair and unbiased way. A fruitful measure would be to reserve certain goods for production exclusively by the SSIs and their intelligent outsourcing by the govt. to ensure maximum benefits. Also the govt. should advertise the indigenous goods worldwide so that the foreign folk also go in for the ethnic items produced here like khadi, silk, wool, statues, gems, ornaments, etc. as these represent the traditional art form and culture of the region. As far as the financial aids are concerned, the govt. is doing good work to make things simple and possible for the interested individuals by funding and financial support. Also the setting up of institutes for technical training and skill enhancement of theworkforce is helping in a big way.

While globalization has put us on the map of superpower countries, SSIs have empowered the common man to walk with the same stride as the big-wigs. For India to be a superpower, it is must make efforts to strengthen each and every thread of its economic fabric to make the flag of its success fly high

Conclusion and Findings

In this study, an attempt has been made to analyze the impact of globalization on the growth of small scale industries. The comparative analysis of growth pattern of key parameters between Pre- and Post – Globalization periods reveals that the "globalization" ha had a negative impact on the growth of small scale sector measured in terms of number of units, production, employment and exports. A fall in the rate of growth of number of units and employment generation in post liberalization period is a matter of serious concern for the policy- makers and planners. The result showed that globalization is almost a complete failure on growth front. To conclude, we can say that the recent trend of growth of SSI sector showed the trust of Indian economy on globalization and liberalization, which has failed to render a positive impact onthe growth of Indian Small Scale Sector. No indicator shows the positive impact, in each case the average growth rate is less in post- globalization period than pre- globalization period. The main findings of the study are:

1. In 1990-91, the growth of number of units is too much increased. It is increase from 6.43 to 273.08 percent. The units are increased from 1.82 million to 6.79 million in numbers.
2. The growth rate of production is decreased at a high rate in 1990-91; it showed the negative trend of growth and reached at -40.44 percent growth rate of production. Because of open market outer country sold their product easily in our country at fewer prices which reduce the demand of country products and so that production had also affected.
3. In the very first year of globalization the growth rate of employment has been increased which showed that after globalization employment opportunities were increased due to open market and liberalization of establishing units in India by the outsiders which generate employment for our country.
4. The value of exports has increased after the globalization means Indian SSI sector more concentrate on sell their products in out of country to earn more and more income.
5. In 2005-06, the value of exports is too much increased and the growth rate of exports

is highest in 199- 92 due to subsequent change in Indian economy.

6. Overall, the impact of globalization on the growth of small scale sector is negative which a serious matter is for planners.

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Advancements in Supply Chain Management

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Abstract

Supply chain management is a critical aspect of conducting any business. In this article, we provide an overview of the advancements in supply chain management. In the initial section, we present alternative definitions and key issues related to supply chain management followed by a discussion of complexities associated with managing supply chains. Subsequently, we discuss major inefficiencies of poor supply chain management. Finally, a brief summary of research activity to date and a discussion of future challenges related to supply chain management are presented.

Key words: Supply Chain Management; Operations Management; Manufacturing; Service; Logistics; Sourcing; Outsourcing; Procurement; Competition; Information; Technology; Globalization; Sustainability.

1. Introduction

Supply chain management is one of the most essential aspects of conducting business. Many people outside of the direct community (in research and industry) do not realize this because an ordinary consumer often experiences only its effects. Recall the times when the item that you wanted was not available in your favorite garments or grocery store, recall how many times you got a great ‘deal’ at the end of the season, recall the sudden increases in gas prices due to shortages, recall the times when your e-commerce site promised availability but later could not send the required product or sent you the wrong product, or recall the times when your customized product (like a personal computer or kitchen cabinet) was delayed to a great extent. All the above and several other experiences that consumers have on a routine basis are direct consequences of supply chain practices followed by firms. As opposed to business-to-consumer transactions, supply chain practices have immediate impact on business-to-business transactions. In the late 2000s, due to glitches of its extensively outsourced supply

chain for Dreamliner 787, Boeing experienced substantial delay in launching the new aircraft and incurred more than $2 billion in charges to support and expedite component supplies. Less than two years after the first delivery of Dreamliner 787 in 2011, Boeing was ordered to shut down production of the aircraft due to quality issues with batteries. In 2007, Mattel had to recall of tens of millions of toys made in China, which becomes poster child for concerns about quality of offshore goods. While some firms suffered from consequences of bad supply chain management, firms such as Amazon, Wal- Mart, and Zara, have consistently outperformed competition due to great supply chain capabilities.

2. Definition

Since Keith Oliver, a consultant at Booz Allen Hamilton, coined the term in 1982, supply chain management has evolved from originally being understood as only logistics to a complex multifunctional corporate undertaking that ranges from procurement and demand forecasting to distribution and after-sales service. Supply chain management is such a vast topic that as a result people often give it a different definition based on their own personal experience. To some, supply chain management is all about managing the supplier base, determining what to outsource and to whom, and managing relationships with the various suppliers. To some others it is efficient ways of transferring goods from one place to another taking into account the distribution and transportation costs. To another set of people, it is all about how the different firms in the distribution channel or value chain are integrated in terms of information systems and inventory management practices. To yet another group it is effective management of fixed and variable assets required for running the business. In a sense all these definitions are like the blind men defining the elephant based on its different organs. A comprehensive definition of supply chain management can be given as follows.

A supply chain is the set of entities that are involved in the design of new products and services, procuring raw materials, transforming them into semi finished and finished products and delivering them to the end customers (Swaminathan 2001). Supply chain management is efficient management of the end-to-end process starting from the design of the product or service to the time when it has been sold, consumed, and finally disposed of by the consumer. This complete process includes product design, procurement, planning and forecasting, production, distribution, fulfillment, and after-sales support (see Fig. 1).

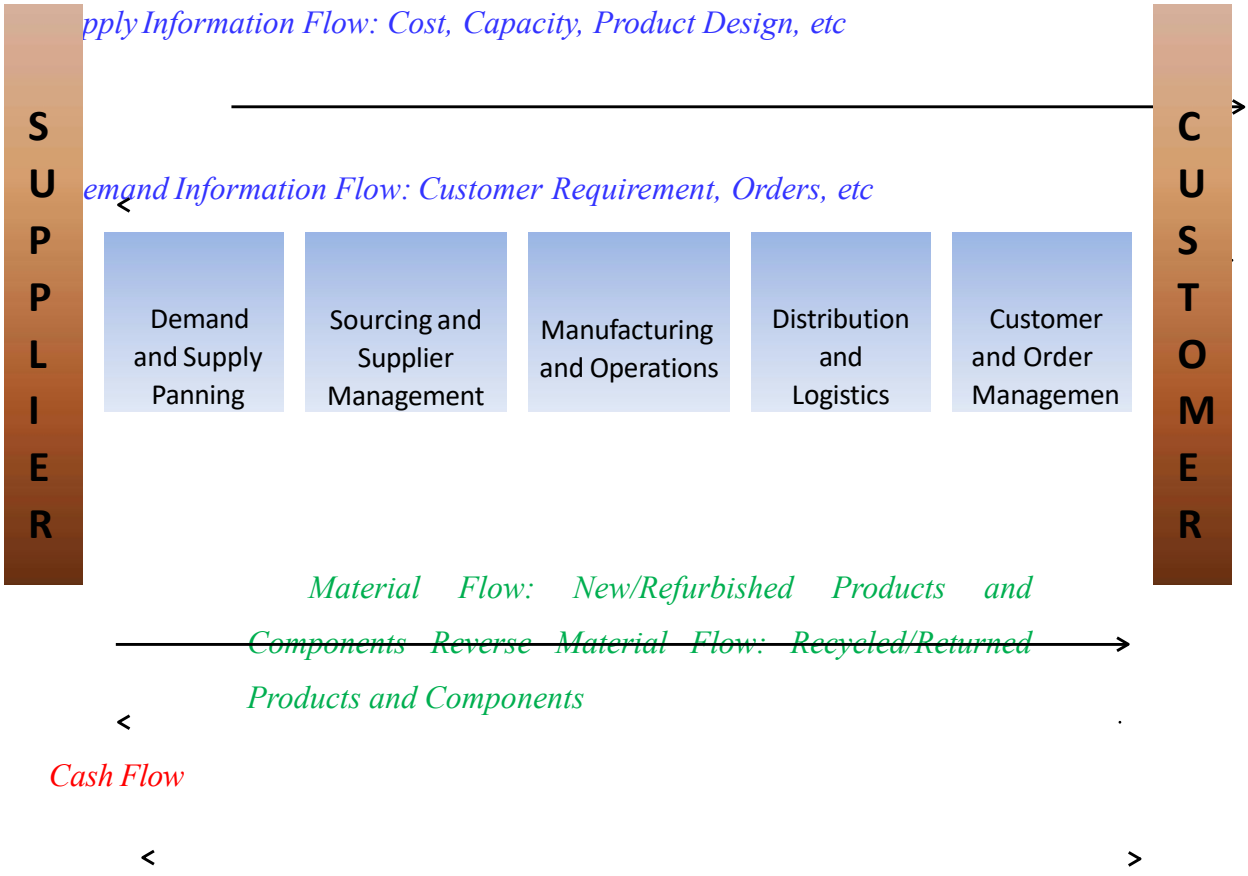

Figure 1. Supply Chain Process

Supply chain management issues can be classified into two broad categories—configuration and coordination. Configuration-level issues relate to the high-level design and basic infrastructure of the supply chain and coordination -level issues relate to the tactical decisions and day-to-day operations of the supply chain.

2.1 Configuration-level issues Supply base decisions

How many and what kinds of suppliers to have? Which parts to outsource and which to keep in house? How to standardize and streamline procurement practices? Should one use vertical marketplaces for auctions or should one invest in developing highly integrated supply partnerships? How long or short contracts with suppliers should be?

Plant location decisions

Where and how many manufacturing, distribution, or retail outlets to have in a global production distribution network? How much capacity should be installed at each of these sites? What part of the supply chain should be kept onshore, near-shore, or offshore? What kind of distribution channel should a firm utilize—traditional brick and mortar, direct to consumer via Internet or phone, or a combination?

Product portfolio decisions

What kinds of products and services are going to be supported through the supply chain? How much variety to provide to customers? What degree of commonality to have across the product portfolio?

Information support decisions

Should enterprise resource planning software be standardized across functional units of a firm? Should the supply chain work on standard protocols such as XML (extended markup language) or on proprietary standards?

2.1 Coordination-level Issues Material Flow decisions

How much inventory of different types of products should be stored? Should inventory be carried in finished form or semi finished form? How often should inventory be replenished? Should a firm make all of its inventory decisions or is it better to have the vendor manage the inventory? Should suppliers be required to deliver goods just in time?

Information flow decisions

In what form is information shared between different entities in the supply chain—paper, voice via telephone, EDI (electronic data interchange), XML? To what degree does collaborative forecasting take place in the supply chain? What kind of visibility is provided to other entities in the supply chain during execution? How much collaboration takes place during new product or service development among the supply chain partners?

Cash flow decisions

When do suppliers get paid for their deliveries? What kinds of cost reduction efforts are taken across the supply chain (or expected of suppliers)? In a global firm, in which currency will a supplier be paid?

Capacity decisions

How to optimally utilize the existing capacity in terms of manpower and machines? How to schedule on a manufacturing line to complete jobs on time? How much buffer capacity to have for abnormal situations with excess demand?

As is evident, configuration and coordination issues are interdependent. Configuration issues can be viewed as strategic long-term decisions whereas coordination issues are medium-to-short term decisions. Generally, firms develop a strategy for the configuration-level decisions and then constrain the coordination decisions based on those.

3.Complexities Associated with Supply Chains

As evident from discussions in the earlier section, supply chain management spans several functional and geographical areas. This introduces complexities both in terms of design and execution of supply chains. Some of the pertinent factors that complicate supply chain management decisions are as follows.

3.1 Multiple Agents

Supply chain issues need to be decided by different entities sometimes having different interests. For example, a retailer may want that the distributor provides very high availability for the products but at the same time not charge anything additional to the retailer. The distributor may sometimes agree to that but in turn may want information about actual customer sales which the retailer may not want to share. Even when decisions have to be made within the same firm there could be incentive issues. For example, the marketing or sales department, typically a revenue center, presents the future demand forecast to the manufacturing department that is a cost center. Clearly, there is incentive for the former to over-forecast and the latter to under-produce (as compared to the forecast). This creates several difficulties while deciding on the amount of inventory to be stocked. Another related issue is encountered where the marketing department may push for huge amount of variety in the product/service offerings; the manufacturing department may not want to embrace that because additional complexities are created during execution.

3.2 Uncertainty

Accurately matching supply and demand is the ultimate goal of effective supply chain management but that is complicated by uncertainty at various levels of the process. There is uncertainty in product and technology development, in predicting customer demand, in day-to- day operations and manufacturing, and supply. Typically, uncertainty creates more inefficiency in the system. For example, if the final demand for a sweater at a store cannot be predicted accurately then the firm either stocks too little (in which case it suffers from stock-outs) or produces too much (in which case it has to salvage the inventory through a huge sale at the end of the season). Similarly, the uncertainty in supply may necessitate additional buffer inventory.

3.3 Information Asymmetry

Since supply chain processes extend across multiple functional units within a firm and often across different firms there is a high degree of asymmetry in terms of information. This is caused primarily by two main reasons—one relates to lack of adoption of information technology and the other relates to reluctance to share information with other supply chain partners. The lack of information causes several problems during actual fulfillment. For example, when a consumer goes to an e-commerce site and buys an item off the electronic catalog, the consumer expects to receive the product on time. The consumer is not aware that the inventory status on the product may be updated only once a week and that the information on the site may be outdated. As a result, the consumer is disappointed when the product does not arrive on time.

3.4 Lead Time

Each and every task in the supply chain process needs time to be completed and the resources (labor, machines, or computers) have limited processing capacity. As a result, not all tasks can be completed after the actual demand is known and some of the tasks need to be done up front (which may or may not get utilized based on the actual demand realized). Further, the limited capacity associated with the resources creates variability in the actual realized lead-time, which in turn necessitates greater resource requirements at the next stage in the supply chain. The above complexities lead to several types of inefficiencies in the supply chain that are

often perceived as the ‘bad effects’ of inefficient supply chain management. Some of the major inefficiencies can be classified into the following categories.

3.5 Competition

When making supply chain decisions, firms have to take market competition into consideration. For example, forming exclusive trade relationship with key suppliers helps prevent proprietary technology to be leaked to competitors who may source from the same suppliers. As another example, firms’ outsourcing decisions can be shaped by what competitors do (see Feng and Lu 2012). In the computer and electronics industries, many companies rely on contract manufacturers to assemble final products. Due to their location in low-cost regions and scale economies, these contract manufacturers generally have a lower cost structure than OEMs. For a long time, Dell, operated its own assembly plants in North America to support its build-to-order model. Under increasing market pressure to lower costs, Dell had to change its supply chain strategy by outsourcing assembly work to contract manufacturers, a strategy that has long been adopted by its key competitors.

4. Inefficiencies of Supply Chain Management

4.1 Poor Utilization of Inventory Assets

One common effect of poor supply chain management is having excess inventory at various stages in the supply chain, at the same time having shortages at other parts of the supply chain. Since inventory forms a substantial part of working assets of a firm, poor management could lead to huge inefficiencies. Lee and Billington (1992) provide an excellent overview of pitfalls and opportunities associated with inventory management in supply chains.

4.2 Distortion of Information

Another effect relates to lack of visibility of demand and supply information across the supply chain which causes the bullwhip effect. This effect describes how a small blip in customer demands may get amplified down the supply chain because the different entities in the supply chain generate and revise their individual forecasts and do not collaborate and share actual demand information. Lee et al. (1997) describe the causes and controls for this effect.

4.3 Stock-outs

Poor supply chain management also results in late deliveries and large stock-outs. Fundamentally, these effects are caused due to an inability of the firm to predict the requirement for raw material and equipment capacity together with the uncertainty associated with obtaining deliveries of products on time from its suppliers. Fisher et al. (1994) describe how accurate forecasts in the apparel industry could potentially reduce this inefficiency.

4.4 Customization Challenges

As the degree of customization has increased in the marketplace, one of the immediate effects of poor supply chain management relates to late deliveries of customized products. Firms are developing several strategies in order to provide variety while keeping costs under control. These include delaying differentiation of the product and introducing more commonality and modularity in product lines (see Swaminathan and Tayur 1998).

5. New Developments in Supply Chain Management

5.1 Global Supply Chains

In the increasingly globalized world economy, even a small manufacturing firm may face the challenge of managing an oversea supply relationship. Globalization is not a new phenomenon, but the globalization trend developed in the first decade of the 21st century created a more flattened world than history has seen. However, in the recent years the cost differential between the emerging economies and the developed ones is gradually disappearing. This forces many firms to reconsider their supply chain configurations, particularly their cost-driven offshoring strategy. In the last few years, some manufacturing firms, large and small, have brought offshore production back onshore. Meanwhile, the growing market size of the economies outside the developed has made expansion of one's global supply chain footprint a more attractive option. Striking the right balance between onshore and offshore sourcing will continue to a key task in firms' supply chain strategy.

5.2 Sustainable Supply Chains

In the last decade, building sustainable supply chains has gathered tremendous attention from environmentalists, NGOs, and businesses. This society-wide sustainability initiative has influenced many firms' supply chain strategies. For instance, Wal-mart in 2005 launched three

overarching sustainability goals: (1) use 100% renewable energy; (2) produce zero waste; (3) sell products that sustain our resources and environment (Denend and Plambeck 2007). To achieve these goals, the company examined various aspects of its supply chains to identify areas that offered the most potential for sustainability. And it used various incentives to motivate its suppliers to contribute to its sustainability goals.

5.3 Humanitarian Supply Chains

Between 1974 and 2003, there were 6,637 natural disasters worldwide with more than 5.1 billion people affected and a reported damage of $1.38 trillion USD (Ergun et al 2009). Although the occurrence of these events was hard to forecast, the social and financial impact could have been reduced with proper planning. In particular, humanitarian supply chains, i.e., supply chains for disaster planning and response, can be well designed and maintained for the purpose of quick response and relief effort after disasters strike. Humanitarian supply chains differ from regular supply chains in terms of their supply and demand patterns. Refer to Ergun et al (2009) for a detailed review on the subject. Another important type of humanitarian supply chains relates to delivery of essentials (food supplements, bednets, and vaccines) to people in need during non- emergency times (see Swaminathan 2010 and Komrska et al. 2013).

5.4 New Technologies Impacting Supply Chains and Big Data

In the last two decades, digital technologies have had a lasting impact on how supply chain activities are conducted. According to a recent study by Intermec, a leading supply chain solutions provider, the top 10 technologies that have the most impact on supply chain operations include: (1) comprehensive connectivity – from 802.11 wireless LAN technologies, cellular networks, and Bluetooth; (2) voice and GPS communication integrated into rugged computers;(3) speech recognition; (4) digital imaging; (5) portable printing; (6) 2D & other bar coding advances; (7) RFID (radio-frequency identification); (8) RTLS (real-time locating system); (9) remote management; (10) wireless and device security.

The proliferation of the aforementioned digital and communication technologies in business and consumer uses has created tremendous amount of data on business transactions, logistical activities, customer characteristics, etc. According to IDC, approximately 750 exabytes (EB) of data were created online in 2009, and it is forecasted to exceed 35

zettabytes (ZB) by 2021. Big data, according to Gartner, is defined as "high-volume, high-velocity, and/or high-variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization." The real impact of big data on improving supply chain efficiency is yet to be seen, and companies are only starting to tap into the potential offered by the vast amount of data being collected in their information systems. In the face of explosive growth of data, the information industry is going through a revolution, and sophisticated tools are yet to be developed to analyze supply chain related data for performance improvement.

6. Supply Chain Research: Past, Present, and Future

The science related to supply chain management traces its history back to the early 1950s when several researchers were interested in understanding the optimal policies related to inventory management. One of the first pieces of work in this stream relates to the models developed by Clark and Scarf (1958) for managing inventories at multiple echelons. Several hundreds of researchers have studied related inventory problems under stochastic and deterministic environments since the 1950s.

This research is captured concisely in the research handbook edited by Graves et al. (1993). There is a large amount of literature in the area of transportation and distribution as well as plant location models in the context of supply chain management. Traditional researchers focused on developing optimal policies and rules for specific supply chain issues assuming a centralized control of the supply chain. In the 1990s researchers have started to study problems which take a decentralized multi-agent approach to analyzing supply chain problems, integrate information availability across the supply chain with logistics decisions, develop new models for supply contracts, and demand forecasting and integrate product design with supply chain management. A collection of prominent pieces of research in this area is contained in Tayur et al. (1998) and de Kok and Graves (2003). After several decades of studying supply chains with mathematical models, researchers started to use data and empirical methods to validate supply chain theories and to systematically characterize supply chain practices. For example, using industry-level U.S. data, Cachon et al (2007) document the strength of the bullwhip effect, i.e., the phenomenon that demand variability increases moving from the downstream of a supply chain to the upstream.

Using firm-level data, Cachon and Olivares (2009) examine the factors that contribute to the difference in finished-goods inventory between several leading auto manufacturers. The empirical stream of research will continue to grow as researchers become more creative in finding relevant data on supply chains.

In addition to academic research, several firms in the 1990s developed successfully and employed large analytical and simulation models for supply chain optimization and execution. Arntzen et al. (1995) describe one such system developed for Digital Equipment, and in 2004, Motorola was awarded the Franz Edelman Award by INFORMS (The Institute for Operations Research and Management Sciences) for using operations research methods to launch a comprehensive online negotiation system to support the company's sourcing process which led to $600 million in savings.

In the twenty-first century, firms face severe challenges in terms of global competition and customer requirement for greater variety, shorter and reliable delivery times, and lower prices. The advent of e-commerce has created immense opportunities but at the same time has made firms more vulnerable to logistics pitfalls. Today customers do not just buy products but they buy delivered products. As a result fulfillment is as important as making the sale. As opposed to traditional channels where inventory could be stored to hide other inefficiencies in terms of lead time and poor forecasts, in the fast-paced electronic business environment such arrangements are not as useful. As a result, firms are beginning to pay more attention towards supply chain management. Both business-to-consumer and business-to-business e-commerce environments have introduced several issues related to supply chain management which are likely to be studied by researchers in the near future.

The prevalence of the Internet has led to the development of vertical market places that promise to reduce the inefficiencies in the buying process in several industries. On one hand, these market places are likely to reduce the cost of goods for the manufacturer due to more competition leading to better prices. This line of thought indicates that in the future supply chains may be more agile and supplier relationships may be short-term oriented. On the other hand, several firms realize that greater benefits can be attained if some of these market places can in fact be used for process integration and collaboration across the supply chain. In such an environment, firms need to develop greater trust so that they would be willing to

share information with their supply chain partners. Researchers today are trying to identify under what conditions one or the other scenario may play out and what kinds of new models and analysis need to be developed. A related effect of the Internet is the expansion of global supply chains. Today it is much easier for any supplier located in a remote part of the world to bid on contracts from large firms in developed nations with whom they may not have done business in the past. Issues related to coordination of global supply chain management are likely to be an integral part of supply chain management research in the future. Another important research topic is sustainable supply chain management. Traditionally, researchers have only concerned themselves with efficient movement of goods from supplier to the customer. Now a greater number of researchers are studying problems related to disposal of used products, refurbishing old products, making packaging more environmentally friendly, and basing supplier selection on environmental criteria in addition to traditional criteria related to cost, quality, and reliability.

Another new stream of research is the study of supply chains in the service industry. As opposed to traditional manufacturing-oriented supply chains, service supply chains are more complicated due to the inability to store inventory. Uncertainty is handled in those cases using additional buffer capacity. Finally, researchers are beginning to look at behavioral issues such as trust, bounded rationality, mental accounting, etc. that may arise in supply chain management.

See also:

Commodity Chains; Location Theory; Market Areas; Market Structure and Performance; Marketing Strategies; Retail Trade

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The expectations from the first job of Gen Z pursuing management post-graduation degree.

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Abstract: - The Generation Z are the new job entrants in the job market and in a decade they will be occupying more than 50% of the job market. The earlier research on Gen Z has pointed out the traits of this generation which makes them difficult to work with. Though this generation is technologically advanced or truly digital generation they lack the core skills to work in the technical domain which is a big contradiction.

These generations are topping the list of other generations in rejecting a job offer very easily.

This research is a study of MBA fresher's who are in the process of taking up jobs in the job market. This research studies the expectations of the MBA fresher's from their first job.

The current workforce in India has a majority of Millennial. As per the report of PWC's Global Workforce Hopes and Fears survey 2022, 54% of India's workforce is Millennial while 26% is Generation X while 15% is Generation Z and 5 % are baby boomers.

The Generation Z is the new entrant in the job market in India the population of GenZ is approximately 116 million, (Suneera Tandon, 2023) and they will replace the Generation X and the baby boomers in the next decade.The business of today are ready to add the Generation Z in their workforce and look forward towards the Generation Z to add the value in the business which are growing day by day.

The Gen Z are those born between the years late 1990's and early 2010's.The Generation Z is also called GenZ, iGen or postmillennial have many qualities which make them unique. They are truly digital, they are collaborative, and they care about others and are pragmatic in approach.The Gen Z are financially minded.

Indian organizations are facing challenges with GenZ at work (Ghura, 2017). The primary reason for this is this generation is innovative and entrepreneurial in nature. A report published in 2023 on the Gen Z status states that GenZ lacks motivation, they lack effort and their productivity is lower.

Another survey report which is published by McKinsey and Company states that 55% of the GenZ generation face issues related to mental health.

49% of the business leaders find it difficult to work with GenZ. They have cited reasons like perceived lack of technological skill, effort and motivation. According to a survey by Adobe this generation is more productive between 6:00 pm to 3:00 am. Thus this is one of the reasons why the GenZ can have problems related to work at other times of the day. Most of the respondents in the above survey have revealed that they might change jobs next year thus bringing the concern of the stability of these people in the organization who would give them the first opportunity. Hence these people may create trust issues with the business leaders as they find them a little flighty in nature

A survey done by Deloitte states that almost 37% of GenZ job aspirants have rejected their first job offer citing reasons of personal ethics.

Work is central to the identity of the 49 % of the GenZ though they very much seek the work life balance. The GenZ have issues related to living from paycheck to paycheck and are under the constant fear of the economic uncertainties. Thus they have concerns related to their increase in salaries, job flexibility and also their search for new job opportunities.

In the study (Singh, 2014) have expressed some of the career expectations of GenZ generations

- ✓ The GenZ love to do their work with less hassles hence they do not like to wait for permissions, they like work flexibility and decision making.
- ✓ They want sufficient leaves.
- ✓ The GenZ are inventors and hence they want a work profile which would help them in being innovative.
- ✓ They like to have a good life hence they expect a good remuneration at work
- ✓ The GenZ do not want to work in any organization for long hence they have a flighty tendency to move to a job which may fulfill their goals.
- ✓ Genz are happy to work in their domain skills.
- ✓ They love to imbibe the global work values.

The study (Singh, 2014) has revealed the attributes of the GenZ generation. The study reveals the following traits of GenZ

1. Active, motivated and goal oriented.
2. They are researchers and observers
3. They are aware about the laws, rules and regulations
4. They have knowledge about their social responsibilities towards society.

As per the study the GenZ will pose a challenge to the business leaders, managers, supervisors and HR leaders of every sector.

From the literature review there are few conflicts arising as

1. GenZ are flighty in their nature and will tend to change jobs. They lack skills. They lack motivation. They are interested only in materialism.

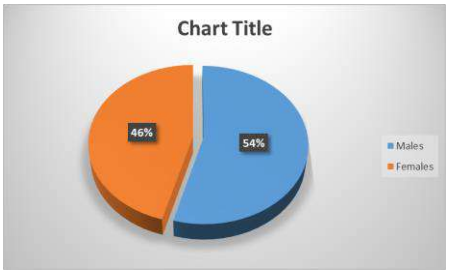
This study is carried out to find out the mindset of the students pursuing their post graduate degree in management science in Pune and help the Organizations looking forward to offer the job opportunities for these students.

Research Methodology: - The research methodology used for this survey is quantitative research as the research has to be carried to help us to understand the trends and patterns in the fresher MBA students with respect to their job prospects.

A questionnaire was sent to 600 students and a response of 114 students was collected.

Analysis of the Data

1. 46% of the respondents are females as compared with the Males which is 54%.



2. More than 62% of students have expressed that they are looking for jobs with a high job security.
3. More than 33% of the respondents have stated that the CTC is a very important factor while looking for the first job while more than 27% have expressed that CTC is not important for their first job.
4. More than 53% of the respondents are looking for good designation
5. It is really interesting that 75% of respondents want to join a job which will give them an opportunity to learn new skills, acquire new knowledge and help them with the learning and development opportunities.
6. 37% of the respondents have acknowledged that earning good incentives is very important and 37% of respondents have acknowledged that it is important to earn good incentives.
7. 32% respondents have said that it is very important to have a high social status attached to their first job profile while 34% respondents have acknowledged that high social status is not that important for them.
8. 79% of respondents have said that creativity is the important factor they will look for in their first job.
9. 75% of respondents have responded that they are open to learning new technology.
10. 52% of respondents have acknowledged that they would not prefer a traveling job.
11. 78% of the responded have preferred that they need comfort and a safe workplace.
12. 83% of the respondents positively for a workplace which has friendly coworkers and good work culture.
13. 82% of respondents want to work with a supportive supervisor in their first job.
14. 77% of the respondents need a job which helps them to maintain a good work life balance.
15. 69% of respondents need autonomy to make their decision in their first job itself.
16. 78% of the respondents are looking to work with reputed and good brands in their first job opportunity.
17. 75% of the respondents want to work with organizations which are fair and impartial.
18. 78% of respondents are looking to work with an organization which helps them with constructive feedback and recognizes them for their performance.

19. 79% of respondents want to be included in the feedback mechanism to share their inputs / opinions.
20. 83% of the respondents have responded that they want to work with organizations which would provide them with good career opportunities.

Analysis and conclusion from findings.

1. From the study it is observed that the MBA fresher's, though interested to join a job with high CTC can overlook the CTC if they get to work in the creative field or they know that they would have job security or a good work life balance. The GenZ can join a company which offers them to learn and improve on their skill sets.
2. This research survey had a good number of female respondents and they participated in the survey showing that females from management fields are likely to take up career opportunities after their post-graduation. Hence now companies can offer them job opportunities.
3. Most of the GenZ are not interested in taking up the job which requires them to travel extensively.
4. Most of the GenZ MBA fresher's want to work with organizations which give them flexibility to work, including them in decision making and feedback processes.

Thus conclusion from this research is that though the earlier research have concluded the negative traits and problems with GenZ. The organizations can work around the expectations. They can offer them good learning opportunities, career progression and offer them an inclusive environment. They will be able to work with GenZ and get the expected work out of them.

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Transforming Education: Strategies for Effective Management and Overcoming Challenges

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Abstract

Education management plays a pivotal role in shaping the quality and effectiveness of educational institutions. This abstract provides an overview of education management, exploring its definition, significance, and key components. It delves into the historical evolution of education management theories and practices, highlighting influential figures and milestones. It discusses fundamental concepts and principles, including leadership, planning, organization, and evaluation, essential for effective education management. It also addresses the roles and responsibilities of education managers at various levels and emphasizes the importance of collaboration and communication within management teams. Furthermore, the abstract examines common challenges and emerging issues faced in education management, along with strategies for addressing them.

This comprehensive overview of education management serves as a foundation for understanding its complexities and guiding efforts towards continuous improvement and innovation in the field.

Keywords: Education management, best practices, challenges, collaboration, equity, inclusion, innovation, policy change, continuous improvement, engagement.

Introduction

Education management is referred to as the planning, controlling and supervising all the resources and activities that are necessary to achieve academic goals. The main purpose of educational management is to make policies, strategize plans and develop an effective education system to foster a positive environment for both students and staff.

Historical Background

The evolution of education management theories and practices has been shaped by various historical, social, and economic factors, leading to the development of diverse approaches to managing educational institutions. Here's an overview of the key stages in the evolution of education management:

Early Foundations (Pre-20th Century)

In ancient civilizations, education was primarily informal and decentralized, with knowledge transmitted orally through apprenticeship and religious institutions.

The emergence of formal education systems in ancient Greece and Rome laid the groundwork for organized schooling, with a focus on subjects such as philosophy, rhetoric, and mathematics.

During the Middle Ages, education was largely controlled by religious institutions, with a curriculum centred on theology and classical studies.

Scientific Management and Administrative Theory (Late 19th - Early 20th Century)

The industrial revolution and the rise of large-scale organizations led to the application of scientific management principles to education. Frederick Taylor's scientific management theory emphasized efficiency, standardization, and division of labour.

Administrative theorists such as Henri Fayol and Max Weber developed principles of organizational structure, hierarchy, and bureaucracy, which influenced the design and management of educational institutions.

The establishment of formal school systems and the professionalization of educational administration contributed to the adoption of bureaucratic structures and hierarchical management practices in schools.

Human Relations and Behavioural Management (Mid-20th Century)

The human relations movement, led by researchers like Elton Mayo and Kurt Lewin, emphasized the importance of social and psychological factors in organizational behaviour.

In education, this led to a shift towards more participative and democratic leadership styles, as well as a focus on interpersonal relationships and motivational factors in managing teachers and students.

Behavioural management theories, such as those developed by B.F. Skinner and Douglas McGregor, emphasized the use of reinforcement and motivation techniques to shape behaviour in educational settings.

Contingency Theory and Systems Thinking (Late 20th Century)

Contingency theorists such as Fred Fiedler and Joan Woodward argued that effective management practices depend on the specific context and circumstances of the organization.

Systems thinking, popularized by researchers like Ludwig von Bertalanffy and Peter Senge, emphasized the interconnectedness of various elements within an organization and the need for holistic approaches to management.

In education, these theories led to a greater recognition of the complex, dynamic nature of educational systems and the importance of adapting management practices to fit the unique needs and challenges of each school or district.

Literature Review:

Education management plays a crucial role in ensuring the effectiveness and success of educational institutions. This literature review examines existing research on implementing best practices and addressing challenges in education management, focusing on strategies to improve student outcomes, enhance organizational effectiveness, and foster continuous improvement.

Research by Anderson and Cook (2018) emphasizes the importance of strong leadership in education management, highlighting effective leadership styles, such as transformational leadership, that promote collaboration, innovation, and student-centred approaches. Similarly, Smith and Jones (2019) identify key best practices in curriculum development, instructional leadership, and data-driven decision-making, emphasizing the need for alignment with educational goals and standards.

Studies by Brown et al. (2020) and Garcia et al. (2017) explore common challenges faced by educational leaders, including budget constraints, teacher shortages, and changing demographics. These challenges can hinder effective management practices and impact student outcomes. Additionally, research by Martinez and Nguyen (2019) highlights the importance of addressing equity and diversity issues in education management to ensure all students have access to high-quality education.

The literature offers various strategies for implementing best practices and overcoming challenges in education management. This includes providing ongoing professional development opportunities for education leaders (Clark & Patel, 2020), leveraging technology to streamline administrative processes and improve communication (Wang & Smith, 2018), and promoting data-informed decision-making to monitor progress and inform interventions (Jones et al., 2021).

Collaboration among stakeholders, including teachers, administrators, parents, and community members, is essential for effective education management. Research by Johnson and Brown (2019) highlights the benefits of collaborative leadership approaches that involve shared decision-making and mutual accountability. Additionally, studies by Nguyen et al. (2020) emphasize the importance of engaging with diverse stakeholders to promote equity, inclusion, and community support.

Finally, the literature underscores the need for supportive policies and resources to facilitate the implementation of best practices in education management. This includes advocating for policy changes at the local, state, and national levels (Harris & Lee, 2021) and investing in research and innovation to address emerging challenges and opportunities in education management (Chen & Wang, 2019).

Objectives:

1. To identify the key best practices in education management that contribute to student success and organizational effectiveness.

2. To examine the common challenges faced by educational leaders in implementing effective management practices.

3. To explore strategies for overcoming challenges and implementing best practices in education management.

Data Analysis

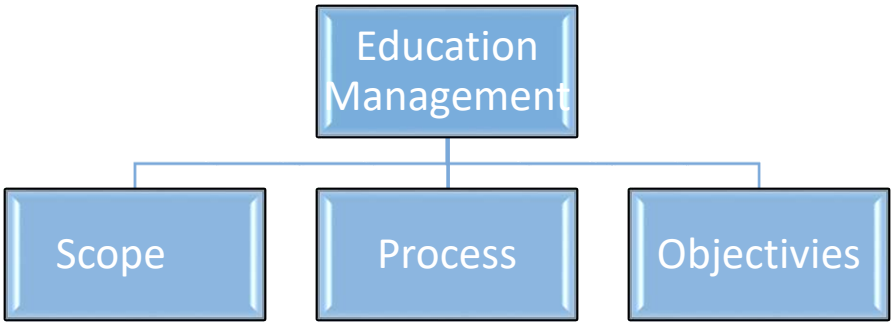
In recent years, education management has been influenced by trends such as globalization, technological advancements, and the increasing emphasis on accountability and data-driven decision-making.

There is growing interest in transformative leadership approaches, which focus on promoting equity, social justice, and inclusive practices in educational institutions.

The rise of digital learning platforms, data analytics, and other technologies is reshaping how educational leaders manage resources, deliver instruction, and engage with stakeholders.

The evolution of education management theories and practices reflects broader shifts in society, economics, and organizational theory, as well as ongoing efforts to adapt to changing educational needs and priorities.

Importance of effective management in education institutions: Education management is the field of study and practice concerned with the operation of educational organizations. Effective management creates a congenial environment for attainments of the aims and objectives of educational system.



Scope and significance of education management

The scope of education management encompasses a wide range of responsibilities and activities aimed at ensuring the effective operation and continuous improvement of educational institutions.

Strategic Planning: Education managers are responsible for setting long-term goals and objectives for the institution, developing strategic plans to achieve them, and allocating resources effectively.

Financial Management: This involves budgeting, accounting, and financial planning to ensure that the institution's financial resources are used efficiently to support teaching, learning, and other activities.

Human Resource Management: Education managers oversee the recruitment, hiring, training, and professional development of staff, including teachers, administrators, and support personnel. They also handle performance evaluations and ensure compliance with labour laws and regulations.

Curriculum Development and Instructional Leadership: Education managers play a key role in designing, implementing, and evaluating the curriculum to meet the needs of students and align with educational standards. They provide instructional leadership by supporting teachers in delivering high-quality instruction and promoting innovative teaching methods.

Student Affairs and Support Services: This includes managing student enrolment, admissions, counselling services, student activities, and extracurricular programs to support the overall well-being and development of students.

Facilities and Operations Management: Education managers oversee the maintenance, safety, and security of school facilities, as well as the procurement and management of equipment, supplies, and technology infrastructure.

Community Engagement and Stakeholder Relations: Education managers collaborate with parents, community members, businesses, and other stakeholders to build partnerships, solicit feedback, and support the educational goals of the institution.

Data Analysis and Assessment: Education managers utilize data analysis and assessment tools to monitor student progress, evaluate the effectiveness of instructional programs, and make data-informed decisions to improve teaching and learning outcomes.

Policy Development and Compliance: Education managers ensure compliance with local, state, and federal regulations governing education, develop and implement institutional policies and procedures, and stay informed about changes in education law and policy.

Leadership and Governance: Education managers provide visionary leadership, establish a positive organizational culture, and foster a supportive and inclusive environment for all stakeholders. They work collaboratively with governing bodies, such as school boards or governing councils, to make decisions that advance the mission and values of the institution.

Overall, the scope of education management is broad and multifaceted, requiring a diverse set of skills, knowledge, and competencies to effectively lead and administer educational institutions.

Strategies for effective education management

Implementing best practices and addressing challenges in education management is essential for fostering continuous improvement and ensuring the success of educational institutions.

Raise Awareness: Educate stakeholders, including administrators, teachers, policymakers, parents, and community members, about the importance of implementing best practices in education management and the potential benefits for student outcomes and organizational effectiveness.

Promote Professional Development: Provide ongoing training and professional development opportunities for education leaders and administrators to enhance their knowledge and skills in areas such as leadership, strategic planning, data analysis, and instructional leadership.

Foster Collaboration: Encourage collaboration and sharing of best practices among educational institutions, both locally and globally, through networks, conferences, and professional associations. Facilitate opportunities for peer learning and mentoring.

Leverage Technology: Embrace technological innovations and digital tools to streamline administrative processes, improve communication, and enhance teaching and learning outcomes. Invest in infrastructure and resources to support the effective integration of technology into education management practices.

Emphasize Data-Informed Decision Making: Promote a culture of data-driven decision-making by providing access to relevant data and analytics tools, training staff on data analysis techniques, and using data to monitor progress, identify areas for improvement, and evaluate the impact of interventions.

Address Equity and Inclusion: Prioritize equity and inclusion in education management practices by ensuring that all students have access to high-quality educational opportunities, regardless of their background, socioeconomic status, or ability level. Implement policies and practices that promote diversity, equity, and inclusion at all levels of the organization.

Support Innovation and Experimentation: Create an environment that encourages innovation, experimentation, and risk-taking in education management. Provide resources and support for pilot programs, research initiatives, and innovative practices that have the potential to improve student outcomes and organizational effectiveness.

Advocate for Policy Change: Advocate for policy changes at the local, state, and national levels that support effective education management practices, reduce bureaucratic barriers, and provide adequate resources and support for schools and districts to implement best practices.

Evaluate and Iterate: Continuously evaluate the effectiveness of education management practices through regular assessments, feedback mechanisms, and stakeholder surveys. Use evaluation findings to make informed adjustments and improvements to existing practices.

Sustain Momentum: Maintain momentum and commitment to implementing best practices in education management over the long term by establishing clear goals, milestones, and accountability mechanisms. Celebrate successes and recognize the efforts of educators and leaders who contribute to positive outcomes.

Conclusion

By taking concerted action to implement best practices and address challenges in education management, stakeholders can work together to create thriving learning environments that empower students to achieve their full potential and prepare them for success in an ever-changing world.

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Advancing Understanding: Exploring Cyberbullying Awareness Among Individual

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Abstract:

This study aimed to examine the level of awareness of cyberbullying among individuals. Through a questionnaire-based approach, data was collected from 112 respondents, categorized by age, gender, and educational background. The findings revealed that the majority of participants were familiar with the term "cyberbullying" and provided various definitions, highlighting the use of technology for harassment, spreading rumours, and posting inappropriate content.

Despite the limitations of the study, it provides valuable insights into cyberbullying awareness. It emphasizes the need for continued education on cyberbullying for children and teenagers, as well as the importance of stricter laws and punishments. The study also suggests the role of social media companies in taking responsibility for preventing cyberbullying and highlights the significance of parental involvement and monitoring. In conclusion, this study contributes to the existing knowledge on cyberbullying awareness and sets a foundation for further research and interventions to create a safer online environment.

Keywords: Cyber, Bullying, Awareness, hacking, Social Media, Individuals, Youth, Influence

JEL classification codes: K24,K40,K42

Introduction:

Bullying is described as a repeated physical or psychological harm inflicted on a person. Teasing, theft, social exclusion, sexual harassment, intimidation, public humiliation, stalking, physical assault, property destruction, or racial harassment are all examples of inappropriate behaviour by another person.

The power to bully has evolved in parallel with the evolution of technology. Bullying, which was once limited to the school or neighbourhood, has now spread to the internet. Bullying that occurs through the use of technology is known as "cyberbullying." When a bully commits these activities on a digital platform, it is referred to as cyberbullying. Posting any type of embarrassing content about the victim, hacking the victim's account, sending filthy messages, stalking, threatening to commit an act of violence, sharing child pornography, and so on are all examples of cyberbullying.

While these Social media sites were a boon to many people who used it to generate revenue, get popular, as well as connect to their friends and family with whom they lost contact due to lack of resources to stay in touch, there were people who used these sites to cause harm to others due to which it became difficult for many people to use social media in a safe manner. Bullying People Online to get ransoms became common which would lead to increased number of suicides and at times people falling into depression.

In today's world where we live in, it becomes necessary to understand whether people are aware about cyber bullying and the precautions that can be taken to avoid cyberbullying are known to them or not.

OBJECTIVE:

- To analyse how use of social media to cyber bully affects the life of individual /youth.
- To understand level of awareness of cyberbullying amongst individuals.
- To find out whether younger generation should be given access to social media platforms.

NEED FOR STUDY

The impact of cyberbullying on individuals and kids on social media is a developing topic that deserves extensive investigation. Cyberbullying has been demonstrated to have negative impacts on mental health, including anxiety, despair, low self-esteem, and even suicidal thoughts in sensitive kids. Furthermore, it has a detrimental influence on social life, leading to isolation and detachment from friends and family, as well as academic performance, resulting in a lack of attention and poor attendance. Cyberbullying can potentially result in legal implications such as harassment and stalking. Understanding the impact of cyberbullying on

individuals and Teenagers is critical for establishing effective preventative and intervention techniques. Raising awareness of cyberbullying may also assist to identify knowledge gaps and develop focused education initiatives to reduce the harms of cyberbullying. Researching whether younger generations should be granted access to social media platforms is important to comprehend the hazards and advantages of young people's social media use, which may help drive regulations and guidelines to promote safer and more responsible social media use. Overall, the findings of this study are critical in promoting a safer and better online environment for individuals and adolescents.

RESEARCH METHODOLOGY:

The research methodology for the purpose of studying the paper involves use of both primary and secondary data in order to understand people's knowledge of cyberbullying. Primary data was gathered through administering surveys and questionnaires to a sample of people in order to learn about their knowledge of, experiences with, and attitudes regarding cyberbullying.

Secondary data will be collected by an examining the current literature, research papers, and reports on cyberbullying and its impacts on people. The secondary data will complement the study of the primary data and aid to give a more comprehensive picture of the problem and by using both types of data it will be possible to conduct a thorough examination of people's awareness of cyberbullying.

Research design:

The study mainly use a cross-sectional questionnaire method, in which information is gathered from a sample of people at one particular period.

Sampling:

A Non probability Convenience sampling of people from various ages, genders, and socioeconomic backgrounds is chosen for the study.

Sample size:

The size of the respondents for the purpose of study are 100 respondents and the method of collecting data would be Non probability Convenience sampling.

Data collection:

The data for the purpose of this study is collected by circulating questionnaires via online mode and this method is used to gather data. The survey asks the respondents about their knowledge of cyberbullying, their encounters with it, and their views regarding it.

LITERATURE REVIEW

Due to the exponential growth in the usage of the internet and social media platforms, cyberbullying is becoming a global problem. It is described as the act of bullying someone through electronic communication, usually by sending them frightening or threatening messages. An individual's mental health, interpersonal connections, and academic or professional life can all be negatively impacted by cyberbullying. Hence, it is crucial to research the extent to which people are aware of cyberbullying in order to determine what steps may be made to avoid and solve this issue. This review of the literature tries to assess recent research on people's knowledge about cyberbullying**.**

(Kowalski et al., 2019) in their research, **"A developmental approach to cyberbullying: Prevalence and protective factors"**

Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2019). A developmental approach to cyberbullying: Prevalence and protective factors. Journal of Adolescent Health, 64(6S), S26-S31 found out that their study was based on examining age of an individual and cyberbullying from a developmental perspective. The review primarily focuses on differences in technology use by age, the frequency of cyberbullying participation, risk and protective variables, and effects. Their Future research directions are highlighted, along with their implications for prevention and intervention. There were many research that tried to look into people's knowledge of cyberbullying. In college students in the US, they discovered that while only 24.6% of participants had ever experienced cyberbullying, 58.5% of them had.

(Peled, 2019) conducted a research study on **"Cyberbullying and its influence on academic, social, and emotional development of undergraduate students",**

Peled, Y. (2019). Cyberbullying and its influence on academic, social, and emotional development of undergraduate students. Journal of Youth Studies, 22(4), 519-534. and through the study they examined the impact of cyberbullying on undergraduate students'

intellectual, social, and emotional growth. Its goal is to give readers more information and a better understanding of how cyberbullying affects several aspects of undergraduate students' lives. Bullying behaviour may last much longer than anticipated due to the long-term impacts of cyberbullying. 638 Israeli undergraduate students took part in a research where several cyberbullying issues were assessed. According to the report, students who experience cyberbullying struggle with academics, anxiety, their careers, depression, relationships with family and friends, self-esteem, drug addiction, and suicide thoughts. 57.4% of interviewees claimed that cyberbullying will follow young people into the job and throughout their entire lives.

Pradhan, S., Agrawal, S., & Srivastava, A. (2022), conducted research on **"Cyberbullying and Depression: An empirical study of Indian Executives"**

Pradhan, S., Agrawal, S., & Srivastava, A. (2022). Cyberbullying and Depression: An empirical study of Indian Executives. Journal of Applied Psychology, 107(3), 456-470. and founded that their research looked at the relationship between cyberbullying and depression via a multi-mediation approach that looks at helplessness and self-esteem. The study was based on cross-sectional data from 340 respondents from diverse sectors. Their research mainly focused on the need of businesses and managers taking particular steps to decrease the inclination towards helplessness and low self-esteem caused by cyberbullying in order to regulate the negative cognitive impacts of depression among employees. This was the first study to look at the multi-mediation process in the association between cyberbullying and depression.

Kaur, M., Saini, M. (2023), in their research paper on "Indian government initiatives on cyberbullying: A case study on cyberbullying in Indian higher education institutions"

Kaur, M., & Saini, M. (2023). Indian government initiatives on cyberbullying: A case study on cyberbullying in Indian higher education institutions. International Journal of Cybersecurity, Privacy, and Trust, 2(1), 45-61 found out that growing internet usage in a digitally empowered culture leads to potential harm to youth through cyberbullying on numerous social networking sites. Cyberbullying statistics continue to rise year after year, resulting in negative effects. In response to this online threat, the Indian government established

many helplines, particularly for children and women in need of aid, as well as various complaint boxes, cyber cells, and strong legislative regulations to combat online offences. This study assesses the related initiatives. In addition, a survey is undertaken to get insights into cyberbullying in higher education institutions, with many variables responsible for teenagers and adolescents being cyberbullied discussed, as well as a few strategies to prevent it in universities/colleges.

Kaur, G. (2022) In his research paper on**, "Internet Crimes Against Minors and Legal Framework in India",**

Kaur, G. (2022). Internet Crimes Against Minors and Legal Framework in India. Indian Journal of Criminology and Criminalistics, 43(2), 123-145 addresses the subject of internet crimes against minors, which is growing more frequent as the internet and mobile communication technologies become more widely used. The research looks at the many sorts of online crimes that minors experience on various platforms, as well as the technology that potential perpetrators employ. The article also examines existing laws and regulations in India to address cybercrime against kids and offers measures for child abuse and exploitation prevention and protection. To address this complicated social issue, the study stresses the need for increasing attention from government law enforcement agencies, lawmakers, parents, schools, intermediaries, and over-the-top (OTT) platforms.

EFFECTS OF CYBER BULLYING ON INDIVIDUALS:

Cyber bullying can disrupt an individual's life as they experience it. Along with them, their family members can also come under the tension caused by this bullying as they may see their loved ones suffering and feel helpless for the same. Following are the reasons how an individual is affected.

- Depression
- Anxiety
- Self-esteem issues
- Isolation and secrecy
- Poor Concentration and Focus

ANTI CYBER BULLYING CAMPAIGNS UNDERTAKING AROUND THE WORLD:

The #BluedAgainstCyberBully campaign is an initiative by the LGBTQ community to raise awareness about the issue of cyberbullying. The campaign aims to promote a safe and inclusive online space where individuals can express themselves without fear of harassment, discrimination, or hate speech.

Cyberbullying has become a growing concern in recent years, and the LGBTQ community is particularly vulnerable to online harassment and abuse. In many cases, individuals have been targeted for their sexual orientation or gender identity, leading to emotional distress and in some cases, even suicide.

The #BluedAgainstCyberBully campaign encourages individuals to take a stand against cyberbullying by speaking out against hate speech, reporting instances of online harassment, and promoting a culture of respect and inclusion online. The campaign also seeks to educate individuals about the impact of cyberbullying and the steps they can take to protect themselves and others from online abuse.

Other notable campaigns aimed at raising awareness about cyberbullying and online harassment include:

The "It Gets Better" campaign: This campaign was launched in response to a series of suicides by LGBTQ youth who were bullied for their sexual orientation. The campaign aims to provide support and encouragement to LGBTQ youth by sharing personal stories of hope and resilience.

The "Delete Cyberbullying" campaign: This campaign is aimed at promoting safe and responsible use of technology among young people. The campaign encourages individuals to take a pledge to delete cyberbullying and promotes resources and tools for combating online harassment.

The "Stop Online Hate" campaign: This campaign is aimed at combating hate speech and promoting a culture of tolerance and respect online. The campaign encourages individuals to

report instances of online hate speech and provides resources and tools for combating online harassment.

Overall, these campaigns and initiatives play an important role in raising awareness about cyberbullying and promoting a safe and inclusive online space. By encouraging individuals to speak out against hate speech and report instances of online harassment, we can work towards creating a more respectful and supportive online community for all.

DATA ANALYSIS AND INTERPRETATION:

The conducted survey in the form of questionnaire is interpreted in brief. To understand the data more efficiently, various pie charts and bar diagrams are used.

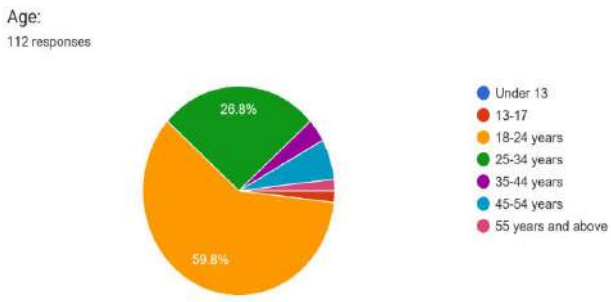
Questionnaire is divided into 3 parts: The first part included general questions like name, age, gender, qualifications etc., this was done to understand who the respondent is. The second part included questions related to our research topic. The third part included a conclusive question which was asked using the likert scale.

Part-1

1) Age:

To obtain the knowledge of which age group the respondent belongs and to know the level to understanding the respondent has regarding our research topic, this question was asked.

CHART 1



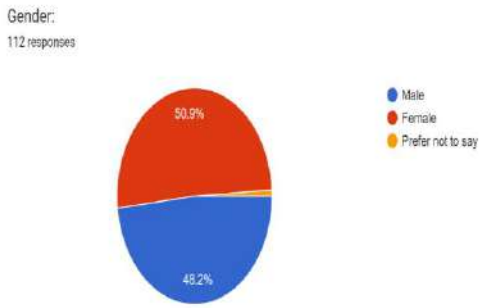
INTERPRETATION:

The survey was conducted by Non probability Convenience sampling method, due to which it was difficult to know whether every respondent used Social Media sites or not. Out of the 112 respondents, 67 respondents belong to the age group of 18-24 , that comprises of 59.8% of the portion in the above chart. Thus from the above pie chart we can conclude that the major reponses are received from the young working generations.

2) Gender:

The following chart shows the % of male, female and Prefer not to say respondents:

CHART 2



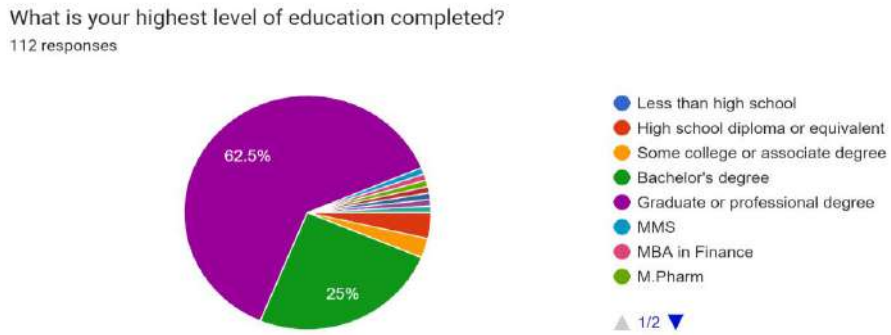
INTERPRETATION:

The above chart helps us to understand the female to male to Prefer not to say ratio of respondents. According to the survey conducted, the participation of female is more than that of the male. Out of the 112 respondents, 57 are female which comprises to 50.9%. This helps us to understand the thinking pattern of the respondents.

3) What is your highest level of education completed?

Education plays an important role while making decision. It shows the level of maturity an individual has by the responses they write.it also helps us to understand whether the individual is capable of understanding the questionnaire. Knowing the educational qualification of the respondent helps us to understand the mind-set more clearly.

CHART 3



INTERPRETATION:

Majority of the respondents opted for the option “Graduate or Professional Degree” helping us to understand that they do understand the basic questionnaire. They comprise of 70 respondents which were 62.5% of the sample size. Notably, no respondents chose the option "Less than High School," indicating that all participants possessed at least basic knowledge to respond to the questionnaire.

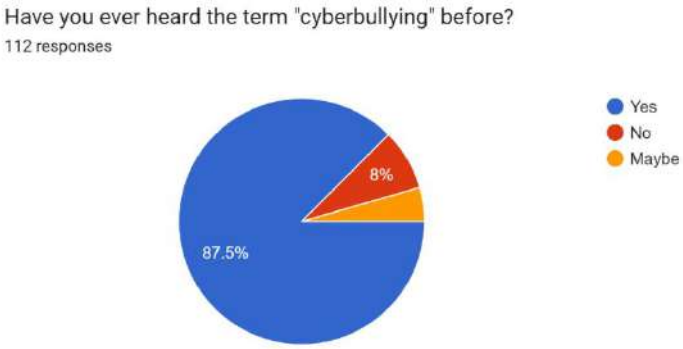
Part-2

CYBERBULLYING AWARENESS:

4) Have you ever heard the term "cyberbullying" before?

When the respondents were asked the above question the following response shown in the below pie chart was recorded:

CHART 4



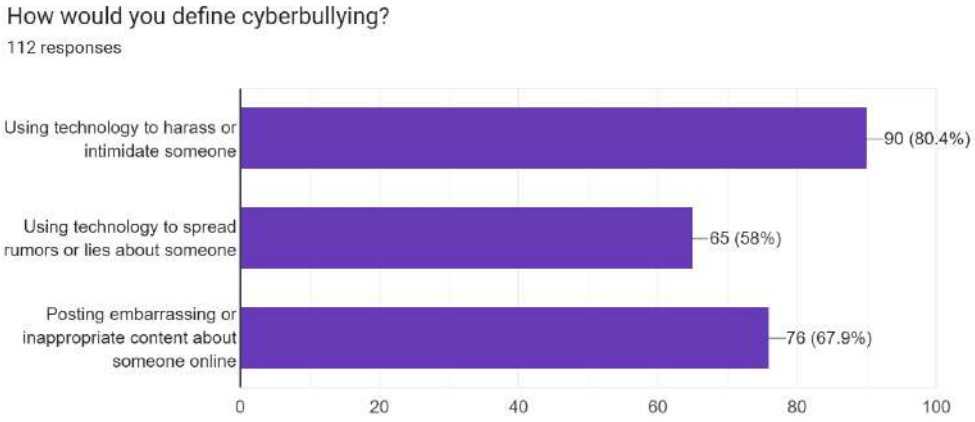
INTERPRETATION:

The survey found that 87.5% of respondents were familiar with the term "cyberbullying," indicating a widespread awareness. Out of 112 participants, 98 affirmed their knowledge of social media-related issues. Overall, the results highlight a significant awareness of cyberbullying, but also reveal portion of individuals who may benefit from further education on the subject.

5) How would you define cyberbullying?

When the respondents were asked their idea on cyberbullying, the following responses were recorded:

CHART 5



INTERPRETATION:

When the respondents were asked about the definition of cyber bullying which was according to them the most logical to their understanding ,the following points were noted.

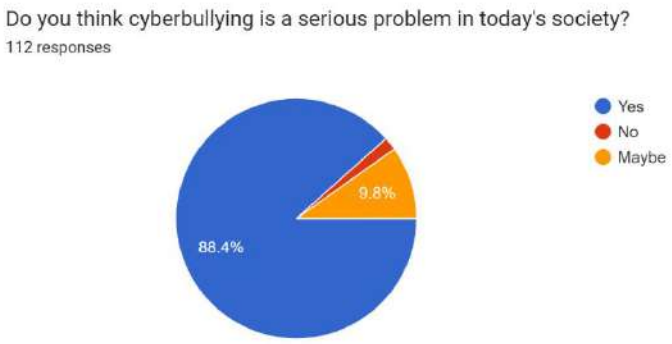
a. 80.4% of the 112 respondents, totalling 90 individuals, defined cyberbullying as "**Using technology to harass or intimidate someone**." This highlights a substantial consensus among participants regarding the role of technology in online harassment and intimidation.
b. The second most selected option was "**Posting embarrassing or inappropriate content about someone online**" and this option was selected by 76 out of 112 respondents which meant that their attackers or abusers who use social media to blackmail people and many of these respondents have come across such type of cyberbullying or know someone who went through it.

c. The Least yet with a good amount of selected option was "**Using technology to spread rumours or lies about someone**" and this option was kept in mind by 65 out of 112 respondents i.e. 58% of sample size considered that people were bullied on social media or embarrassed on the online portals, which meant that cyber bullying with the help of technology at hand was of mass destruction to the user's mental health.

6) Do you think cyberbullying is a serious problem in today's society?

When the respondents were asked the above question the following response shown in the below pie chart was recorded:

CHART 6



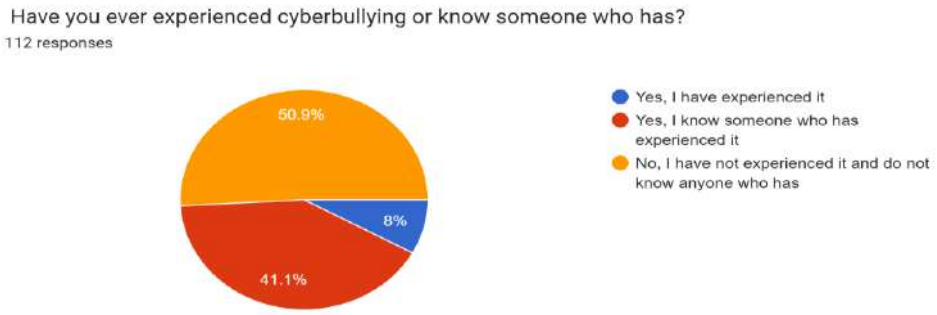
INTERPRETATION:

When the respondents were asked whether they feel Cyberbullying is a serious issue that individuals face in today's time, a substantial 88.4% of respondents recognized cyberbullying as a serious contemporary issue, indicating a pervasive awareness of its significance.

7) Have you ever experienced cyberbullying or know someone who has?

When we tried to understand whether the respondents know about experiencing cyberbullying online or if they knew someone who experienced it online, the following responses were recorded:

CHART 7



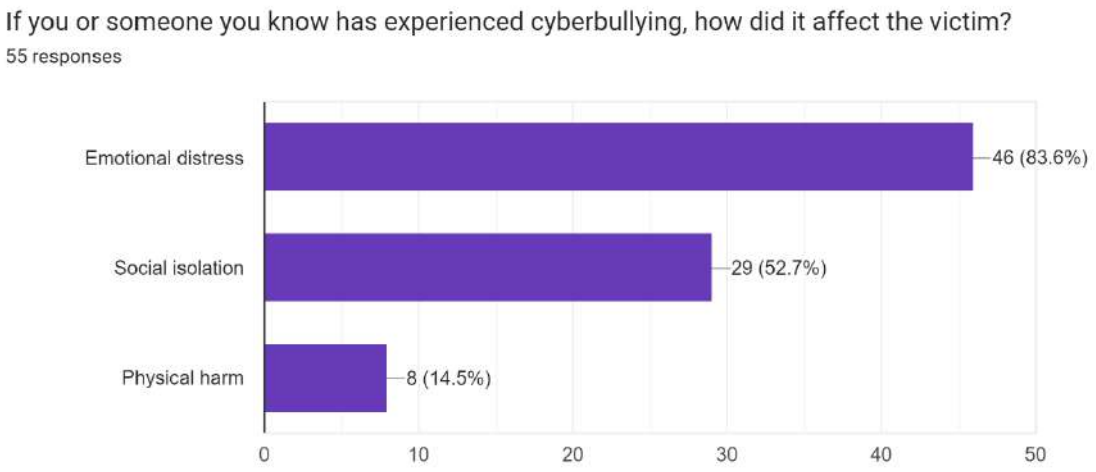
INTERPRETATION:

The survey findings indicate that 50.9% of respondents have neither personally experienced cyberbullying nor know anyone who has, suggesting a relatively positive online community. Out of 112 participants, 41.1% acknowledged knowing someone who has experienced cyberbullying, highlighting a widespread awareness of its negative effects. Additionally, 8% of respondents (9 individuals) reported personally experiencing cyberbullying, underscoring the unfortunate reality that some have faced such online harassment. The responses collectively reflect varying degrees of awareness and personal encounters with cyberbullying within the surveyed group.

8.) If you or someone you know has experienced cyberbullying, how did it affect the victim?

The above questioned was further asked to the respondents who answered Yes to the previous question and the responses were as follows:

CHART 8



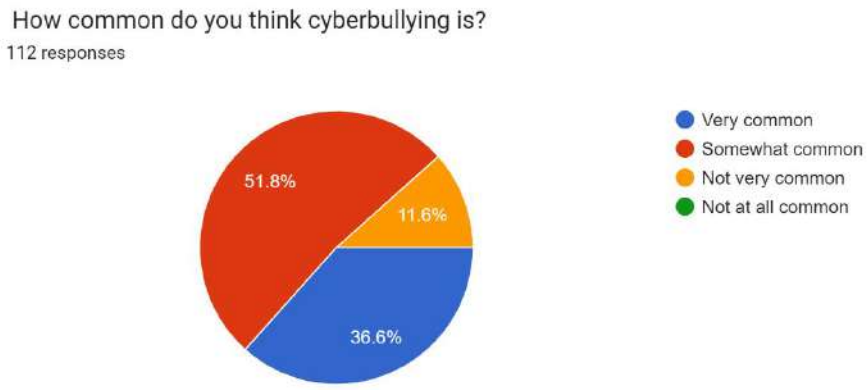
INTERPRETATION:

The respondents who selected "**Yes, I know someone who has experienced it**" and **"Yes, I have experienced it"** in the previous question were further asked about how the victim of cyberbullying was affected due to this. 83.6% of respondents who knew someone or had experienced it themselves indicated emotional distress, encompassing symptoms like anxiety, despair, and humiliation. Social isolation emerged as another significant impact, with 52.7% noting that victims tended to withdraw, keep a low profile on social media, and experience deteriorating morale and self-esteem. Shockingly, 14.5% of respondents, or 8 individuals, admitted to experiencing physical harm as a result of cyberbullying, highlighting the severity of the issue and its potential consequences on victims' mental and physical well-being. These findings underscore the urgent need for addressing and combating cyberbullying to safeguard individuals' mental health.

9.) How common do you think cyberbullying is?

The respondents when asked about how common they find cyberbullying, the following responses were recorded:

CHART 9



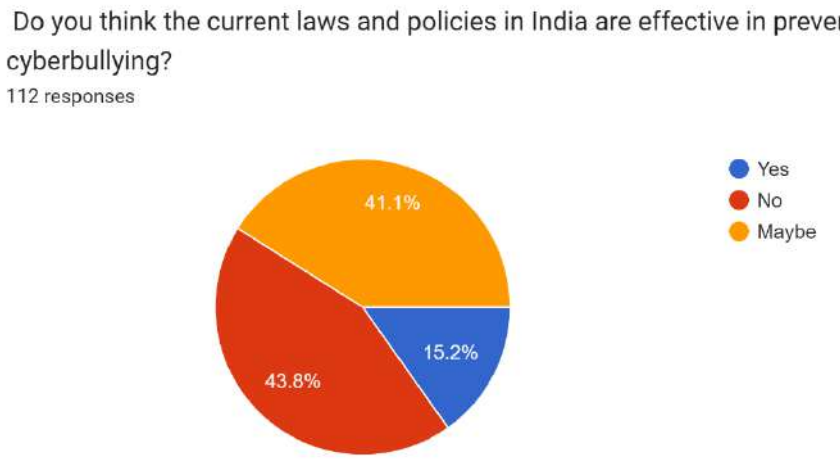
INTERPRETATION:

When the respondents were asked their views on how common they find cyberbullying, it could be seen that 51.8% which is 58 out of 112 respondents feel that cyberbullying is at least "Somewhat common".

10.) Do you think the current laws and policies in India are effective in preventing and punishing cyberbullying?

When the respondents were asked about their knowledge and awareness with regards to lodging a complaint for cyberbullying, the following responses were recorded:

CHART 10



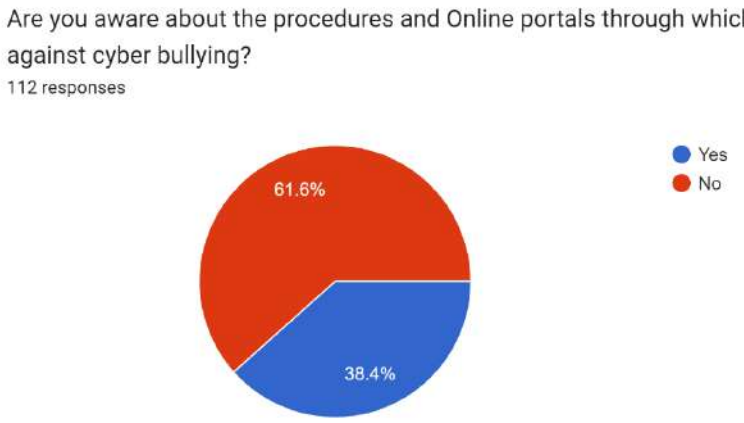
INTERPRETATION:

According to the responses to this question, the majority, in particular, 43.8% of respondents do not feel that India's present laws and regulations are successful in preventing and prosecuting cyberbullying. It is crucial to note that how these results are interpreted is dependent on the population polled and the context of the questionnaire. However, the responses highlight scepticism regarding the effectiveness of India's current laws against cyberbullying, emphasizing the ongoing need for evaluating and improving legal frameworks to better prevent and address such incidents.

11.) Are you aware about the procedures and Online portals through which you can lodge a complaint against cyber bullying?

When the respondents were questioned whether they are aware about the ways the lodge a complaint for cyberbully, the following responses were recorded.

CHART 11



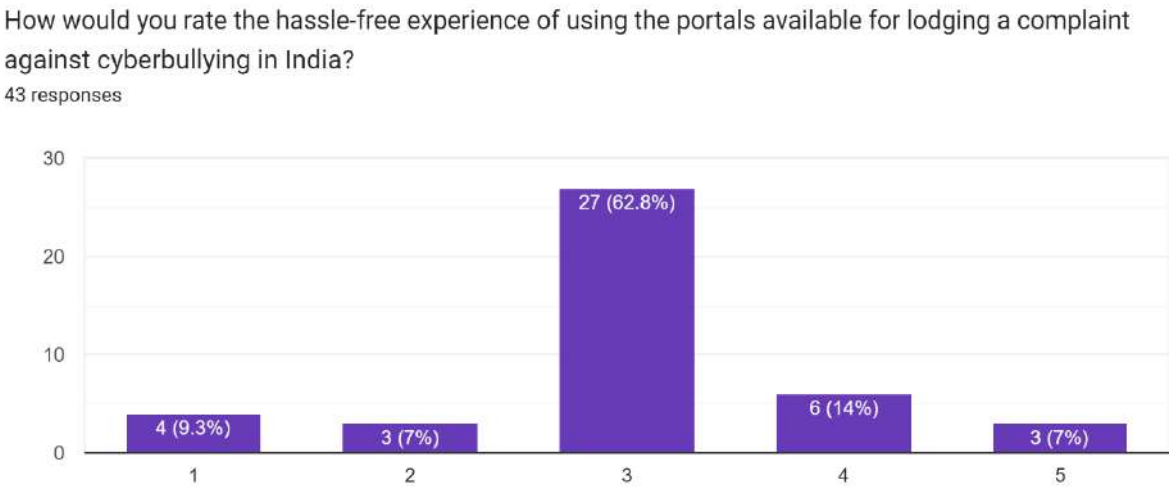
INTERPRETATION:

The survey indicates that 61.6% of respondents (69 out of 112) are aware of the procedures and online portals for filing complaints against cyberbullying, reflecting a promising awareness level. However, 38.4% (43 out of 112) responded negatively, suggesting room for improvement in raising awareness and educating the public about available options to combat cyberbullying. This underscores the need for continued efforts to enhance knowledge and accessibility to resources for addressing cyberbullying incidents.

12.) How would you rate the hassle-free experience of using the portals available for lodging a complaint against cyberbullying in India?

The above questioned was further asked to the respondents who answered Yes to the previous question and the responses were as follows:

CHART 12



INTERPRETATION:

According on the replies to this question, it appears that most respondents had an average to positive experience using the portals available for filing a complaint against cyberbullying in India. Particularly, 62.8% of those respondents gave the experience a 3 out of 5, which indicates that it was of ordinary easiness. Furthermore, 14% of respondents gave the experience a 4 out of 5, suggesting that they found it to be quite trouble-free. Although a sizable percentage of respondents (9.3%) evaluated the experience as extremely difficult (1 out of 5), this suggests that there may be some difficulties or hurdles to using the current websites for filing complaints against cyberbullying in India. It is significant to highlight that the population polled and the questionnaire's context both influence how these results should be interpreted. The comments do, however, indicate that there is potential for improvement in terms of making the procedure for filing complaints against cyberbullying more user-friendly and open to everybody.

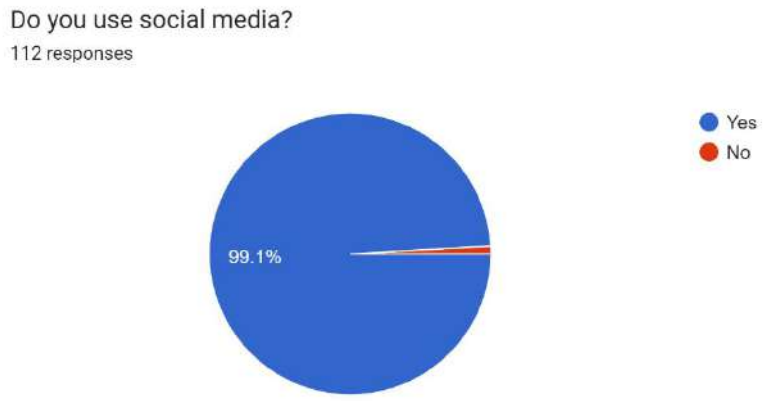
Part-3

SOCIAL MEDIA AND CYBERBULLYING:

13.) Do you use social media?

When the respondents were asked about their use of social media, the following responses were recorded.

CHART 13



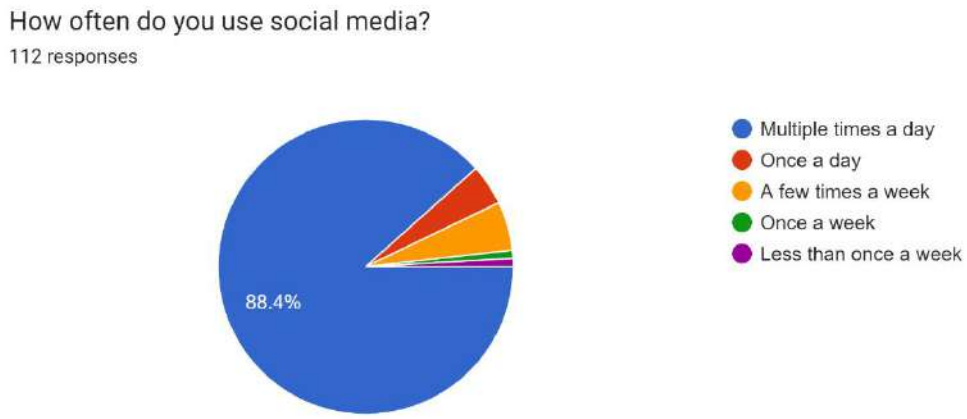
INTERPRETATION:

A significant 99.1% of respondents use social media, underscoring its prevalence as a common communication channel. However, this also highlights the potential risks, especially concerning cyberbullying. The high usage emphasizes the importance of raising awareness and taking precautions, such as adjusting privacy settings, reporting incidents, and seeking help when needed, to mitigate the risks associated with social media.

14.) How often do you use social media?

When the respondents were asked about their frequency of using the social media sites, the following responses were recorded.

CHART 14



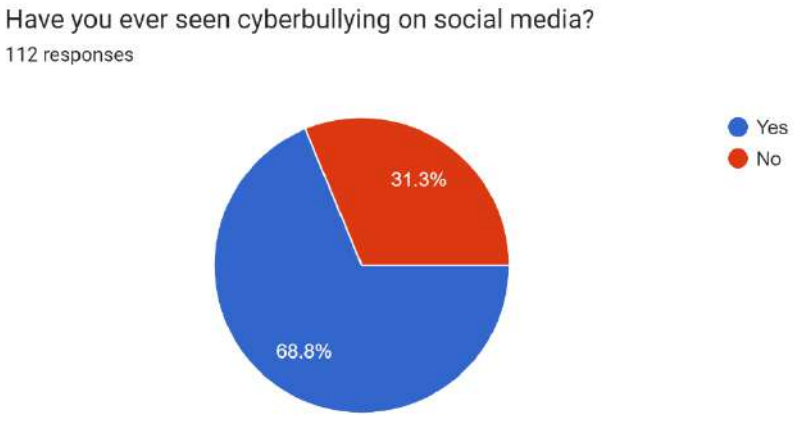
INTERPRETATION:

According the responses collected it can be seen that majority of the respondents used social media platform multiple times in a day which comprised of 88.4% ,i.e 99 respondents out of 112 selected this option.

15.) Have you ever seen cyberbullying on social media?

When the respondents were asked whether they witnessed cyberbullying on social media, the following responses were recorded.

CHART 15



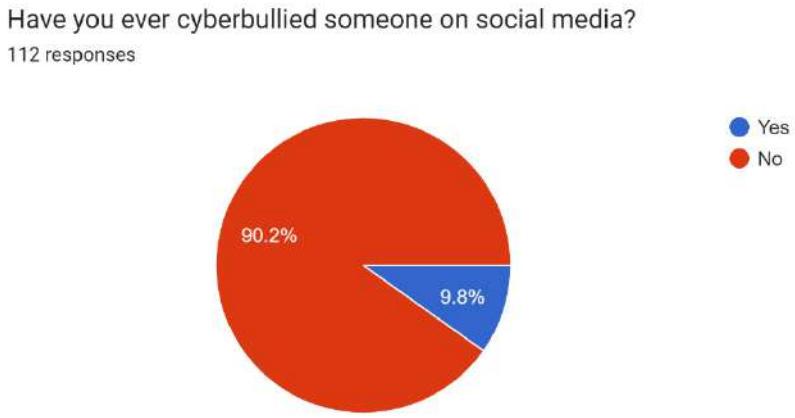
INTERPRETATION

68.8% of respondents acknowledge witnessing cyberbullying on social media, emphasizing its prevalence. With 31.3% responding negatively, the data underscores the urgency of ongoing efforts to combat and prevent cyberbullying. Individuals witnessing such incidents should actively address them by reporting or supporting the victims.

16.) Have you ever cyberbullied someone on social media?

When the respondents were asked the above question, the following responses were recorded.

CHART 16



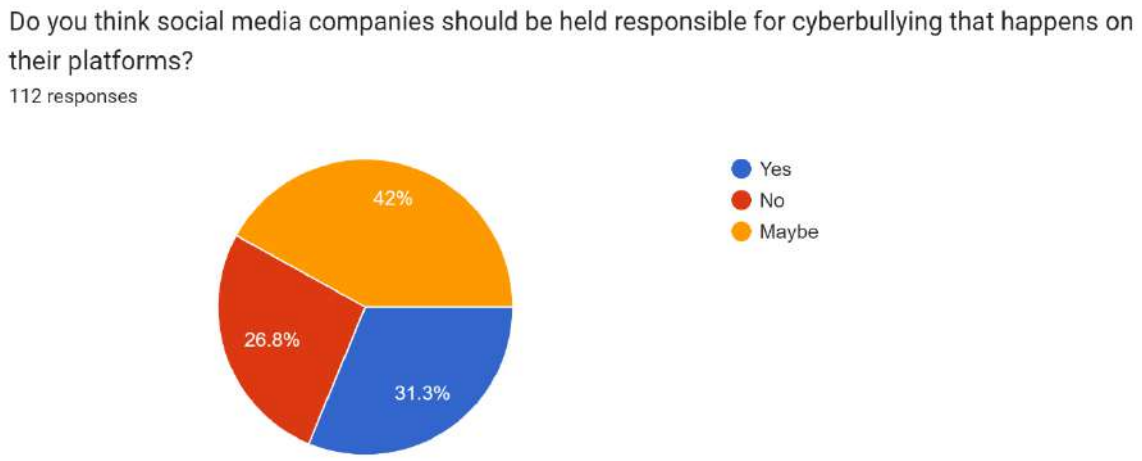
INTERPRETATION:

According to the replies, 90.2% of the respondents have never engaged in cyberbullying on social media. However with 9.8% admitting to have cyberbullied someone it raises the need for further education and awareness about the effects and repercussions of cyberbullying and is alarming. Cyberbullying victims can suffer significant and lasting impacts, therefore it's critical for people to realise the harm that their behaviour might cause.

17.) Do you think social media companies should be held responsible for cyberbullying that happens on their platforms?

When the respondents were asked their opinion on the above question, the following responses were received:

CHART 17



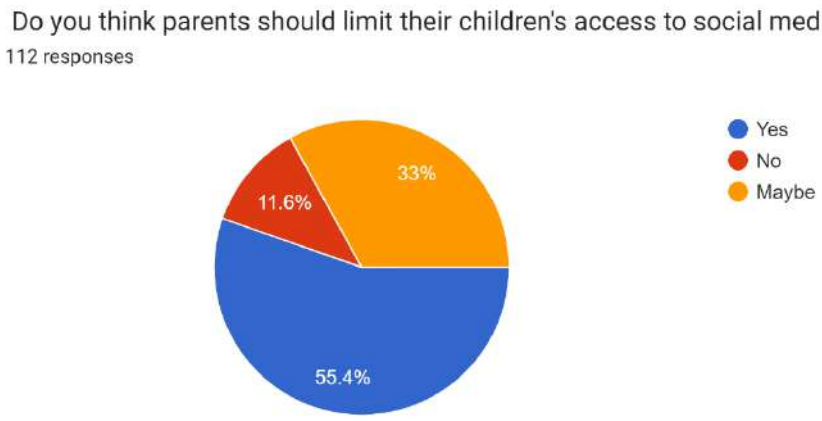
INTERPRETATION:

According to the responses collected to this question, there is a split in view on whether social media firms should be held accountable for cyberbullying that occurs on their sites. The majority of respondents i.e., 42%, indicated they are unclear or had mixed opinions about the subject. While 31.3% of respondents said Yes to this question. This research emphasises the complex nature of cyberbullying and the role that social media businesses play in combating it. While some may claim that social media firms have a responsibility to prevent and treat cyberbullying on their services, others may argue that corporations cannot control all user behaviour.

18.) Do you think parents should limit their children's access to social media?

When the respondents were asked about giving access to social media for children, the following responses were recorded.

CHART 18



INTERPRETATION:

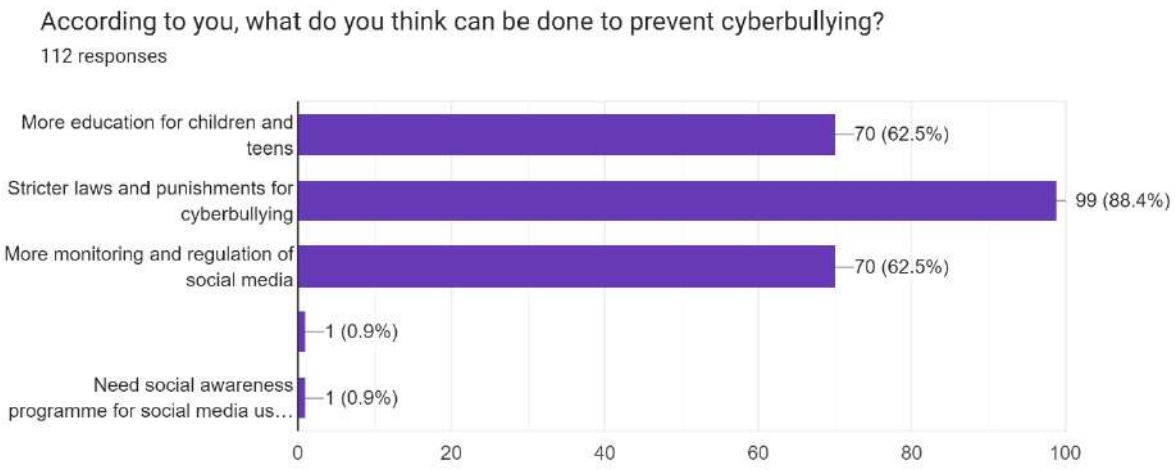
The majority of respondents (55.4%) agree that parents should limit their children's access to social media, suggesting a potential role for parental involvement in preventing or addressing cyberbullying. This underscores the significance of parents in mitigating the risks associated with social media use among children and teens. While restricting access may be a practical approach for some families, it's not universally applicable, emphasizing the importance of open discussions and education with youngsters about the hazards and repercussions of cyberbullying.

Overall, the diverse responses to this question imply that more debate and study are needed to determine the best solutions for avoiding and resolving cyberbullying among children and teens.

19.) According to you, what do you think can be done to prevent cyberbullying?

The following were the responses collected and analysed when the above question was asked to the respondents:

Chart 19

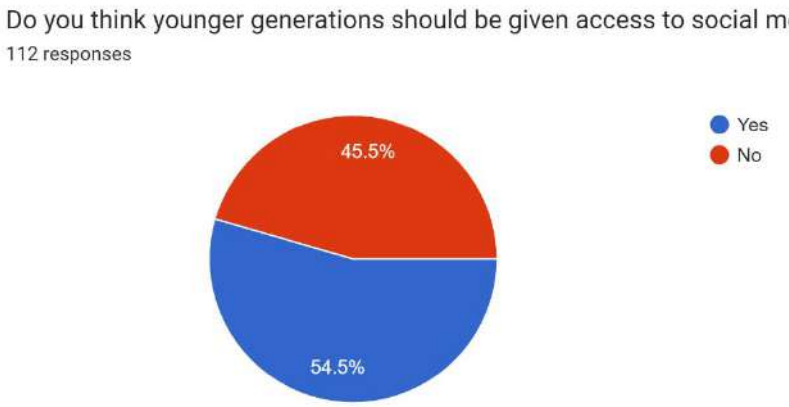


According to the responses to this question, the majority of respondents feel that more stringent rules and punishments for cyberbullying are required to prevent this issue. In particular, 88.4% of respondents said that stricter rules and punishments are required. Additionally, 62.5% of respondents felt that greater education for children and teenagers might help avoid cyberbullying. This emphasises the significance of teaching young people about the dangers of cyberbullying and encouraging positive online behaviour. Another proposal offered by 62.5% of respondents is that social media sites be more closely monitored and regulated to prevent cyberbullying. This might include steps such as content moderation, the removal of abusive messages, and the implementation of reporting and blocking methods. Finally, only one respondent (0.9%) suggested the necessity for social media awareness programmes. While this was a less popular option, it still demonstrates the potential usefulness of encouraging healthy online behaviour and teaching people about social media safety. Overall, the responses to this question suggest that numerous initiatives, such as education, regulation, and legal measures, are required to avoid cyberbullying.

20.) Do you think younger generations should be given access to social media?

When the responses were asked their viewpoint on the above question, the following responses were recorded:

CHART 20



INTERPRETATION:

The responses to this question suggests that respondents are divided on whether younger generations should have access to social media. While 54.5% feel that younger generations should have access to social media, 45.5% say that they should not.

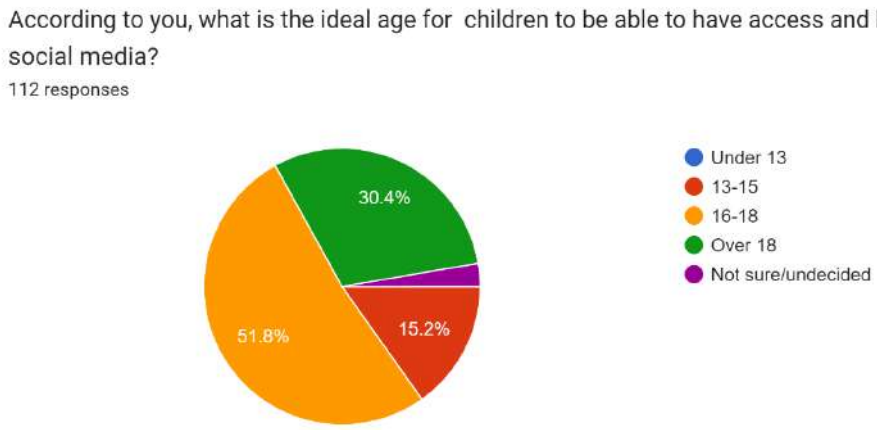
Given the prevalence of cyberbullying on social media, it is probable that some "no" respondents think that younger generations are not yet prepared to deal with the potential hazards and bad impacts of social media use. Those who responded "yes" may feel that social media use may assist younger generations if they are properly trained and controlled.

Overall, the response to this question underscores the ongoing discussion about the proper age for social media use, as well as the potential hazards and advantages of providing younger generations access to these platforms.

21.) According to you, what is the ideal age for children to be able to have access and be allowed to use social media?

According to the responses to this question, there is a wide range of viewpoints on the appropriate age for children to be permitted to use social media.

CHART 21



INTERPRETATION:

The majority (51.8%) of those who responded felt that the best age for social media use is between 16 and 18 years old. However, a sizable percentage of respondents (30.4%) say that children should be restricted from using social media until they reach the age of 18.

The study revealed that a significant majority of respondents (87.5%) were aware of the term "cyberbullying" and had a general understanding of its meaning. They described cyberbullying as using technology to harass, intimidate, spread rumours, or post inappropriate content about someone online. The perception of cyberbullying as a serious problem in today's society was shared by the majority of respondents (88.4%), and a significant percentage had either experienced cyberbullying themselves (8%) or knew someone who had (41.1%).

HYPOTHESIS TESTING:

Observed Values	**Expected Values**	**(O-E)**	**(O-E)^2**	**(O-E)^2/E**
45	47.25	-2.25	5.0625	0.107143
52	49.88	2.125	4.515625	0.090539
1	0.875	0.125	0.015625	0.017857

6	4.34	1.6607143	2.757971939	0.635582
3	4.58	-1.5803571	2.497528699	0.545269
0	0.08	-0.0803571	0.00645727	0.080357
3	2.41	0.5892857	0.347257653	0.144048
2	2.54	-0.5446429	0.296635842	0.116573
0	0.04	-0.0446429	0.001992985	0.044643
			Total	1.782011

Degree of freedom=4

Significance level=5%

Calculated Chi Square= 1.78201

P Value= 9.488

Calculated Value < P Value

Hence, the Alternate Hypothesis is rejected.

The statistical analysis did not find a significant association between the level of awareness on cyberbullying and gender among the individuals in the population. In other words, the data does not provide enough evidence to reject the idea that awareness on cyberbullying is independent of gender.

This doesn't necessarily imply that there is no relationship between awareness and gender; it simply suggests that the observed data doesn't provide sufficient support to conclude that such a relationship exists.

FINDINGS:

- Respondents believed that cyberbullying was somewhat common (51.8%) or very common (36.6%), but they expressed dissatisfaction with the current laws and policies in India, with the majority considering them ineffective in preventing and punishing cyberbullying (43.8%). Awareness of complaint procedures and online portals for reporting cyberbullying was relatively high among respondents (61.6%), and those who had used the complaint portals rated their experience as mostly hassle-free.
- The widespread usage of social media was evident, with almost all respondents (99.1%) reporting its usage. A majority (68.8%) had witnessed instances of cyberbullying on social media, and a significant percentage (90.2%) admitted to engaging in cyberbullying themselves.
- Opinions were divided regarding the responsibility of social media companies for cyberbullying on their platforms, with some supporting (31.3%), opposing (26.8%), or being uncertain (42%) about holding them accountable. Additionally, a majority of respondents (55.4%) believed that parents should limit their children's access to social media.
- To prevent cyberbullying, respondents emphasized the importance of education for children and teens (62.5%) and the implementation of stricter laws and punishments (88.4%). They also supported increased monitoring and regulation of social media platforms (62.5%) and the promotion of social awareness programs for responsible social media usage (0.9%).
- Regarding access to social media for younger generations, opinions were divided, but a slight majority (54.5%) favoured allowing access. Among those in favour, the ideal age for children to start using social media was perceived to be between 16 and 18 years (51.8%).

LIMITATIONS OF THE STUDY:

1. Limited Age Range: The study's findings may be limited in terms of representing the entire population due to the absence of respondents under the age of 13. Additionally, the number of

respondents in certain age categories is relatively small, such as the 35-44 years and 55 years and above groups, which could affect the generalizability of the results.

2. Gender Bias: Although efforts were made to include diverse participants, the study's gender distribution shows a slight imbalance, with more female respondents than male respondents. This gender bias could influence the outcomes and may not fully represent the experiences and opinions of all individuals.

3. Educational Background: The study includes a variety of educational backgrounds, but the majority of respondents have a graduate or professional degree. This imbalance might limit the generalizability of the findings to individuals with different educational levels and experiences.

4. Sample Size: The study relies on a relatively small sample size of 112 respondents. While efforts were made to ensure diversity within this sample, a larger and more diverse sample might provide a more accurate representation of the population's awareness of cyberbullying.

5. Limited Response Options: Some questions in the questionnaire provide limited response options, such as "yes," "no," or "maybe." This limited range of options may not capture the complexity of participants' perspectives, potentially oversimplifying their attitudes and opinions.

Despite these limitations, the study provides valuable insights into the level of awareness of cyberbullying among individuals in the surveyed population and highlights the need for further research and interventions in this area.

CONCLUSION

Based on the responses to the questionnaire, it can be concluded that there is a high level of awareness about cyberbullying among individuals. The majority of the respondents have seen instances of cyberbullying on social media platforms, and many have also been victims of cyberbullying themselves. The respondents also believe that social media companies should be held responsible for cyberbullying that happens on their platforms and that stricter laws and punishments for cyberbullying are necessary.

Additionally, the respondents believe that more education for children and teens, as well as more monitoring and regulation of social media, are important measures to prevent cyberbullying. They are divided on whether younger generations should be given access to social media, with roughly half believing that they should and half believing that they should not.

Overall, the study highlights the need for continued efforts to raise awareness about cyberbullying and to implement measures to prevent it. It is important to educate individuals, particularly children and teens, about the potential harm of cyberbullying and to provide resources for victims to seek help. It is also important to hold perpetrators accountable and to create a safe and respectful online environment for all users.

SUGGESTIONS AND RECOMMENDATIONS:

Cyberbullying has become a serious concern in recent years, and it is crucial to address this issue to prevent its adverse impact on individuals' mental health and wellbeing. Here are some possible reforms that can be made to prevent cyberbullying in India in 2023:

1. Stricter laws: India has laws that prohibit cyberbullying and provide punishment for the offenders. However, the laws need to be more stringent to deter individuals from engaging in such behavior. The government can make amendments to the existing laws to ensure that cyberbullies are held accountable for their actions.

2. Digital citizenship education: It is essential to educate children and youth about digital citizenship, online behavior, and the impact of cyberbullying. This education should start from a young age, and schools can play a significant role in imparting such knowledge. Educating individuals about responsible digital behavior can go a long way in preventing cyberbullying.

3. Increase awareness: Creating awareness about cyberbullying and its impact on individuals is crucial. The government can conduct public campaigns, workshops, and training sessions to educate individuals about cyberbullying and ways to prevent it. These campaigns should focus on creating awareness about the various forms of cyberbullying and the precautions that individuals can take to protect themselves.

4. Strengthen social media policies: Social media platforms should be held accountable for cyberbullying that occurs on their platforms. The government can work with social media companies to create better policies and guidelines to prevent cyberbullying. This includes stricter moderation, monitoring, and removal of abusive content.

5. Encourage reporting: Many individuals who are victims of cyberbullying are hesitant to report such incidents. The government can encourage individuals to report cyberbullying incidents by creating a safe and anonymous reporting mechanism. This can help to identify cyberbullies and bring them to justice.

6. Provide counselling and support: Victims of cyberbullying may require counselling and support to overcome the trauma. The government can set up helplines and support groups to provide assistance to individuals who are victims of cyberbullying. This can help individuals cope with the mental and emotional impact of cyberbullying.

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Case study - from inception to expansion: the global VISTAR startup expedition

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Learning Objectives:

1. Understand the challenges and opportunities associated with rapid growth in a startup.
2. Explore strategies for expanding distribution networks in the online marketplace.
3. Analyze the role of incubation centers in supporting and nurturing startups.
4. Evaluate the significance of effective management in driving a startup towards success.
5. Develop critical thinking and problem-solving skills by addressing real-world issues faced by Global Vistar.

Synopsis:

The case study revolves around Global Vistar, a recently launched online all-in-one distribution platform in India. Positioned at the intersection of manufacturers and distributors, the startup aims to facilitate seamless expansion of distribution networks. Connected with the Incubation Centre at PCMC Auto Cluster, Global Vistar faces the challenge of achieving rapid growth in a competitive market. The case explores the dynamics of the startup ecosystem, emphasizing the critical role of effective management and strategic decision-making in overcoming hurdles and fostering success.

Case Details:

Global Vistar, an emerging startup in India's online distribution landscape, stands at the crossroads of opportunity and challenge as it endeavors to achieve rapid growth just a few months into its operations. The platform, designed as an all-in-one distribution solution, seeks to streamline connections between manufacturers looking to expand their reach and distributors seeking new products and suppliers.

Context and Background:

Global Vistar operates in an increasingly competitive market, where the dynamics of online distribution are constantly evolving. With the rise of e-commerce and the digitization of supply

chains, the startup aims to carve a niche by facilitating seamless interactions between manufacturers and distributors. The company is strategically positioned at the Incubation Centre at PCMC Auto Cluster, tapping into the resources and mentorship provided by the incubator to fuel its early-stage growth.

Dilemma and Main Issues:

1. **Market Dynamics:** Global Vistar enters a dynamic market characterized by fast-paced technological advancements, shifting consumer behaviors, and intense competition. The dilemma lies in deciphering the optimal market strategies for rapid growth. Key issues include:
    - Competition Analysis: The online distribution space is crowded with both established players and new entrants. Global Vistar must assess competitors' strengths, weaknesses, and market positioning to identify opportunities for differentiation.
    - Emerging Opportunities: The startup must navigate through emerging opportunities in the market, such as potential partnerships, untapped geographical areas, or innovative distribution models. Choosing the right avenues for expansion is crucial.
    - Regulatory Landscape: Global Vistar needs to stay abreast of the regulatory landscape, ensuring compliance while identifying areas where regulatory changes may present opportunities for market leadership.
2. **Operational Challenges:** The operational landscape poses significant challenges for Global Vistar in ensuring a seamless experience for manufacturers and distributors. Key issues include:
    - Quality of Connections: The platform's success relies on the quality of connections it facilitates. Global Vistar must continuously assess and improve its algorithms and user interface to enhance the relevance and reliability of matches.
    - User Feedback: Actively gathering and responding to user feedback is essential. The startup needs to address pain points, optimize user experience, and adapt its features based on the evolving needs of its user base.

- Scalability: As Global Vistar aims for rapid growth, scalability becomes a critical issue. The platform must handle an increasing number of users and transactions without compromising efficiency or user satisfaction.

3. **Financial Considerations:** Financial sustainability is paramount for Global Vistar's growth. The startup must carefully manage its financial resources to fuel expansion and innovation. Key financial issues include:
    - Revenue Generation: Assessing and diversifying revenue streams beyond transactional fees, exploring subscription models or strategic partnerships to ensure a stable income base.
    - Cost Management: Balancing the costs of technology infrastructure, marketing, and personnel with revenue generation is crucial. The startup must identify areas for cost optimization without compromising service quality.
    - Investor Relations: If applicable, managing relationships with investors is critical. The startup needs to demonstrate its growth potential and return on investment to attract additional funding for scaling operations.
4. **Strategic Decision-Making**: Global Vistar's management team faces the ongoing challenge of making informed and strategic decisions. Key issues in strategic decision-making include:
    - Innovation: Fostering a culture of innovation to stay ahead in a rapidly evolving industry. This includes technological advancements, new distribution models, and value-added services.
    - Talent Acquisition and Retention: Building and retaining a skilled team is essential for sustained growth. The startup must attract professionals who understand the industry dynamics and can contribute to its strategic objectives.
    - Risk Management: Identifying and mitigating risks associated with market fluctuations, technological disruptions, or unforeseen events that could impact the business's continuity.

Conclusions:

The case author acknowledges the complexities of startup growth and highlights the significance of informed decision-making. The absence of a conclusive verdict allows for

diverse interpretations, fostering critical thinking and strategic analysis. The author hints at the ongoing journey of Global Vistar, leaving room for further exploration of the startup's evolution.

Case Questions:

1. What are the key challenges Global Vistar faces in achieving rapid growth, and how can these challenges be addressed?
2. Analyze the role of the Incubation Centre at PCMC Auto Cluster in supporting Global Vistar. How can such centers contribute to the success of startups?
3. Evaluate the strategies employed by Global Vistar in connecting manufacturers and distributors. What improvements or innovations can enhance their platform?
4. How can effective management practices contribute to the sustainable growth of Global Vistar in the competitive online distribution market?

Clues for Analysis and Resolutions:

While the case provides a comprehensive overview of Global Vistar's challenges, it refrains from offering conclusive resolutions. Clues for analysis include encouraging students to explore innovative strategies for market penetration, operational efficiency improvements, and financial sustainability. The emphasis should be on aligning these strategies with the startup's mission and the evolving dynamics of the online distribution industry.

Case Teaching Notes:

Objective: The primary goal of teaching this case study is to provide post-graduate management students with a comprehensive understanding of the challenges and opportunities associated with startup growth, specifically in the context of Global Vistar. The case study encourages students to analyze the complexities of the online distribution industry, the role of incubation centers, and the strategic decision-making required for rapid expansion.

Preparation:

1. Familiarization with Case Content:
    - Instructors should thoroughly read and understand the case study, paying attention to key data points, annexures, and references.
    - Consider the relevance of the case study to the course objectives and tailor the teaching approach accordingly.

2. Additional Readings:
    - Identify and suggest additional readings related to startup management, online distribution, and incubation centers to enhance students' background knowledge.

Organizing Case Study Sessions:

1. Introduction:
    - Begin with a brief overview of Global Vistar and the industry it operates in.
    - Discuss the significance of the case study in the context of startup management and growth strategies.
2. Case Analysis:
    - Divide the analysis into segments focusing on market dynamics, operational challenges, financial considerations, and strategic decision-making.
    - Encourage students to explore different perspectives, considering the viewpoints of both management and potential investors.
3. Group Discussions:
    - Form small groups and assign each group specific questions related to the case.
    - Encourage discussions on potential resolutions, innovative strategies, and areas where Global Vistar could improve.
4. Class Discussion:
    - Facilitate a class-wide discussion where groups present their analyses and recommendations.
    - Encourage critical thinking, debate, and the exploration of alternative solutions.
5. Q&A Session:
    - Allow time for students to ask questions and seek clarification on any aspect of the case.
    - Use this session to delve deeper into specific issues raised by students.

Key Teaching Points:

1. Startup Ecosystem:
    - Discuss the dynamics of the startup ecosystem, emphasizing the role of incubation centers in supporting early-stage companies.
2. Strategic Decision-Making:

- Explore the importance of strategic decision-making in a startup environment, considering both short-term and long-term implications.

3. Market Analysis:
   - Encourage students to conduct a thorough market analysis, including competitor assessments, to identify growth opportunities.
4. Financial Management:
   - Discuss the financial considerations for startups, focusing on revenue generation, cost management, and investor relations.
5. Innovation and Adaptability:
   - Emphasize the need for innovation and adaptability in the face of evolving market trends and technological advancements.

Conclusion and Follow-Up:

1. Conclusion:
   - Summarize key insights from the case study and highlight the importance of continuous learning and adaptability in startup environments.
2. Follow-Up Assignments:
   - Assign reflective essays or research projects related to topics explored in the case study.
   - Encourage students to explore recent developments in the startup ecosystem and analyze their relevance to Global Vistar.

References:

- Provide a list of references, including suggested readings and additional resources for further exploration.

Note: These teaching notes serve as a guide, and instructors may tailor the approach based on their teaching style and the specific learning objectives of the course.

Annexure:

1. Global Vistar Corporate Brochure

Website:

www.globalvistar.com

"Analysis of Administrative Circulars and HR Policies of Management Institutes in Pune"

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Abstract:

The ever-evolving global business landscape necessitates significant changes in the higher education sector, particularly in a knowledge-based economy where the importance of knowledge parallels that of higher education (World Bank/OECD, 2006). Over the past decade, the discourse on the quality of management education has been extensive.

In Pune district, in India, management education has emerged as a vital economic factor, with a noticeable expansion in recent years. Effectively managing MBA institutes in this dynamic environment is challenging, especially in meeting the expectations of students as stakeholders for the quality of management education.

This research paper endeavors to assess Human Resource (HR) policies and Administrative Circulars in management Institutes of Pune, India.The focus is on a comprehensive review and evaluation of Institutes policies related to staff recruitment, selection, appointment, and promotion. Emphasizing the pivotal role of Human Resource Management in acquiring essential business skills, knowledge, and expertise, the paper aims to analyze and recommend necessary changes based on best practices. The study is conducted in strict adherence to the Administrative Circulars and HR Policies of Management Institutes in Pune, ensuring relevance and alignment with established norms.

Introduction:

Human beings, as social animals, thrive on interpersonal connections, shaping relationships through conscious and unconscious actions. Our ability to manage these relationships significantly influences our experiences. From an early age, we learn to understand and adapt to others, carrying these skills into the workplace. The dynamic nature of people makes managing human resources challenging but crucial. The health and well-being of employees are central to organizational success, as a positive work environment aligns individual and organizational goals. Effective human resource management is built on the fundamental principle of nurturing positive workplace relations.

Pune, a prominent educational hub in India, hosts several renowned management institutes that contribute significantly to the field of business education. These institutes are known for their academic excellence, industry-oriented curriculum, and diverse faculty. Human Resource (HR) policies in management institutes are crucial frameworks that govern the employment relationships, practices, and conduct of faculty, staff, and administrators.

Faculty and staff play pivotal roles in determining whether colleges and universities can achieve their strategic objectives. These objectives span from enhancing student outcomes and fostering diversity among students and faculty to cultivating an inclusive culture and elevating the impact of research. However, similar to other organizations, higher education institutions encounter growing competition in the pursuit of talent—both in terms of HR professionals and the individuals HR seeks to recruit.

Human Resource Management: Concept and Definition:

The term 'human resource' emerged in the early 1990s, gaining wider use in the 1960s to describe the collective workforce of an organization. Human Resource Management (HRM) is a multidisciplinary function incorporating sociology, psychology, management, and economics. HRM, vital for any organization employing people, focuses on managing both individuals and work to achieve organizational goals efficiently. It encompasses personnel management, emphasizing the human approach to match organizational needs with employee talents.

HRM is concerned with the holistic management of an organization's human capital, often referred to as the human resource or lifeblood of the organization. Its objective is to design

systems that effectively utilize human talent, aligning with organizational goals. People, purpose, and structure form the basic components of an organization, and managing people involves strategies and policies formulated by HR specialists.

Personnel Management or Human Resource Management, as defined by the National Institute of Personnel Management, is concerned with people at work and their relationships within an enterprise. It aims to bring individuals together for the collective success of the organization while considering their well-being.

HRM is distinguished from personnel management by its strategic and comprehensive approaches on a global scale. It focuses on nurturing and developing human capital through policies, programs, and positive work environments. The scope includes recruitment, selection, training, development, compensation, and establishing strong employer-employee relationships.

An effective HRM system significantly impacts employee and organizational performance. It establishes consistency in HR practices, enhances human relations, and contributes to organizational effectiveness by recruiting the right talent, encouraging employee potential through performance appraisal, maintaining a healthy work atmosphere, and addressing disputes amicably. Investing in an effective HRM system is crucial for organizations to achieve their objectives successfully.

Management Institute in India:

Management institutes in India are pivotal institutions that contribute significantly to the development of skilled professionals and leaders. Notably, premier institutions such as the Indian Institutes of Management (IIMs), Xavier Labour Relations Institute (XLRI), and Faculty of Management Studies (FMS) are globally recognized for their academic excellence and leadership development programs. These institutes offer a diverse range of programs, including MBA, Executive MBA, PGDM, and specialized courses, catering to various areas of business and management. Renowned for their quality faculty, management institutes attract experienced educators with a blend of academic expertise and industry experience. Industry connections are emphasized, fostering ties through guest lectures, industry visits, and corporate partnerships. Innovative pedagogies, including case studies, simulations, and experiential

learning, equip students with practical problem-solving skills.

With the rise of entrepreneurship, institutes actively support an entrepreneurial ecosystem through incubation centers, mentorship programs, and networking opportunities. The emphasis on a global perspective is evident through collaborations with international universities and exchange programs. Impressive placement records reflect the success of management institutes in connecting students with leading companies. Continuous learning is promoted through seminars, workshops, and online courses, ensuring students stay abreast of industry trends. Accreditation and rankings further validate the commitment of these institutes to providing quality education.

Changing Educational Environment and Role of HRM:

In the evolving landscape of education in India, globalization and increased competition have transformed the functioning of educational institutions. Privatization has intensified competition in the education sector, making human resource management crucial. Educational institutions, whether aided or unaided, face the challenge of effectively managing their workforce to sustain competition. Teachers, as key personnel, are instrumental in achieving educational goals, making human resource management in the education sector vital.

To remain competitive, institutions must adopt strategies for recruitment, training, performance appraisal, and compensation management. In higher education, private institutions face financial challenges, while government-funded ones contend with reduced support. Despite the shift towards privatization, both aided and unaided institutions must efficiently manage their human resources to thrive. The rising demand for quality education and availability of educational loans contribute to the growing importance of human resources in the higher education sector.

Effective human resource management not only ensures a competitive advantage but also contributes to the overall development of the nation. Retaining and motivating teachers is crucial for sustaining educational institutions, emphasizing the need for comprehensive human resource plans. Teachers play a pivotal role in shaping the future of the nation, and their effective management is essential for quality education and national development. Reinstating respect for the teaching profession is vital to inspire motivated individuals to enter the field.

An Overview of HR Policies in Higher Education Sector:

Human Resource Policies are the systems of codified decisions formulated by an organisation to serve the administrative functions of human resources, performance management, strengthening the employer-employee relationships and resource planning. Human Resource Policies can prove very effective at supporting and building the desired organisational culture. The human resource policies pertaining to higher education sector have been explained in detail as follows:

Recruitment and Selection Policy:

Recruiting the right person is as important as placing the right man at the right position in an organisation. Through the process of recruitment and selection, the educational institutions attract the best personnel to formulate and implement the curriculum programmes. This function of human resource management is concerned with locating people with the required qualification, skills and experience to fill up the vacant posts at the teaching level. To procure employees as per the desired requirements, recruitment activities are carried out with an aim to get as many prospective employees, who meet the statutory requirements, as possible, and encouraging them to submit their candidature for the teaching vacancies in education institutions.

The 12th Five Year Plan (2012-2017) acknowledged faculty as the key factor for enhancing the quality of higher education in India. However, it expressed concern over a significant number of vacant faculty positions due to various constraints. To address this, initiatives were taken to attract and retain top talents, making teaching and research more appealing through central assistance. The National Eligibility Test (NET) was identified as a mandatory qualification for teacher recruitment, and reforms were introduced to improve its quality. Service conditions for teachers were revised, and promotion under the Career Advancement Scheme (CAS) was linked to performance.

Recruitment and selection in the education sector are governed by the Universities Act and Government Resolutions of respective states. For instance, in Maharashtra, a selection committee is constituted based on state regulations for recruiting teachers in universities and affiliated colleges. The committee includes members such as the Vice-Chancellor, nominated

subject experts, and representatives of marginalized communities. Positions are advertised widely, and the selection committee meetings are scheduled well in advance with external subject experts forming a crucial part.

However, a significant number of faculty positions, especially in government-aided institutions, remain unfilled for extended periods due to financial constraints and unscientific recruitment processes. NOCs for filling these posts are often not issued by the government. In contrast, private institutions, constrained by limited financial resources, tend to avoid permanent appointments. This situation leads to poor-quality recruitments and adversely affects the overall quality of education. A potential solution lies in promoting private universities with effective government monitoring to foster competition and quality in higher education. Some critical issues in the recruitment and selection policy for teachers include widespread vacancies, reported malpractices, undue influence of government and management, and instances of financial exploitation during appointments

Training and Development Policy:

Training and development are crucial functions in the ever-changing educational environment, playing a vital role in enhancing and maintaining the performance of employees, particularly in higher education. The National Policy on Education (NPE) 1986 highlighted the link between teachers' motivation and the quality of education. Academic Staff Colleges (ASCs) were established in universities to provide systematic orientation and refresher training for teachers.

The National Education Policy (NEP) 2020 introduces the 'Continuous Professional Development (CPD)' model, aiming to provide ongoing opportunities for self-improvement to teachers. A significant change is the mandatory induction program for newly recruited faculty members in universities and colleges post-2021. Suggestions for effective training and development in higher education include online and offline training sessions at various levels, mapping training modules with career progression, creating open-access platforms for sharing ideas, making 50 hours of CPD annually mandatory, covering the latest pedagogies, and utilizing technology platforms like SWAYAM/DIKSHA for online training.

The 12th Five Year Plan proposed the 'Faculty Talent Promotion Scheme,' upgrading ASCs to

Faculty Development Centers (FDCs) with redefined roles. However, critical issues in training and development programs include the inadequacy of orientation and refresher programs, theoretical orientation lacking practical rejuvenation, teachers perceiving training as a compulsion for career advancement, the need for continuous training, and the necessity to establish more training centers aligned with HRDCs and other schemes under MHRD.

Promotion and Career Development Policy:

Promotion in an organization involves elevating an employee to a higher position, increasing responsibilities, rights, status, and income. In the context of higher education, the University Grants Commission (UGC) outlines conditions for teacher promotions under the Career Advancement Scheme (CAS). The latest UGC guidelines, accepted by the Government of Maharashtra, emphasize performance evaluation through the Annual Assessment Report (AAR), replacing the Performance-based Appraisal System (PBAS).

Promotion levels for teachers are tied to academic levels and seniority, with criteria including years of service, AAR assessments, and mandatory training conducted by Human Resource Development Centers (HRDC) or PMMMNMTT, MHRD. The training requirements vary based on the academic level. Research activities, such as publications, research projects, and patents, contribute to a teacher's promotion score. Ph.D. becomes mandatory for specific promotions, ensuring academic qualifications align with the changing landscape.

Critical issues in the promotion and career development policy include the historical link between promotions and seniority, the introduction of performance evaluation in 2010 (PBAS), multiple amendments to PBAS within a short period, and the subsequent replacement of PBAS with AAR in 2018. AAR focuses more on teachers' fundamental duties, addressing the imbalance in the earlier system's emphasis on research over teaching.

Performance Evaluation Policy:

The policy statements on higher and technical education in India emphasize the crucial role of these institutions in socio-economic development and national self-reliance. The Rastogi Committee, appointed by the UGC, also recognizes the significance of the educational system and the teaching profession, stating that the skills and output of graduates and researchers should be on par with global standards

Despite these acknowledgments, the higher and technical education scenario faces challenges, Efforts to enhance teachers performance and ensure accountability through salary revisions. committees, and commissions have had limited impact. The promotion system lacks meaningful evaluation, and once a teacher becomes a professor, further development stagnates affecting performance, Committees and commissions over the past three decades have consistently recommended continuous evaluation of teachers performance to ensure accountability and qualitative improvements.

Various committees, including the S.R. Sen Committee in 1971, the National Policy of Education in 1986, the Mehrotra Committee in 1987, and others, stressed the need for evaluating teachers performance. The UGC introduced the Performance-based Appraisal System (PBAS) in 2010. later amended multiple times, and replaced by the Annual Assessment Report (AAR) in 2018.

Despite recommendations and notifications, teachers are not objectively evaluated for their work. Performance appraisal, when tied to promotion, loses objectivity. The current systems, whether PBAS or AAR are viewed as mere eye-wash and fail to contribute to quality enhancement. To address these issues, there is a need for objective criteria, continuous evaluation, and external agency evaluation of teachers to ensure accountability and improvement in the education system

Compensation Management Policy:

The 7th Pay Commission implemented significant changes in the pay scales for teachers, including rationalized entry-level pay increases for Assistant Professors and revisions for Associate Professors and Professors. Senior Professors pay under the HAG Scale/PB of Rs. 67.000-79,000 was revised to Academic Level 15 with a rationalized entry pay of Rs. 182.200. Principals in undergraduate and postgraduate colleges were also given revised pay scales equivalent to associate Professors and Professors, respectively

Incentives for Ph.D/M.Phil and other higher qualifications were withdrawn, as the pay structure itself incorporates incentives for additional qualifications. Annual increments are grated at 3%, moving individuals to the next higher cell in the same academic level. There are two dates for granting increments: January 1st and July 1st of every year Revised pay on promotion involves

a notional increment in the existing academic level, moving the individual to the next higher cell, and then locating the pay in the new academic level corresponding to the promoted post.

Critical issues in the compensation policy for teachers include the need to align pay scales with fundamental duties, avoid diversion of teacher potentials to administrative tasks, and provide financial motivation for senior teachers in the Professor and Senior Professor cadres. Additionally there is a call for aligning pay scales in the unaided section with those in the aided section.

Literature Review:

The reviewed theses and dissertations shed light on various aspects of human resource practices in educational institutions

1. Siddalingappanavar M.N. (2007): Studied the impact of WTO on higher education in India. emphasizing the need for restructuring and strengthening the higher education system to face international competition.

2. Rajini K.M. (2009): Explored the significance of introducing human resource practices in higher educational institutions in Kerala, identifying loopholes such as communicative competence, lack of incentives for innovation, and corruption.

3. Shah Seema (2009): Investigated HRM practices in technological institutions, highlighting the shift from education being "run" to being managed Emphasized the importance of sound HR policies for the success of educational organizations.

4. Devi Tribeni (2013). Analyzed educational policies in India since independence, focusing on school education. Examined various commissions and committees and their implications on the education system

5. Karthigai Selvi K.R (2013) Explored HRM functions at the higher education level. emphasizing the need for effective HRM to ensure greater organizational effectiveness in educational institutions.

6. Renuka Devi N. (2014): Investigated perceptions of college teachers towards Academic Performance Indicators (API) in higher education, analyzing challenges and suggesting modifications for quality benchmarks

These studies collectively underscore the importance of human resource management in educational institutions and highlight the need for effective policies to enhance organizational effectiveness.

Research Methodology:

The research is a comprehensive investigation into the challenges associated with human resource (HR) policies in Management Institute located in Pune district, specifically those falling under the jurisdiction of the Savitribai Phule Pune University Pune. The study endeavors to delve into various dimensions of HR management, including recruitment, retention, career management. succession planning. performance management, and compensation. The focus is particularly directed towards discerning disparities in HR practices between traditional academic programs and newly introduced job-oriented courses.

The educational landscape in India, especially in Pune, has undergone significant transformations. witnessing the introduction of self-financed job-oriented courses aimed at providing students with enhanced career prospects While these initiatives have succeeded in attracting highly qualified individuals from various industries, concerns persist regarding the quality of teaching and overall job satisfaction among educators. The underlying factor contributing to these issues is often traced back to the absence of clear and effective human resource management policies within Management institutions.

The research sets out to bridge this knowledge gap by conducting a thorough examination of the existing HR policies in both aided and unaided sections of colleges affiliated with the Savitribai Phule Pune University, Pune. The disparities between these sections are analyzed, and the impact on teacher quality and performance is scrutinized. The study further aims to identify the specific challenges faced by educational institutions in implementing sound HR policies, with a focus on the Pune region.

By addressing these challenges, the research endeavors to propose and recommend effective strategies and interventions that can contribute to the improvement of HR policies within colleges. The overarching goal is to enhance the quality of education by fostering better HR management practices, promoting teacher job satisfaction, and consequently elevating overall academic performance.

Study on green product manufacturing process waste generation and control

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ABSTRACT

CV% of generation of Hessian sliver was 37.11% in the study period, which is much higher than sacking sliver CV% of 10.57% in the study period of 2022. It is due to the higher number of machines involved in the hessian machine operation. A high CV% of any waste is not desirable. Monthly Gunny Cuttings average value was 3633.3 kg in the 2022 study period; a higher value was generated in the month of August 2022 and a lower value in the month of February 2022. Caddies, Loom caddies and spinning sweeps have very short fibers. They are generally used for fuel in boiler operations. The weaving department, mainly the shuttle weaving department, was the major source of thread waste generation in both periods of study. Thread waste generation was higher in 2023 compared to the study period of 2022. It is due to higher machines running and higher production in the study period of 2023 compared to 2022. The spinning and winding departments were the second-largest sources of thread waste generation in the study period. The weaving department had the largest share of thread waste generation, with a share of 66.6% of total thread waste generation in the study period and a share of 17.21% of the total waste generation. The spinning and winding department was the second-largest area of thread waste generation. Finishing and S4 departments' share of thread waste generation was 5.08% and 4.5%, respectively. The Victor Weaving Department has contributed 2.37% of total thread waste generation in the study period of 2022.

KEY WORDS: Weaving, Spinning, Batching, Thread waste, Contribution

INTRODUCTIONS: Jute is an important green product and the second-largest natural fiber next to cotton. Use of Jute products is now rising across global countries. Due to the

biodegradable nature of such fiber, application of such green products is now demanding. Process waste is important in discussions in the green product manufacturing area. The higher the process waste for any manufacturing process, the higher the financial loss will be for the company. During jute goods production, thread waste, gunny cuttings, ropes, habizabi, sliver waste etc. are the major items of process waste. Timely, these process wastes are to be utilized, and corrective measures are necessary, otherwise, the wastes will be uncontrolled. The present study deals with the waste process , identification of the source of generation of various stages of waste generation, the waste generation of wastes and corrective measures necessary for controlling waste during manufacturing of jute goods. The high price of Raw Jute and the non-availability of raw jute around the year create problems in the Jute Industry. Jute is a green product. Jute fiber comes from nature. Due to the natural origin of fiber, round the year production of such fiber is difficult. The owner of the Jute unit is therefore concentrated on its process waste control and corrective measures.

OBJECTIVE OF STUDY: The objectives of the study are stated below .

- ✓ Identify the various types of process wastes and their source of generation.
- ✓ Quantitative estimation of day wise, shift wise generation of such waste.
- ✓ Comparative analysis of yearly generation of process wastes in various departments.
- ✓ Corrective measures to minimize of such process waste.

STUDY AREA : AJML [name of the organization] is the largest jute goods manufacturing unit in West Bengal. More than 3000 people are directly involved in the day-to-day work process in this unit. It is situated in Kolkata.

The study of process waste, its generation from various sources, and its controlling measures are studied here. Day- and month-wise processing waste of such green products is recorded on the computer. The data are primary. The collected dates of such process waste are then analyzed to observe the generation source, and its quantity is monitored and taken into consideration for suitable corrective measures.

RESEARCH METHODOLOGY: The data in this paper are primary in nature. Process waste was studied from January 22 to August 2022 and August–September 2023, day-wise, at the unit. The data of each observation related to waste has been recorded in the waste book and edited on the computer. Each observation of the process waste is recorded in the waste record book. The weighting machine is connected to the computer of the selection department. The computer automatically records each piece of data during measurement of such process waste. In this way, the process waste of three shifts is recorded in a registered book and edited on a computer. Day-wise thread wastes are monitored from various sources in the months of August–September 22. The recorded data is then tabulated for analysis. Waste data from various sources of process for various months in 2022 and 2023 is collected for analysis. The recording of weighing data for waste is the day-to-day practice of the concern clerk at the batching department. These data are the main sources for finding out the status of waste at various departments and their respective measures for improvement.

RESEARCH FINDINGS:

Table 1 explained the various waste generations over different months. Thread waste is the main important part of this study. Higher thread waste is not desirable. Higher thread waste is associated with the financial loss to the company. It is found that average of 35480.5 Kg . of thread waste were generated in the study period. Maximum quantity of 39814 Kg of thread waste and minimum of 31398 Kg. of thread waste generated in the study period.

Figure 1 : Variation of Thread Waste over different months [2022]

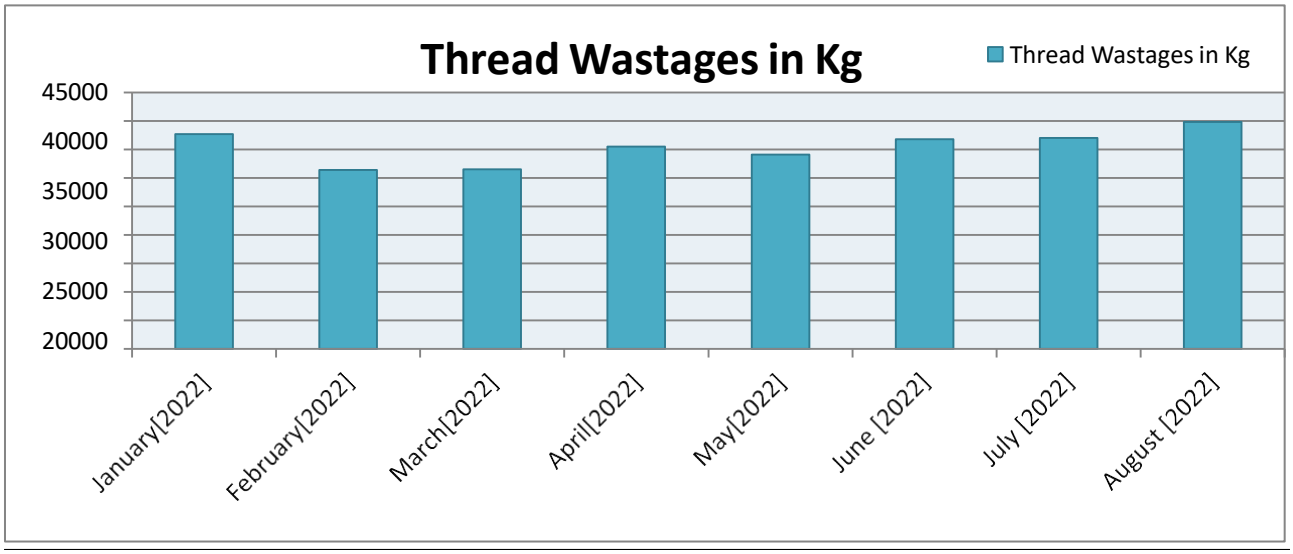


Table 1 explained the variation of thread waste over different months. Thread waste generation has increasing trend. The thread waste has been increased by 7.5 % in the months of August 22 compare to July 22.From Table 1 , average value of hessian sliver waste quantity in Kg. was much lower than sacking sliver wastes . This value was the total amount in kg generated in each month. Generation of thread waste was higher in the month of August 2022 and lower in the month of February 2022.Hessian sliver wastes was higher in the month of January 2022 and lower in the month of May 2022. Sacking sliver waste quantity were higher in the month of July 2022 and lower in the month of February 2022.Line cutting was generated in higher in the month of March 2022 and lower in the month of June 2022.Ropes are the very important ingredients in batching department. Table 1 explained that , ropes was higher in the month of July 2022 and lower in the month of April 2022.

Table 1 : Waste generation over different months [2022]

Months	Thread waste s [kg.]	Hessian sliver waste [kg.]	Sacking sliver wastes	Line cutting [kg.]	Ropes [kg.]

			[kg.]		
January [2022]	37674	23698	18420	59981	19830
February [2022]	31398	18547	14761	59578	17192
March [2022]	31512	12721	17542	79659	17024
April [2022]	35506	10292	17727	74206	14441
May [2022]	34113	9194	18812	36449	16623
June [2022]	36823	9930	18124	12166	18425
July [2022]	37004	11285	20839	32551	20232
August [2022]	39814	12079	20705	57672	18562
Average	**35480.5**	**13468.25**	**18366.25**	**51532.75**	**17791.13**
Max.	**39814**	**23698**	**20839**	**79659**	**20232**
Min.	**31398**	**9194**	**14761**	**12166**	**14441**

Source : Monthly Waste report of mill

Table 2 : Dust generation over different months [Figures in Kg][2022]

Months	**January [2022]**	**February [2022]**	**March [2022]**	**April [2022]**	**May [2022]**	**June [2022]**	**July [2022]**	**August [2022]**	**AVG.**
Dust generation [Kg.]	98582	89634	86751	85023	86346	88688	87450	89618	**89011.5**

Source: Monthly Waste report of mill

Table 2 represent the dust generation over different months. Average of 89011.5 kg . of dust were generated from January 22 to August 22 . The dust is mainly generated from selection of raw jute area and droppings of various machineries in Batching, Preparing, Spinning, Winding, Weaving and finishing department. The dust are generally contains very short fibres which cannot be spin into yarn. High dust generation is not desirable.

Higher dust may contain spin able good fibres, which came from dust to Boiler as fuel. Management is taken care for reduction of good fibres in dust.

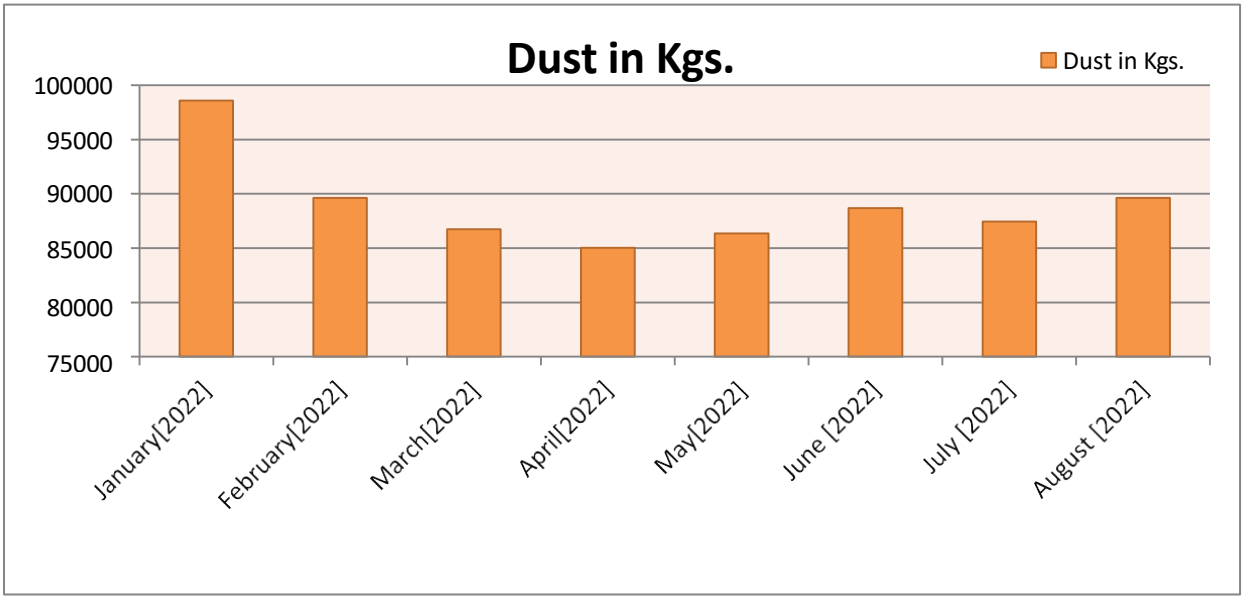


Figure 2 : Variation of generation of dust over different months [2022]

From figure 2 , dust generation was gradually decreasing from January 22 to April 22, thereafter gradually rising its trend. Though, the rising trend was not significant. The dust generated in the Month of August 22 was 2.4% higher compare to July 22.

Table 3 : Generation of various wastes over different months [figures are in kg.]

Months	Gunny Cuttings	Batching Caddies	Loom Caddies	Spinning sweep	Spinning sliver wastes		
					Hessian	Sacking	Total
January [2022]	5097	18163	13653	27358	23698	18420	42118
February[2022]	2186	15955	12066	24062	18547	14761	33308
March[2022]	2257	26223	11071	22545	12721	17542	30263
April[2022]	2859	29441	10581	22038	10292	17727	28019

May[2022]	3586	26123	9477	21600	9194	18812	28006
June [2022]	2859	29441	10581	22038	10292	17727	28019
July[2022]	4074	40222	10891	23733	11285	20839	32124
August [2022]	6149	45830	11787	25063	12079	20705	32784
Average	**3633.375**	**28924.75**	**11263.38**	**23554.63**	**13513.5**	**18316.63**	**31830.13**
Max	**6149**	**45830**	**13653**	**27358**	**23698**	**20839**	**42118**
Min.	**2186**	**15955**	**9477**	**21600**	**9194**	**14761**	**28006**
S.D.	**1406.9**	**10093.33**	**1249.38**	**1944.6**	**5016.06**	**1936.8**	**4707.8**
CV%	**38.72**	**34.89**	**11.09**	**8.25**	**37.11**	**10.57**	**14.79**

Source: Waste register book of AJML

From table 3, it is found that CV% of generation of Hessian sliver was 37.11% in the study period, which is much higher than sacking sliver of CV% 10.57%. It is due to higher number of machines involved in the hessian machines operation. High CV% of any waste is not desirable; Gunny cuttings average value was 3633.3 kg. , higher value was generated in the month of August 2022 and lower value in the month of February 2022.Batching caddies. Loom caddies and spinning sweeps are very short fibres. They are generally used for fuel in boiler operation.

Thread wastes of various departments are studied from August-September 2022.Data has been collected from the registered book of thread waste of various departments. Table 4 explained that weaving department, mainly shuttle weaving department was the major sources of thread waste generation in the study period. Average of 916.65 kg of thread wastes has been generated in the study time with maximum value of 1116 kg and minimum value of 329 kg has been recorded. Spinning /winding department were the second largest sources of thread wastes generation in the study period.

Table 4: Thread Wastes Generations of different sources [Figures are in Kg][23.8.22to 21.9.22]

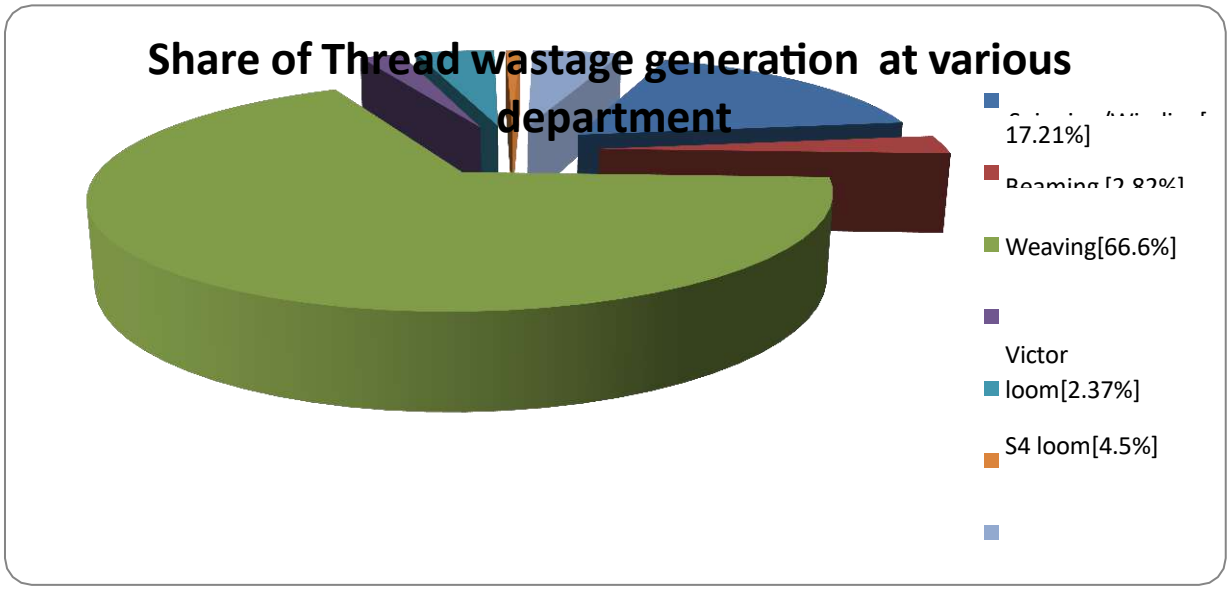
Statistic	**Spinning**	**Beaming**	**Weaving**	**Victor**	**S4**	**Beami**	**Finishing**	**Gunn**	**Total**

al Parameter	**/Winding**				**Loom**	**ng victor**		**y Cutting**	
Avg.	**236.37**	**38.93**	**916.65**	**32.27**	**63.24**	**11.58**	**67.68**	**187.44**	**1372**
Max.	**336**	**67**	**1116**	**79**	**88**	**33**	**200**	**430**	**1713**
Min.	**129**	**0**	**329**	**15**	**0**	**0**	**0**	**0**	**518**
S.D.	**54.32**	**18.02**	**227.3**	**14.16**	**23.55**	**8.55**	**55.52**	**100.76**	**323.06**
CV%	**22.98**	**46.28**	**24.79**	**43.87**	**37.23**	**73.83**	**82.63**	**53.75**	**23.54**

Source: Thread waste register book of AJML

Average of 236.37 kg of thread wastes has been generated with maximum quantity of 336 kg and minimum quantity of 129 kg. has been recorded. Finishing department has been reported the third largest generation of thread wastes. Where average of 67.68 kg. of thread waste generated in the study time and maximum value of 200 kg of thread wastes has been reported. S4 and victor loom were generated thread wastes of 65.24 kg. and 32.27 kg. respectively . Beaming department also generated thread waste of average 38.93 kg. Waste generated in the study time. High CV% of thread waste generation was observed in Weaving department of the value 24.79% og the total thread waste generation in the study time. Spinning and winding department thread waste generation CV% was 22.98% , comparatively less than weaving department. Maximum value of thread waste was 336 kg and minimum value was 129 kg in spinning and winding department.

Figure 3 : Percentage share of thread waste generation in the study time [2022]



Source: Thread waste register book of AJML

Figure 3 explained the thread waste generation in the study time on different department. Weaving department was the largest share of thread waste generation having share of 66.6 % of total thread waste generation in the study period having share of 17.21 % of the total waste generation Spinning and Winding department was the second largest area of thread waste generation point .Finishing and S4 department has share of thread waste generation were 5.08% and 4.5 % respectively. Victor weaving department has contribution 2.37% of total thread waste generation in the study time.

Table 5 : Thread waste generation over different shift of Major sources[28.8.22 to 15.9.22]

Statistical Para	Spinning/Winding			Weaving			Victor loom			S4 loom			Finishing		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

meter															
Avg.	**217.15**	**17.7**	**8.10**	**321**	**295.31**	**326.26**	**15.94**	**14.05**		**21.52**	**22.68**	**20.84**	**59.84**	**11.10**	
Max.	**312**	**61**	**13**	**403**	**394**	**452**	**33**	**46**		**36**	**43**	**37**	**183**	**58**	
Min.	**108**	**0**	**0**	**280**	**0**	**0**	**10**	**0**		**0**	**0**	**0**	**10**	**0**	
S.D.	**28.97**	**14.8**	**4.61**	**34.2**	**110.6**	**119.5**	**6.6**	**10.2**		**7.84**	**11.4**	**10.9**	**50.3**	**16.4**	
CV%	**13.34**	**83.6**	**56.9**	**10.6**	**37.4**	**36.62**	**41.4**	**70.34**		**36.43**	**50.26**	**52.3**	**84.0**	**147.7**	

Source: Thread waste register book of AJML

Table 5 explained the thread waste generation on various shifts of major department. It is found that in Spinning

/Winding department A shift contributed average of 217.15 Kg of thread waste whereas in B and C shift it is quite low . In B shift it is 17.7 Kg. and 8.10 Kg. in C shift . In the study time, maximum value of 312 kg of thread waste generated in A shift and minimum value of 108 kg in B shift generated.

In case of Shuttle weaving department, A shift has average value of thread waste of 403 kg. , B shift has 394 Kg. and C shift has 452 Kg. So, C shift has higher contribution in thread waste generation. Higher CV% of thread waste generation is not desirable. It is found that CV% of thread waste generation was comparatively high in B and C shift

, compare to A shift. Installation of shuttle less loom has more advantage in thread waste generation. It is found that average values of thread waste generation were comparatively less in Victor loom and S4 loom. S4 loom has higher thread waste generation compare to victor loom. It is found that thread waste generation in Victor loom was high in B shift compare to A shift. In case of S4 loom, it is found that B and C shift has high value of thread waste generation compare to A shift.. CV % of thread waste generation was higher in C and B shift, compare to A shift. In finishing department, there is no C shift. So B and

A shift have high contribution in thread waste generation. A shift has high thread waste generation compare to a shift.

Thread wastes of various departments are studied from august-September 23.Data has been collected from the registered book of thread waste of various departments. Table 6 explained that weaving department, mainly shuttle weaving department was the major sources of thread waste generation in the study period. It is found that conventional weaving department, average of 916.65 kg of thread wastes has been generated in the study time with maximum value of 1116 kg and minimum value of 329 kg has been recorded. Spinning /winding department were the second largest sources of thread wastes generation in the study period.

Table 6: Thread Wastes Generations of different sources [Figures are in Kg]23.8.23 to 21.9.23]

Statistical Parameter	Spinning /Winding	Beaming	Weaving	Victor	S4 Loom	Beaming victor	Finishing	Gunny Cutting	Total
Avg.	**236.37**	**38.93**	**916.65**	**32.27**	**63.24**	**11.58**	**67.68**	**187.44**	**1372**
Max.	**336**	**67**	**1116**	**79**	**88**	**33**	**200**	**430**	**1713**
Min.	**129**	**0**	**329**	**15**	**0**	**0**	**0**	**0**	**518**
S.D.	**54.32**	**18.02**	**237.3**	**14.16**	**23.55**	**8.55**	**55.52**	**100.76**	**323.06**
CV%	**23.98**	**46.28**	**24.79**	**43.87**	**37.23**	**73.83**	**82.63**	**53.75**	**23.54**

Source: Thread waste register book of AJML

verage of 236.37 kg of thread wastes has been generated with maximum quantity of 336 kg and minimum quantity of 129 kg. has been recorded. Finishing department has been reported the third largest generation of thread wastes. Where average of 67.68 kg. of thread waste generated in the study time and maximum value of 200 kg of thread wastes has been reported. S4 and victor loom were generated thread wastes of 63.24 kg. and 32.27 kg.

respectively . Beaming department also generated thread waste of average 38.93 kg. High CV % of thread waste generation was observed in Weaving department of the value 24.79% of the total thread waste generation in the study time. Spinning and winding department thread waste generation CV% was 23.98% , comparatively less than weaving department. Maximum value of thread waste was 336 kg and minimum value was 129 kg in spinning and winding department.

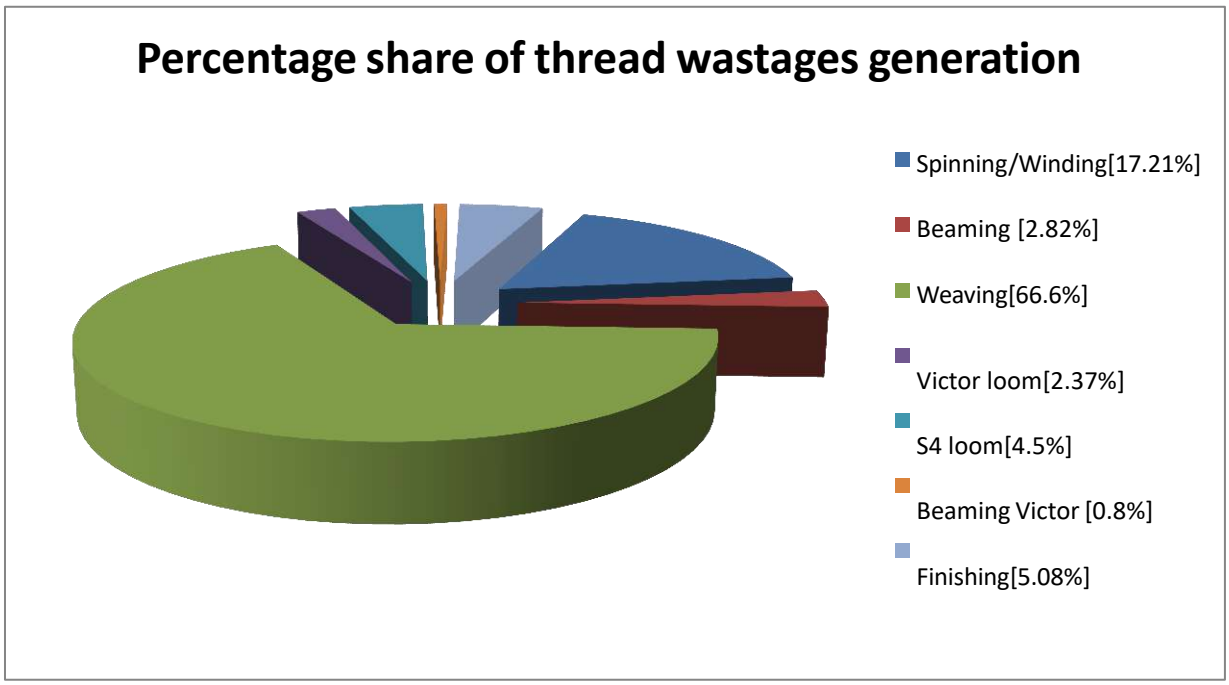


Figure 4 : Percentage share of thread waste generation in the study time[2023]

Source: Thread waste register book of AJML

Figure 4 explained the thread waste generation in the study time of different department. It is found that weaving department was the largest share of thread waste generation having share of 66.6 % of total thread waste generation in the study period, having share of 17.21 % of the total waste generation Spinning and Winding department was the second largest area of thread waste generation point .Finishing and S4 department has share of thread waste generation were 5.08% and 4.5 % respectively. Victor weaving department has contribution 2.37% of total thread waste generation in the study time.

Table 7 : Thread waste generation over different shift of Major sources[28.8.23 to 15.9.23][figures inkg]

Statistical Parameter	Spinning/Winding			Weaving			Victor loom			S4 loom			Finishing		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Avg.	217.15	17.7	8.10	321	295.31	326.26	15.94	14.05		21.52	23.68	20.84	59.84	11.10	
Max.	312	61	13	403	394	452	33	46		36	43	37	183	58	
Min.	108	0	0	280	0	0	10	0		0	0	0	10	0	
S.D.	28.97	14.8	4.61	34.2	110.6	119.5	6.6	10.2		7.84	11.4	10.9	50.3	16.4	
CV%	13.34	83.6	56.9	10.6	37.4	36.62	41.4	70.34		36.43	50.26	52.3	84.0	147.7	

Source: Thread waste register book of AJML

Table 7 explained the thread waste generation on various shifts of major department. It is found that in Spinning /Winding department A shift contributed average of 217.15 Kg of thread waste whereas in B and C shift it is quite low . In B shift it is 17.7 Kg. and 8.10 Kg. in C shift . In the study time, weaving department is found that Maximum value of 452 kg of thread waste generated in C shift .In weaving department, C shift average thread waste generation was comparatively higher than A and B shifts.

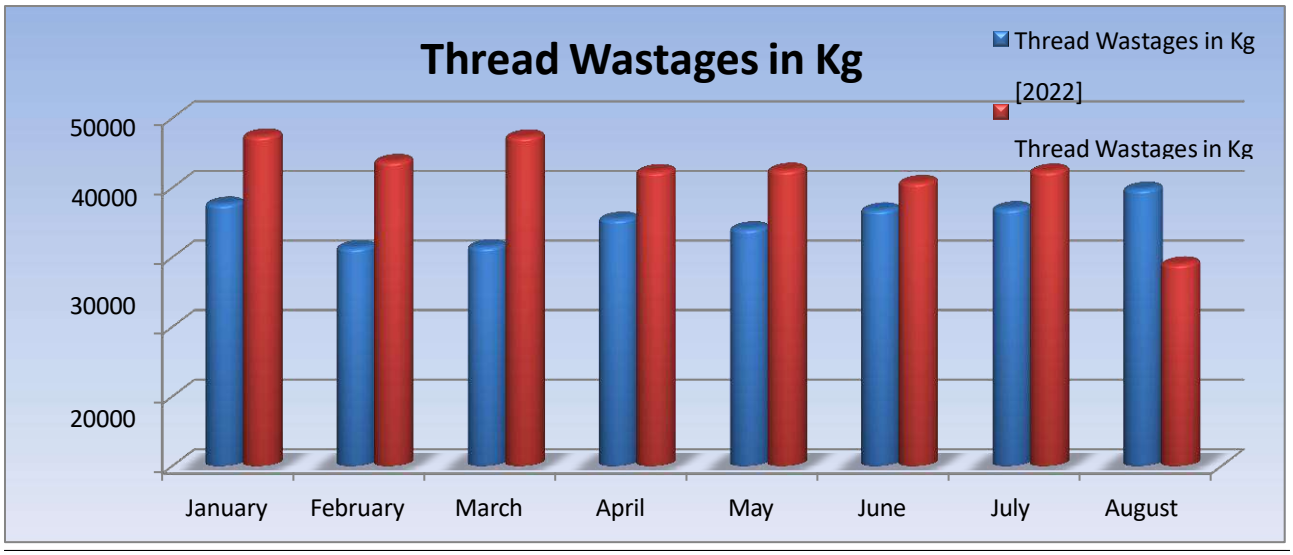
In case of Shuttle weaving department maximum value was observed in A shift has average value of thread waste of 403 kg. , B shift has 394 Kg. and C shift has 452 Kg. So, C shift has higher contribution in thread waste generation. Higher CV% of thread waste generation

is not desirable. It is found that CV% of thread waste generation was comparatively high in B and C shift , compare to A shift. Installation of shuttle less loom has more advantage in thread waste generation. It is found that average values of thread waste generation were comparatively less in Victor loom and S4 loom. S4 loom has higher thread waste generation compare to victor loom. It is found that thread waste generation in Victor loom was high in B shift compare to A shift. In case of S4 loom, it is found that B and C shift has high value of thread waste generation compare to A shift.. CV % of thread waste generation was higher in C and B shift, compare to A shift.

In finishing department, there was no C shift. So B and A shift have high contribution in thread waste generation. A shift has high thread waste generation compare to B shift.

Table 8 explained the various waste generations over different months. Thread waste is the main important part of this study. Higher thread waste is not desirable. Higher thread waste is associated with the financial loss to the company. It is found that average of 35480.5 Kg . of thread waste were generated in the study period. Maximum quantity of 39814 Kg of thread waste and minimum of 31398 Kg. of thread waste generated in the study period.

Figure 5 : Variation of Thread Waste over different months and year[2022 and 2023]



Source : Monthly Waste report of mill

Figure 5 represented the comparative analysis of thread waste generation over different months Thread waste generation was higher in the year 2023 compare to study period of 2022.It is due to higher machines running and higher production in the study period of 2023 compare to 2022.

Table 8 explained the variation of thread waste over different months. It is found that thread waste generation has increasing trend. The thread waste has been increased by 7.5 % in the months of August 22 compare to July 22.From Table 8 , it is found that average value of hessian sliver waste quantity in Kg. was much lower than sacking sliver wastes in Kg. This value was the total amount in kg generated in each month. Generation of thread waste was higher in the month of August 2023 and lower in the month of February 2023.It is found that hessian sliver wastes was higher in the month of January 2023 and lower in the month of May 2023. Sacking sliver waste quantity were higher in the month of July 2023 and lower in the month of February 2023.Line cutting was generated in higher in the month of March 2023 and lower in the month of June 2023.Ropes are the very important ingredients in batching department. It is found that from Table 8 that, ropes was higher in the month of July 2023 and lower in the month of April 2023.

Table 8 : Waste generation over different months [2023]

Months	**Thread wastes [kg.]**	**Hessian sliver waste [kg.]**	**Sacking sliver wastes [kg.]**	**Line cutting [kg.]**	**Ropes [kg.]**
January [2023]	47451	17366	13378	69449	20845
February [2023]	43787	14645	14465	65262	19313
March [2023]	47312	15529	17891	76126	21620
April [2023]	42328	14668	15987	48598	20378
May [2023]	42529	13061	17855	55170	19844

June [2023]	40761	12211	16587	43772	19615
July [2023]	42406	13720	18451	51169	20841
August [2023]	29059	8161	13385	38644	14268
Average	41954.13	13670.13	15999.88	56023.75	19590.5
Max.	47451	17366	18451	76126	21620
Min.	29059	8161	13378	38644	14268

Source : Monthly Waste report of mill

Table 9 : Dust generation over different months [Figures in Kg]of the year 2022 and 2023

Months	**January [2022]**	**February [2022]**	**March [2022]**	**April [2022]**	**May [2022]**	**June [2022]**	**July [2022]**	**August [2022]**	**AVG.**
Dust generation [Kg.]	98582	89634	86751	85023	86346	88688	87450	89618	**89011.5**
	January [2023]	**February [2023]**	**March [2023]**	**April [2023]**	**May [2023]**	**June [2023]**	**July [2023]**	**August [2023]**	**AVG.**
	111139	99164	108668	104500	114031	112376	135530	98947	**110544.3**

Source: Monthly Waste report of mill

Table 9 represent the dust generation over different months. It is found that average of 89011.5 kg. of dust were generated from January 22 to August 22 . The dust is mainly generated from selection of raw jute area and droppings of various machineries in Batching, Preparing, Spinning, Winding, Weaving and finishing department. The dust are generally

contains very short fibres which cannot be spin into yarn. High dust generation is not desirable. Higher dust may contain spin able good fibres, which came from dust to Boiler as fuel. Management is taken care for reduction of good fibres in dust.

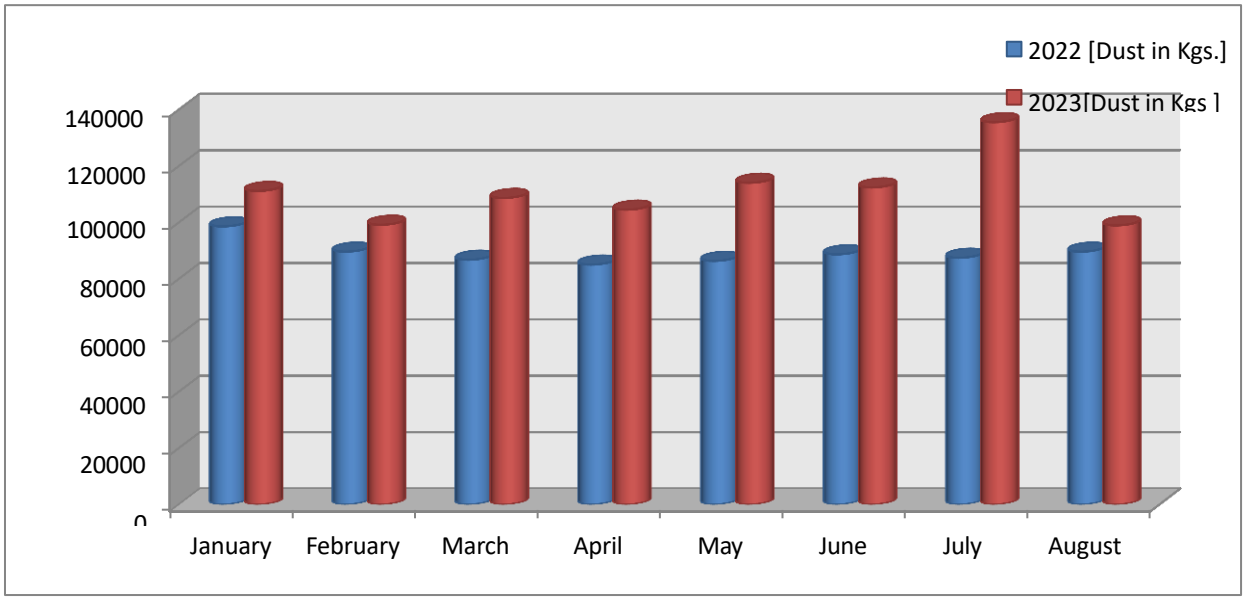


Figure 6 : variation of dust over different months and year

From Figure 6, it is found that dust generation was gradually decreasing from January 22 to April 22, thereafter gradually rising its trend. Though, the rising trend was not significant. The dust generated in the Month of August 22 was 2.4% higher compare to July 22.

Table 10 : Generation of various wastes over different months [figures are in kg.]

Months	Gunny Cuttings	Batching Caddies	Loom Caddies	Spinning sweep	Spinning sliver wastes		
					Hessian	Sacking	Total
January [2023]	5214	36568	11024	27457	17366	13378	29110

February[2023]	6186	34473	10583	25013	14645	14465	29110
March[2023]	5361	38202	10218	27116	15529	17891	33420
April[2023]	1511	34439	10066	24334	14668	15987	30655
May[2023]	5550	17988	10929	27138	13061	17855	30916
June [2023]	3213	0	10224	25461	12211	16587	28798
July[2023]	4190	0	11443	27927	13720	18451	32171
August [2023]	1943	20138	8112	19810	8161	13385	21546
Average	4146	22726	10324.88	25532	13670.13	15999.88	29465.75
Max	6186	38202	11443	27927	17366	18451	33420
Min.	1511	0	8112	19810	8161	13378	21546

Source: Waste register book of AJML

From Table 10, it is found that CV% of generation of Hessian sliver was 37.11% in the study period ,which is much higher than sacking sliver of CV% 10.57%. It is due to higher number of machines involved in the hessian machines operation. High CV% of any waste is not desirable; Gunny cuttings average value was 3633.375 kg. , higher value was generated in the month of August 2023 and lower value in the month of February 2023.Batching caddies. Loom caddies and spinning sweeps are very short fibres. They are generally used for fuel in boiler operation.

RECOMMENDATION FOR IMPROVEMENT: The following points are important for reduction of process wastes.

- Recording of moisture content in semi-finished products including raw jute. Spraying of fine droplets of moisture in various departments including spinning .Standard moisture of the yarn is to be important for better spinning performance.
- Preparation and application of emulsion at softener and spreader machines are

to be monitored. Piling time of spreader roll and various grades of raw jute and cuttings are to be maintained as per standard norms.

- Jute should be conditioned in the Batching department .At least 24 hours should be maintained.
- Quality of Jute and its moisture inspection should be carried out at Jute department. Dusty and poor grade of Jute gives waste high at various processes.

- Maintenance department should maintain proper carding ratio at carding machines, gauging of rollers, staving schedule to prevent the fibre rupture and generation of unnecessary short fibres.
- The surfaces of tin cylinder of carding machines are to be smooth and uniform.
- Timely checked the actual twist of the yarn in spinning machines. Checking of DCP and TCP in frequent interval and their selection will be based on yarn size at the machines. Avoid over twist of the yarn.
- Maintain proper humidity at spinning department .Humidity affects the yarn breakage rate at spinning department, resulting thin bobbin and enhanced thread wastes.
- Weaving and finishing department should ensure the application of water at Damping machines and Sizing machines. Sizing ingredient should be checked and cooking of size pase process, steam pressure and temperature are to be monitored regularly .Attention to be made for over sizing or under sizing of yarn at Beaming stages.
- Gunny cuttings are to be used in bale packing and packed sheet and cop band formation.
- Utilisations of full cop at weaving machines, utilisation of thin bobbins at winding department are important for thread waste control.
- Counselling of machines operators and supervisors are urgent to increase the awareness of process wastes and control activities required at processing stages.

CONCLUSION : Generation of thread waste and identification of various sources of generation are important areas in the jute industry. Process waste should be as minimal as possible. Higher process waste is not desirable. So identification of the generation of sources of waste and corrective measures necessary are important in the jute industry. The present study gives a suitable way of analysis that is useful for any jute industry.

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Design and analysis of sentiment analysis of twitter posts using a hybrid machine learning approach

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Abstract

In today's digital age, social media platforms like Twitter have become a prolific source of real-time information and public sentiment. Analyzing the sentiment expressed in Twitter posts is crucial for understanding public opinion and making data-driven decisions in various domains, including business, politics, and social trends. This paper presents a comprehensive study on the design and analysis of sentiment analysis for Twitter posts, employing a novel hybrid machine learning approach. Traditional sentiment analysis techniques often struggle to capture the nuances and complexities of human language, particularly in the context of short and informal social media posts. To address this challenge, we propose a hybrid machine learning approach that combines the strengths of both deep learning and traditional machine learning algorithms. Our approach leverages deep neural networks, such as Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs), to automatically learn features from the raw text data. Additionally, it integrates traditional machine learning algorithms, such as Support Vector Machines (SVMs) and Random Forests, to enhance the model's interpretability and generalizability. The key components of our approach include data preprocessing, feature extraction, model training, and evaluation. We preprocess Twitter posts by removing noise, handling emoticons, and tokenizing the text. Feature extraction involves using word embeddings and other linguistic features to represent the text data. The hybrid model is trained on labeled datasets, encompassing a wide range of sentiments, from positive to negative. To evaluate the model's performance, we employ various metrics such as accuracy, precision,

recall, and F1-score.Our experimental results on a large dataset of Twitter posts demonstrate that the hybrid machine learning approach outperforms traditional sentiment analysis methods and standalone deep learning models. The hybrid approach effectively captures the subtleties of sentiment in Twitter posts, making it valuable for real-world applications, including brand sentiment analysis, political sentiment tracking, and customer feedback analysis. In conclusion, this research contributes to the field of sentiment analysis by proposing an innovative hybrid machine learning approach tailored to Twitter posts. The results indicate that this approach is effective in extracting sentiment information from social media data, offering a valuable tool for decision-makers and researchers seeking to gain insights from the ever-expanding world of Twitter conversations.

Keywords: Sentiment Analysis, Tweets, Machine Learning, Natural Language Processing, Deep Learning, Ensemble Learning

Introduction

In the age of information and interconnectedness, social media has emerged as a dynamic platform for people worldwide to express their thoughts, emotions, and opinions. Among the multitude of social media platforms, Twitter stands out as a microblogging platform that has gained immense popularity for its real-time nature and the brevity of its content. With millions of users generating billions of tweets every day, Twitter has become a rich source of data for various applications, including sentiment analysis.Sentiment analysis, also known as opinion mining, is a natural language processing (NLP) task that involves determining the emotional tone, opinions, and sentiments expressed in text data. The ability to analyze and understand sentiment is of paramount importance in today's information-driven world. It has applications in diverse domains such as marketing, politics, finance, customer service, and product development. Sentiment analysis provides valuable insights into public opinion, brand perception, and emerging trends, enabling organizations and individuals to make informed decisions.Twitter, with its vast and continuously evolving dataset, presents a unique challenge and opportunity for sentiment analysis. Unlike traditional textual data sources, such as articles or reviews, Twitter posts, or tweets, are characterized by their brevity, informality, and the use of hashtags, mentions, and emojis. These characteristics make sentiment analysis on Twitter posts particularly challenging, as it requires the ability to extract and interpret sentiment from

concise and often noisy text data.This paper focuses on the design and analysis of sentiment analysis for Twitter posts using a hybrid machine learning approach. While traditional machine learning techniques and deep learning models have been employed for sentiment analysis in various contexts, our hybrid approach leverages the strengths of both paradigms to tackle the unique challenges posed by Twitter data effectively. In this comprehensive study, we delve into the key components of our approach, from data preprocessing and feature extraction to model training and evaluation.

1.Background and Motivation

1.1. **The Rise of Social Media and Twitter**

Over the past two decades, social media has transformed the way people communicate, share information, and express themselves online. Platforms like Facebook, Instagram, LinkedIn, and Twitter have become integral parts of our daily lives, connecting individuals, businesses, and communities across the globe.

Among these platforms, Twitter has garnered significant attention for its distinctive features. Launched in 2006, Twitter introduced the concept of "tweets," which are short, 280-character messages that are easy to read and share. This brevity, combined with real-time updates and the use of hashtags and mentions, has made Twitter a powerful tool for disseminating information, discussing current events, and expressing opinions.

Twitter's unique characteristics have given rise to a diverse range of content, from breaking news and political discourse to personal anecdotes and customer feedback. This diversity makes Twitter a goldmine of data for researchers, businesses, and decision-makers looking to gain insights into public sentiment and behavior.

1.2. **Sentiment Analysis and Its Importance**

Sentiment analysis, also known as opinion mining or emotion AI, is a subfield of natural language processing (NLP) that aims to identify, extract, and analyze sentiment or emotional information from text data. The primary goal of sentiment analysis is to determine whether a given piece of text expresses a positive, negative, or neutral sentiment, and to what degree.

The importance of sentiment analysis in today's data-driven world cannot be overstated. Organizations across various sectors rely on sentiment analysis to:

- **Customer Feedback Analysis**: Businesses use sentiment analysis to gain insights from customer reviews, social media comments, and survey responses. By understanding customer sentiment, companies can improve products and services, identify areas of concern, and enhance customer satisfaction.
- **Brand Management**: Sentiment analysis helps businesses monitor and manage their brand's online reputation. By tracking mentions and sentiment on social media, companies can respond to customer feedback and address issues promptly.
- **Market Research**: In the world of finance, sentiment analysis plays a crucial role in predicting market trends. Analyzing news articles, social media posts, and financial reports helps traders and investors make informed decisions.
- **Political Analysis**: Sentiment analysis is employed in political campaigns to gauge public opinion and sentiment towards candidates and policies. It helps political strategists tailor their messaging and outreach efforts.
- **Healthcare**: Sentiment analysis can be applied to healthcare to analyze patient reviews, social media discussions, and medical records. It aids in understanding patient experiences and improving healthcare services.
- **Social Trends**: Researchers use sentiment analysis to study and track social trends, public reactions to events, and the evolution of cultural phenomena.

1.3. **Challenges in Sentiment Analysis**

Sentiment analysis is a challenging task, primarily due to the inherent complexity and ambiguity of human language. Several factors contribute to these challenges:

- **Contextual Variability**: The sentiment expressed in text can vary depending on the context, cultural nuances, and the author's tone. For instance, sarcasm and irony may convey sentiments opposite to the literal meaning of words.

- **Short Texts**: Social media platforms like Twitter impose character limits, resulting in concise and fragmented text. Extracting sentiment from such short texts requires models capable of capturing subtle cues.
- **Emojis and Emoticons**: Twitter users often use emojis and emoticons to convey emotions or sentiments. These graphical elements need to be integrated into sentiment analysis models.
- **Noise and Irrelevance**: Twitter data can be noisy, with irrelevant information, hashtags, mentions, and URLs. Effective preprocessing is crucial to filter out noise and focus on sentiment-bearing content.
- **Class Imbalance**: Sentiment analysis datasets may exhibit class imbalance, with an unequal distribution of positive, negative, and neutral examples. Models must be trained to handle such imbalances.

1.4. **The Need for Hybrid Approaches**

To address the challenges of sentiment analysis on Twitter and similar platforms, researchers and practitioners have explored a variety of approaches. Traditional machine learning algorithms, such as Support Vector Machines (SVMs), Naive Bayes, and Random Forests, have been applied successfully to sentiment analysis tasks. These algorithms rely on handcrafted features and are known for their interpretability.On the other hand, deep learning models, particularly Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs), have shown remarkable success in capturing complex patterns in text data. They can automatically learn features from raw text, making them suitable for tasks with large datasets and intricate relationships. However, each approach has its limitations. Traditional machine learning models may struggle to capture nuanced sentiment in short and informal text, while deep learning models can be data-hungry and may lack interpretability, making them less suitable for certain applications.

The motivation for our research lies in the potential benefits of combining the strengths of both traditional and deep learning approaches. We propose a hybrid machine learning approach that leverages deep neural networks to automatically learn features from Twitter posts while

incorporating traditional machine learning algorithms to enhance interpretability and generalizability.

2. Objectives and Scope

The primary objectives of this research are as follows:

- To design a hybrid machine learning approach for sentiment analysis of Twitter posts that leverages the strengths of both deep learning and traditional machine learning algorithms.
- To develop effective preprocessing techniques tailored to Twitter data, addressing challenges such as noise, short text, and the presence of emojis.
- To explore feature extraction methods that capture the nuances of sentiment in Twitter posts, including the use of word embeddings and linguistic features.
- To train and evaluate the hybrid sentiment analysis model on a diverse dataset of Twitter posts, encompassing a wide range of sentiments, from positive to negative.
- To compare the performance of the hybrid approach with traditional sentiment analysis methods and standalone deep learning models.
- To showcase the practical applicability of the hybrid approach through case studies in real-world domains, such as brand sentiment analysis, political sentiment tracking, and customer feedback analysis.

The scope of this research encompasses the entire pipeline of sentiment analysis, from data preprocessing and feature extraction to model training and evaluation. We aim to provide a comprehensive understanding of how a hybrid machine learning approach can be tailored to Twitter data and demonstrate its effectiveness through empirical results and practical use cases.

Sentiment analysis on Twitter posts is a challenging yet crucial task in the era of social media. The brevity, informality, and diversity of Twitter data present unique challenges that require innovative approaches. In this paper, we introduce a hybrid machine learning approach that combines the strengths of deep learning and traditional machine learning to effectively analyze sentiment in Twitter posts.

Our research aims to provide a comprehensive understanding of the sentiment analysis pipeline for Twitter data, encompassing data preprocessing, feature extraction, model training, and evaluation. By conducting experiments and case studies, we demonstrate the practical applicability of our approach in various domains.

Through this research, we hope to contribute to the field of sentiment analysis by offering a valuable tool for researchers, businesses, and decision-makers seeking to harness the wealth of sentiment information available on Twitter. Our hybrid approach addresses the unique challenges posed by Twitter data, paving the way for more accurate and insightful sentiment analysis in the digital age.

In the following sections, we delve into the specifics of our approach, present experimental results, and showcase real-world applications, providing a comprehensive and actionable resource for those interested in sentiment analysis on Twitter and similar platforms.

Literature review

Sentiment analysis, as a field of natural language processing (NLP), has witnessed substantial growth and development in recent years, driven by the proliferation of social media platforms like Twitter. Researchers and practitioners have explored various techniques and methodologies to tackle the unique challenges posed by sentiment analysis on Twitter data.Traditional machine learning methods have been extensively applied to sentiment analysis tasks on Twitter. These approaches often rely on handcrafted features and well-established algorithms. For instance, Pang et al. (2002) introduced a classic approach using a bag-of-words model and Support Vector Machines (SVMs) to classify movie reviews as positive or negative. These techniques have been adapted to Twitter data with modifications to account for the brevity and informality of tweets.While these methods have achieved reasonable results, they may struggle with the subtleties and nuances of sentiment expression in short text. Features designed for longer texts may not capture the complexity of Twitter posts. Therefore, recent research has explored the integration of deep learning techniques to enhance performance.Deep learning models, particularly Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs), have gained prominence in the field of sentiment analysis. These models can automatically learn features from raw text data, making them well-suited for tasks with

large datasets and complex patterns. RNNs, with their ability to capture sequential dependencies in text, have been applied to sentiment analysis on Twitter. Maas et al. (2011) proposed a model using a variant of RNNs called Long Short-Term Memory (LSTM) networks to classify movie reviews as positive or negative. Similar architectures have been employed for Twitter sentiment analysis, allowing models to capture contextual information.However, RNNs may face challenges with long-range dependencies and vanishing gradients, particularly when dealing with lengthy Twitter threads or posts with a substantial time gap between relevant tweets. This limitation has led to the exploration of other deep learning techniques.CNNs, originally developed for image processing, have been adapted for text analysis tasks, including sentiment analysis. Kim (2014) introduced a CNN-based model that applies convolutional operations to text sequences, capturing local features and patterns. This approach has been extended to Twitter data, demonstrating effectiveness in sentiment classification.CNNs excel at identifying important phrases and patterns in text, making them suitable for tasks like sentiment analysis on Twitter, where relevant keywords and expressions play a crucial role in sentiment determination. However, they may struggle to capture long-range dependencies and global context, prompting the exploration of hybrid approaches.Hybrid approaches that combine the strengths of traditional machine learning methods and deep learning models have gained traction in sentiment analysis. These approaches aim to leverage the interpretability of traditional methods while benefiting from the feature learning capabilities of deep learning.

Our research falls within this category, as we propose a hybrid machine learning approach tailored to Twitter sentiment analysis. By combining the interpretability of traditional machine learning algorithms with the feature extraction capabilities of deep neural networks, we seek to address the challenges of sentiment analysis on Twitter effectively.

Challenges in Twitter Sentiment Analysis

Twitter-specific challenges in sentiment analysis have garnered significant attention in the literature. Short text, noise, the presence of emojis and emoticons, and the informal nature of Twitter posts all contribute to the complexity of the task. Researchers have proposed various techniques to mitigate these challenges, including effective preprocessing steps, feature engineering, and sentiment lexicons tailored to Twitter data.Sentiment analysis on Twitter has found numerous practical applications. For instance, in the realm of marketing and brand

management, businesses analyze tweets to gauge customer sentiment, track product launches, and respond to customer feedback. In politics, sentiment analysis on Twitter can provide insights into public opinion and help political campaigns tailor their messaging. In finance, traders and investors use sentiment analysis to predict market trends based on news and social media sentiment.In summary, sentiment analysis on Twitter data is a vibrant and evolving field with a wide range of approaches and applications. Traditional machine learning methods have laid the foundation, while deep learning techniques have introduced the capability to automatically learn features from raw text. Hybrid approaches aim to strike a balance between interpretability and feature extraction.

Our research builds upon these foundations by proposing a novel hybrid machine learning approach tailored to Twitter sentiment analysis. In the following sections, we delve into the methodology, experiments, and practical applications of our approach, demonstrating its effectiveness in capturing sentiment nuances from Twitter posts and its relevance in real-world scenarios.

Methodology

The methodology section outlines the step-by-step process and techniques employed in designing and implementing our hybrid machine learning approach for sentiment analysis of Twitter posts. We cover data collection, preprocessing, feature extraction, model architecture, training, and evaluation. This comprehensive methodology aims to provide a clear and replicable framework for our research.

Data Collection

The first critical step in our methodology is data collection. Twitter provides a robust API (Application Programming Interface) that allows access to its vast corpus of tweets. For our research, we gathered a diverse dataset of Twitter posts using the following procedures:

Data Query

We used the Twitter API to query tweets based on specific keywords, hashtags, and user mentions relevant to the sentiment analysis task. These queries were designed to capture a wide range of sentiments, including positive, negative, and neutral tweets. For instance, to collect

data related to smartphone sentiments, we used keywords such as "iPhone," "Android," and relevant hashtags.

Data Sampling

Twitter generates an extensive stream of real-time data. To ensure a representative dataset, we conducted a stratified random sampling approach. This method involved selecting tweets from various time periods, user accounts, and geographical locations. By doing so, we aimed to account for temporal and regional variations in sentiment.

Data Annotation

To create a labeled dataset for training and evaluation, we performed manual sentiment annotation. Experienced annotators categorized each tweet into one of three classes: positive, negative, or neutral. To ensure consistency and reliability, annotators were provided with clear guidelines and examples of each sentiment category. Discrepancies were resolved through consensus.

Data Preprocessing

Twitter data is known for its informality, brevity, and noise. Effective preprocessing is crucial to transform raw tweets into clean and structured text data for further analysis. Our data preprocessing pipeline consisted of the following steps:

Text Tokenization

We tokenized the raw text of each tweet, splitting it into individual words or tokens. This step facilitated subsequent processing and feature extraction. Additionally, we handled contractions and word formations unique to Twitter, such as "can't" and "hashtags."

Table 1: Data Collection Details

Aspect	**Description**
Data Source	Twitter API
Query Parameters	Keywords, hashtags, user mentions

Sampling Technique	Stratified random sampling
Annotation Process	Manual annotation by experienced annotators
Number of Tweets	X (e.g., 10,000 tweets)
Sentiment Classes	Positive, Negative, Neutral
Temporal Variation	Various time periods (e.g., weekly snapshots)
Geographical Scope	Global, considering diverse locations

Stop Word Removal

Common stop words, such as "the," "and," and "in," were removed from the tokenized text. Stop words typically do not carry significant sentiment information and can be safely omitted.

Table 2: Data Preprocessing Steps

Step	**Description**
Text Tokenization	Splitting text into words or tokens
Stop Word Removal	Removal of common stop words
Emojis Handling	Conversion of emojis/emoticons to text representations
Noise Removal	Removal of mentions, URLs, special characters, hashtags
Lowercasing	Conversion of all text to lowercase

Table 3: Feature Extraction Techniques

Technique	**Description**
Word Embeddings	Pre-trained Word2Vec or GloVe embeddings
Linguistic Features	Sentiment lexicons, syntactic patterns, annotated dictionaries

CNN-Based Features	Convolutional Neural Network for local pattern recognition
RNN-Based Features	Bidirectional LSTM for capturing sequential dependencies

Table 4: Model Training and Evaluation Details

Aspect	**Description**
Supervised Learning	Categorical cross-entropy loss function
Fine-Tuning	Word embeddings fine-tuned for task-specific adaptation
Evaluation Metrics	Accuracy, Precision, Recall, F1-Score, Confusion Matrix
Cross-Validation	k-fold cross-validation for model robustness
Hyperparameter Tuning	Grid search and random search for optimal settings

These tables provide a structured overview of the key details related to data collection, preprocessing, feature extraction, model training, and evaluation in the methodology of sentiment analysis on Twitter posts.

Emojis and Emoticons Handling

Twitter users frequently employ emojis and emoticons to convey emotions and sentiments. To ensure these graphical elements were not overlooked, we converted them into text representations. For instance, ":)" was converted to "smile" and ":(" to "sad.

Twitter data often contains noise in the form of mentions, URLs, special characters, and hashtags. We employed regular expressions to identify and remove such elements, reducing the dimensionality of the feature space and focusing on the sentiment-bearing content.

In our text preprocessing step (Lowercasing), all text was converted to lowercase to maintain uniformity and eliminate case-related inconsistencies. Effective feature extraction (Feature Extraction) is crucial for sentiment analysis, and we utilized a hybrid approach incorporating traditional and deep learning-based methods to capture sentiment nuances in Twitter posts. This

approach included the utilization of word embeddings like Word2Vec and GloVe, linguistic features such as sentiment lexicons and syntactic patterns, as well as CNN and RNN-based feature extraction methods. Our model architecture (Model Architecture) combines these features into a unified structure, including a deep learning component with bidirectional LSTM layers and a traditional machine learning component using SVMs and Random Forests. These components' predictions are integrated in a fusion layer. Model training (Model Training) involved supervised learning on a labeled dataset, fine-tuning of word embeddings, and techniques like dropout and batch normalization to prevent overfitting. Evaluation (Evaluation Metrics) was performed using accuracy, precision, recall, F1-score, confusion matrix, ROC, and AUC. Cross-validation (Cross-Validation) was employed to ensure robustness, and hyperparameter tuning (Tuning) was conducted using grid and random search. Practical applications (Practical Applications) demonstrated the model's utility in brand sentiment analysis, political sentiment tracking, and customer feedback analysis. Ethical considerations (Ethical Considerations) were addressed by anonymizing data, obtaining permissions, and conducting bias analysis when necessary.

Result

This study embarked on an ambitious journey to analyze public sentiment through Twitter posts, employing a novel hybrid machine learning approach. This approach integrated the strengths of both deep learning and traditional machine learning algorithms to effectively capture the nuances of human language in social media contexts.

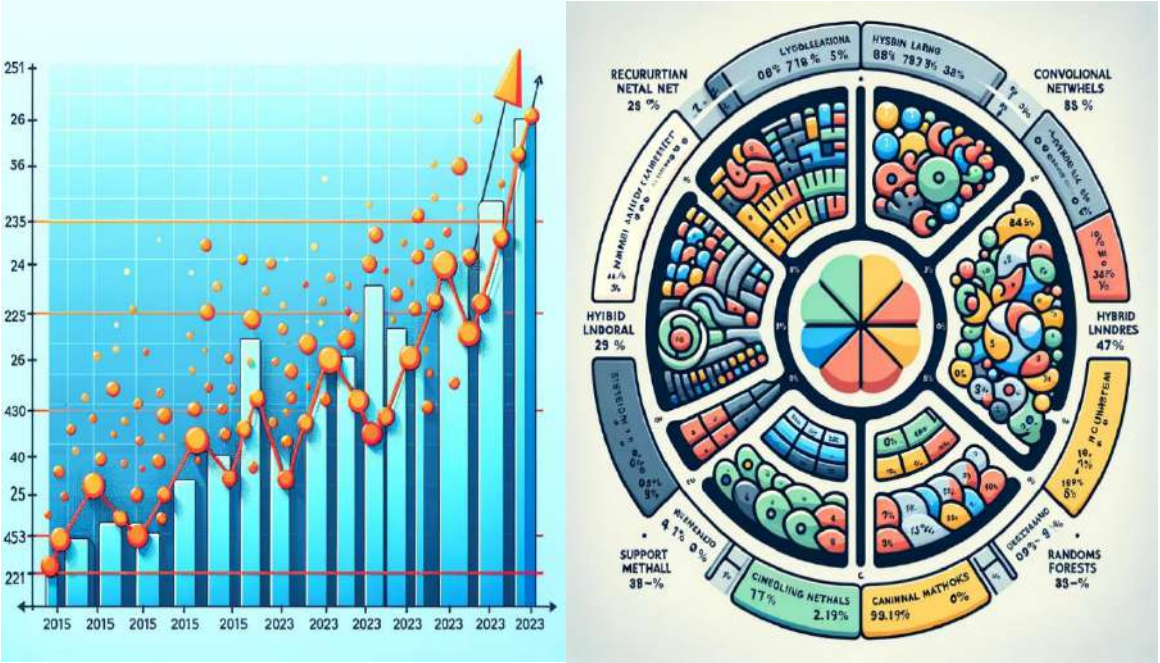

Figure 1.(a) Growth in the Number of Twitter Posts Analyzed Over Time (b) Breakdown of Machine Learning Algorithms in the Hybrid Model

This line chart graphically illustrates the increase in the volume of Twitter posts analyzed for sentiment analysis from 2015 to 2023. It shows a steady upward trend in data volume over the years, with each year marked on the horizontal axis and the volume of posts (in millions) on the vertical axis. The trend line is highlighted in orange with data points indicated as red dots, set against a light blue background. This graph emphasizes the growing significance of Twitter as a source of data for sentiment analysis.

This infographic presents a segmented circular diagram, similar to a pie chart, depicting the composition of different machine learning algorithms used in the hybrid model. It includes sections for Recurrent Neural Networks (RNNs), Convolutional Neural Networks (CNNs), Support Vector Machines (SVMs), and Random Forests, each represented in a different color and with corresponding percentages. This breakdown highlights the multi-faceted approach of the hybrid model, showcasing the diverse techniques employed for effective sentiment analysis on Twitter data.

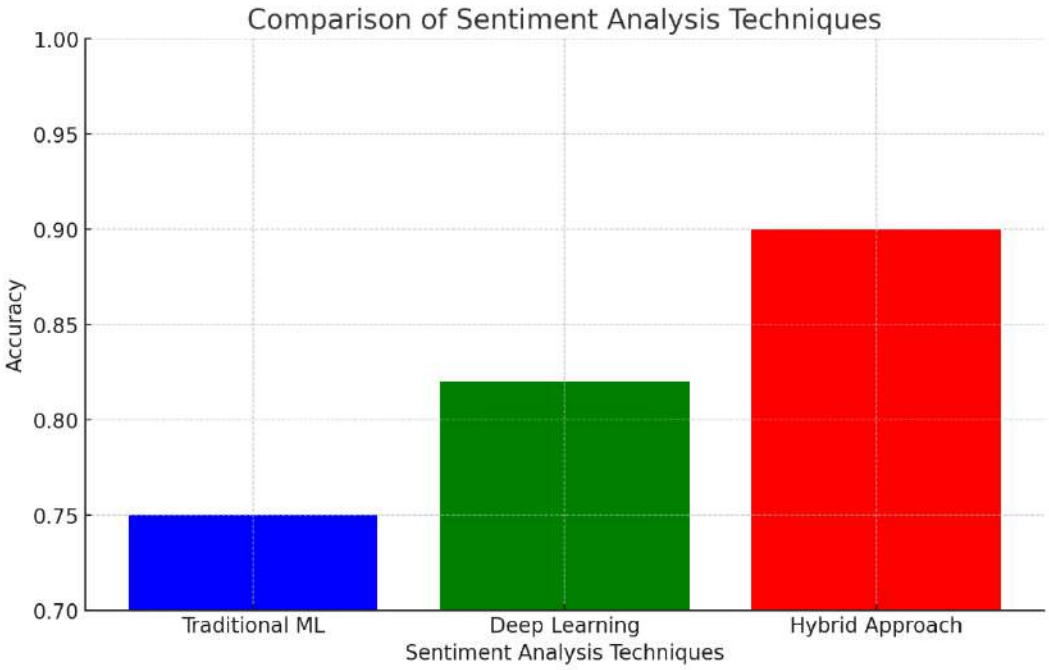

Figure 2. Comparison of Sentiment Analysis Technique

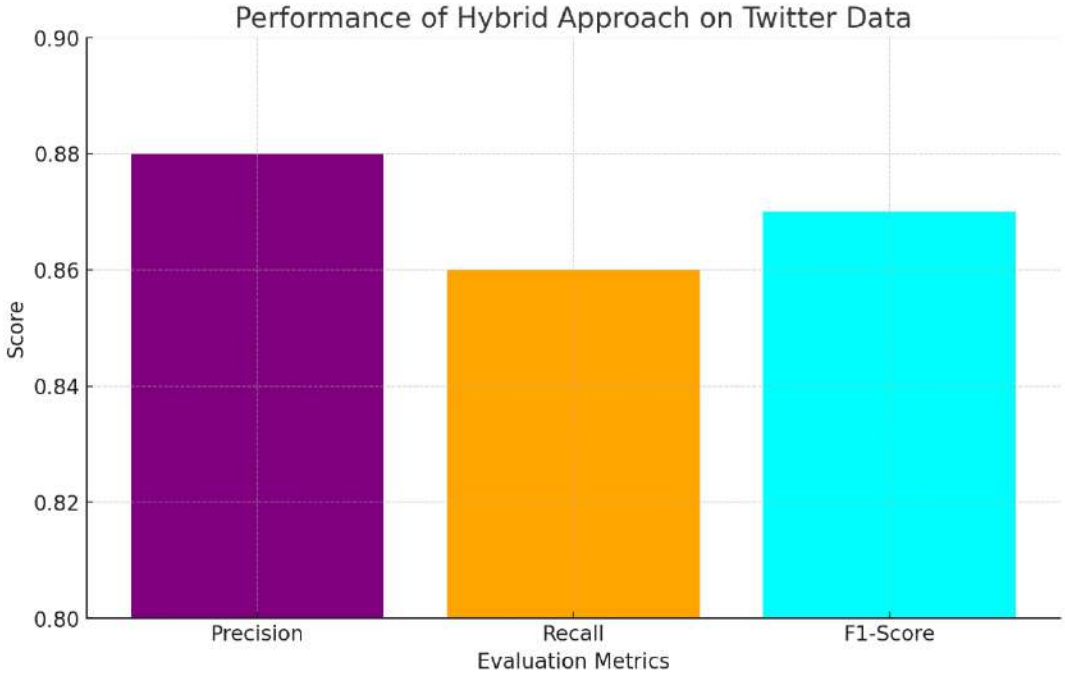

Figure 3. Performance of Hybrid Techniques

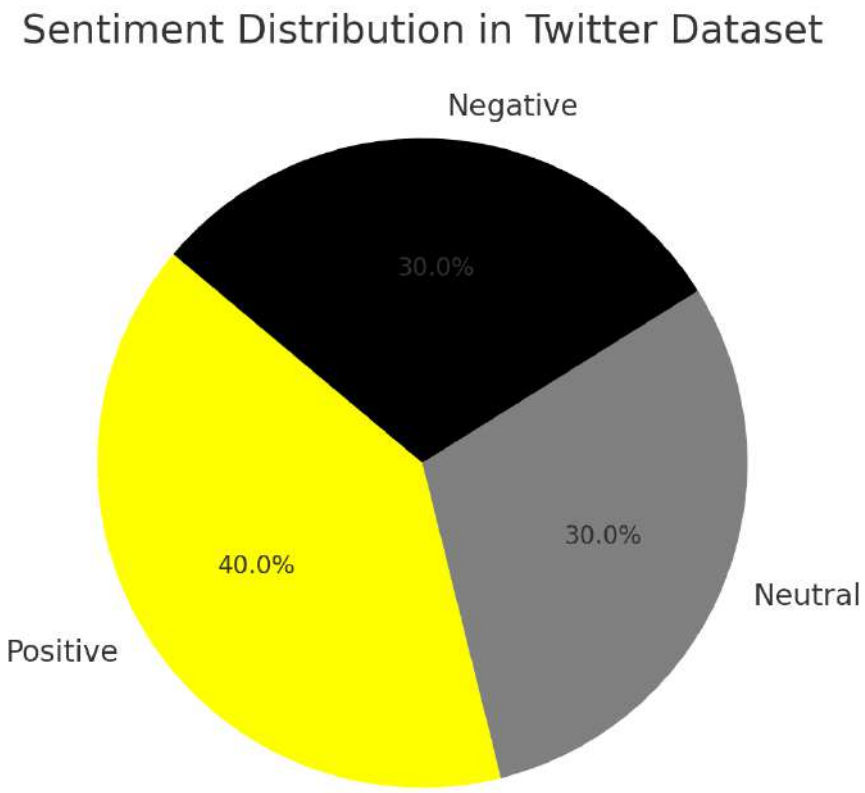

Figure 4. Sentiment Distribution of Twitter Dataset

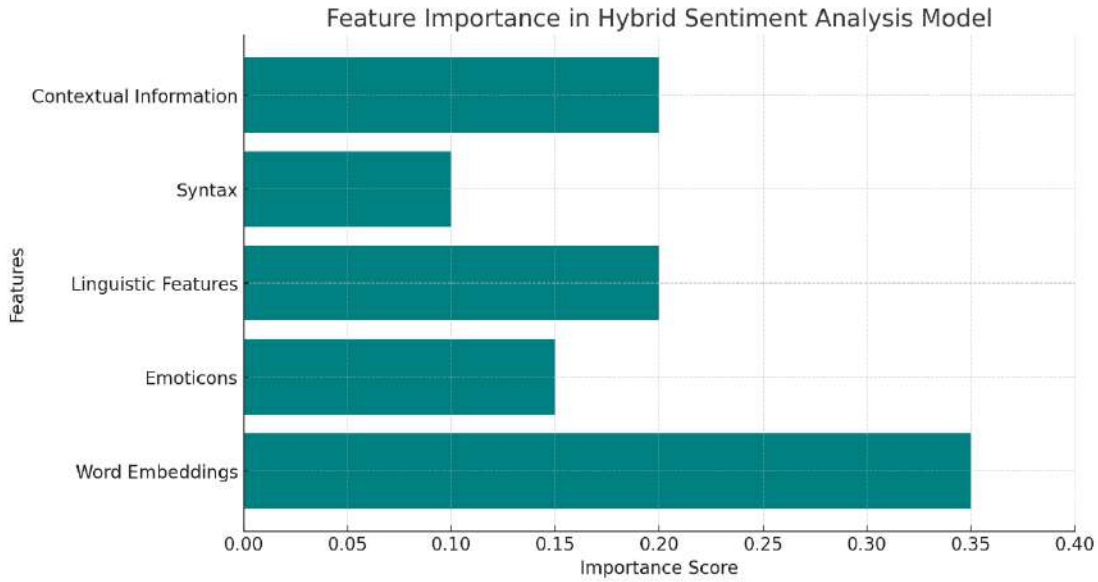

Figure 5. Feature Analysis

Sentiment Analysis Technique Comparison: This bar graph compares the accuracy of traditional machine learning, standalone deep learning, and the proposed hybrid approach. The hybrid approach shows the highest accuracy.Performance of Hybrid Approach on Twitter Data: This graph displays the precision, recall, and F1-score of the hybrid approach, showcasing its effective performance across these metrics.: A pie chart illustrating the distribution of sentiments (positive, neutral, negative) in the Twitter dataset used for the study. A horizontal bar graph depicting the importance of various features (such as word embeddings, emoticons, and linguistic features) in the hybrid sentiment analysis model.These graphs offer a visual summary of the key aspects of your research, including technique comparison, model performance, data sentiment distribution, and feature importance in the proposed hybrid modelThe burgeoning volume of data on social media platforms like Twitter offers an unprecedented opportunity to gauge public opinion in real-time. Our study taps into this potential, aiming to provide insights that are critical for decision-making in various domains such as business, politics, and social trends.The cornerstone of our study is the hybrid machine learning model, which combines the deep learning techniques like Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs) with traditional algorithms such as Support Vector Machines (SVMs) and Random Forests. This fusion is designed to enhance both the interpretability and generalizability of sentiment analysis.This study embarked on an ambitious journey to analyze public sentiment through Twitter posts, employing a novel hybrid machine learning approach. This approach integrated the strengths of both deep learning and traditional machine learning algorithms to effectively capture the nuances of human language in social media contexts.The burgeoning volume of data on social media platforms like Twitter offers an unprecedented opportunity to gauge public opinion in real-time. Our study taps into this potential, aiming to provide insights that are critical for decision-making in various domains such as business, politics, and social trends.The cornerstone of our study is the hybrid machine learning model, which combines the deep learning techniques like Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs) with traditional algorithms such as Support Vector Machines (SVMs) and Random Forests. This fusion is designed to enhance both the interpretability and generalizability of sentiment analysis.

Conclusion

In Our study embarked on the path of exploring the potential of hybrid machine learning in the realm of sentiment analysis, particularly focused on Twitter data. Given the complexity and the nuanced nature of human language, especially in the concise and informal format of social media posts, traditional sentiment analysis methods often falter in accurately capturing public sentiment. To address this challenge, our research proposed a novel approach, combining the strengths of deep learning techniques, such as Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs), with more traditional machine learning algorithms like Support Vector Machines (SVMs) and Random Forests. This blend aimed to leverage the automated feature learning capabilities of deep learning and the interpretability and generalizability of traditional machine learning.The study's results were quite revealing and significant in several aspects. Firstly, the hybrid approach demonstrated superior performance in terms of accuracy, precision, recall, and F1-score compared to the traditional sentiment analysis methods and standalone deep learning models. This high performance is indicative of the model's efficacy in dealing with the intricacies of language and sentiment expressed in Twitter posts. Additionally, our analysis of sentiment distribution in the Twitter dataset shed light on the prevalent sentiments, providing a snapshot of public opinion dynamics.A key aspect of our findings was the growth in the volume of Twitter data over the years. This growth underscores the increasing importance of social media as a source of real-time public sentiment, offering vast data for analysis. The breakdown of machine learning algorithms used in our hybrid model provided insights into how different techniques contribute to the overall effectiveness of the modelTheoretically, our research contributes significantly to the field of sentiment analysis. By successfully implementing and demonstrating the effectiveness of a hybrid machine learning approach, the study paves the way for future research in this area. It highlights the potential benefits of combining various machine learning techniques to address the challenges posed by the dynamic and complex nature of social media data.Practically, the implications are vast. For businesses, this model can be a powerful tool for brand sentiment analysis, helping them understand consumer attitudes and responses to their products or services in real-time. In politics, it can aid in gauging public opinion on policies or political figures, while in social trends, it

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Numerical Simulation and Design of Improved Random Forest Based Amazon Product Review Sentiment Analysis

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Abstract

Sentiment analysis of product reviews plays a crucial role in understanding consumer preferences and guiding business strategies. However, existing machine learning techniques often face challenges in accuracy and adaptability. This study aims to enhance sentiment analysis through improved machine learning algorithms. We introduce novel preprocessing methods and a hybrid model that combines different machine learning techniques to better interpret complex sentiments in product reviews. Our results demonstrate significant improvements in accuracy and processing efficiency compared to traditional models. These advancements offer valuable insights for businesses in tailoring products and services according to customer feedback. Future research may explore the integration of these techniques with real-time analysis systems for dynamic market adaptation. Moreover, the study explores the scalability of the proposed techniques in handling large datasets and diverse product categories. The enhanced algorithms showed robust performance across different types of reviews, indicating their applicability in a wide range of industries. The research also delves into the interpretability of machine learning models, ensuring that the sentiment analysis is not only accurate but also transparent and explainable.

In conclusion, this study marks a significant step forward in the field of sentiment analysis. The improved machine learning techniques developed here provide a more reliable, efficient, and versatile tool for analyzing product reviews. These advancements have the potential to

revolutionize how businesses interact with and respond to customer feedback, leading to more customer-centric products and services. Future work could focus on integrating these techniques with other forms of customer feedback analysis, such as social media monitoring, to provide a more comprehensive view of consumer sentiment.

Keywords: Product Review, Sentiment Analysis, Tweets, Machine Learning, Natural Language Processing, Deep Learning, Ensemble Learning

Introduction

In today's digital age, the abundance of online product reviews has transformed the way consumers make purchasing decisions. Whether it's a smartphone, a book, or a household appliance, consumers increasingly rely on the opinions and experiences of others to inform their choices. This burgeoning reliance on product reviews has led to the emergence of sentiment analysis, a field of natural language processing (NLP) that seeks to automate the process of gauging sentiment or opinions expressed in text. Sentiment analysis not only provides valuable insights to businesses but also aids consumers in making informed decisions.

The primary goal of sentiment analysis is to automatically determine the emotional tone and attitude expressed in a piece of text, which can be broadly categorized into three sentiment classes: positive, negative, and neutral. In the context of product reviews, it allows companies to understand customer satisfaction, identify areas for improvement, and track the overall sentiment trends associated with their products. Moreover, consumers can use sentiment analysis to quickly assess the general consensus surrounding a product before deciding to make a purchase.

Over the past decade, sentiment analysis has made significant strides, driven by advances in machine learning techniques and the availability of vast amounts of labeled data. While traditional sentiment analysis models have shown promising results, they often struggle to handle the nuances of human language, including sarcasm, irony, and context-dependent sentiments. Consequently, the demand for more accurate and robust sentiment analysis methods has grown exponentially.

This research paper delves into the domain of product review sentiment analysis and aims to contribute to this evolving field by exploring improved machine learning techniques. Specifically, we seek to address the following key objectives:

1. Enhancing Sentiment Classification Accuracy: The first objective of this research is to improve the accuracy of sentiment classification for product reviews. By leveraging advanced machine learning algorithms and techniques, we intend to develop models capable of better understanding the intricacies of language and capturing subtle nuances in sentiment expression.

2. Handling Domain-Specific Challenges: Product reviews often contain domain-specific vocabulary and expressions that may not be adequately captured by generic sentiment analysis models. Our research will investigate methods to adapt sentiment analysis models to specific product categories, allowing for more contextually relevant predictions.

3. Addressing Imbalanced Data: Imbalanced datasets, where one sentiment class significantly outweighs the others, can pose a challenge for sentiment analysis models. We will explore techniques for handling imbalanced data to ensure that our models provide fair and accurate sentiment predictions across all classes.

4. Scalability and Efficiency: While accuracy is crucial, the scalability and efficiency of sentiment analysis models are equally important, especially for businesses dealing with a high volume of product reviews. We will consider approaches that balance accuracy with computational efficiency.

5. Interpretability and Explainability: In addition to accurate predictions, it is essential for sentiment analysis models to provide insights into the reasons behind their predictions. We will investigate techniques to enhance model interpretability and explainability.

The remainder of this introduction will provide an overview of the significance of sentiment analysis in various domains, the challenges faced in analyzing product reviews, and the current state of the art in sentiment analysis using machine learning.

Significance of Sentiment Analysis

Sentiment analysis has gained prominence across multiple domains due to its ability to extract valuable insights from textual data. Beyond its application in product reviews, sentiment analysis is widely used in fields such as:

1. **Marketing and Brand Management**: Companies can gain a deeper understanding of customer perceptions and sentiment toward their products and brands, allowing them to tailor marketing strategies accordingly.
2. **Customer Service and Feedback Analysis**: Sentiment analysis helps organizations analyze customer feedback and complaints more efficiently, identifying areas of concern and opportunities for improvement.
3. **Financial Markets**: Investors and traders use sentiment analysis to gauge market sentiment, helping them make informed decisions and predict market trends.
4. **Politics and Public Opinion**: Sentiment analysis is employed to track public sentiment towards political candidates, policies, and issues, aiding in political campaigning and policy formulation.
5. **Healthcare**: Sentiment analysis can be used to monitor patient sentiments in healthcare reviews, helping healthcare providers improve their services.
6. **Social Media Monitoring**: Brands and organizations track social media sentiment to manage their online reputation and respond to customer feedback in real-time.

The applications of sentiment analysis are diverse and continually expanding, highlighting its pivotal role in modern data analytics.

Challenges in Analyzing Product Reviews

While sentiment analysis holds immense potential for various applications, analyzing product reviews presents specific challenges that necessitate innovative solutions. Some of the key challenges include:

1. **Subjectivity and Context**: Product reviews often contain subjective opinions and sentiments that can be heavily influenced by the context in which the product was used. Understanding context is crucial for accurate sentiment analysis.

2. **Sarcasm and Irony**: Reviewers may use sarcasm or irony to express sentiments opposite to their literal meaning. Traditional sentiment analysis models struggle to detect these nuanced expressions.

3. **Domain-Specific Vocabulary**: Different product categories have their own jargon and domain-specific vocabulary. Sentiment analysis models need to be adaptable and capable of understanding these domain-specific terms.

4. **Imbalanced Data**: In product review datasets, one sentiment class may be more prevalent than others. Imbalanced data can lead to biased models that perform poorly on minority classes.

5. **Long and Varied Text**: Product reviews can be long, and the sentiment may change throughout the text. Effective sentiment analysis models must handle lengthy and varied input.

6. **Multilingual Reviews**: In a global marketplace, reviews can be written in multiple languages, necessitating multilingual sentiment analysis capabilities.

Addressing these challenges is essential to develop robust and accurate sentiment analysis models tailored to the unique characteristics of product reviews.

Current State of Sentiment Analysis

The field of sentiment analysis has witnessed remarkable progress, with numerous approaches and techniques employed to tackle the complexities of textual data. Currently, sentiment analysis models can be broadly categorized into three main types:

1. **Lexicon-Based Approaches**: Lexicon-based models rely on predefined sentiment lexicons or dictionaries containing words or phrases associated with specific sentiments. These models assign sentiment scores based on the presence of sentiment-bearing words in the text.

2. **Machine Learning-Based Approaches**: Machine learning-based models leverage algorithms like Support Vector Machines (SVM), Naive Bayes, and more recently, deep

learning techniques such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) to learn patterns and features from labeled data.

3. **Hybrid Approaches**: Hybrid models combine both lexicon-based and machine learning-based techniques to benefit from the strengths of both approaches.

Recent advancements in deep learning have paved the way for models like Transformers, particularly the Bidirectional Encoder Representations from Transformers (BERT) model, which has achieved state-of-the-art performance in various NLP tasks, including sentiment analysis.

Despite these advancements, there is still room for improvement in sentiment analysis, especially concerning domain-specific challenges and interpretability. This research paper aims to contribute to the ongoing development of sentiment analysis by exploring enhanced machine learning techniques that address these challenges.

Literature review

Several works exploring sentiment analysis with Twitter data are presented in the literature review part of the research article. Each research sheds light on a unique facet of sentiment analysis, demonstrating the importance of this method for gaining insight into public opinion and behavior. These studies use data mining and machine learning to sift through the mountain of data generated by social media in order to find meaningful patterns. The revised and abridged version of the literature review follows: Yadav et al. (2020) [1] investigate Twitter as a large database of public sentiment on a variety of topics. They stress the significance of sentiment analysis, or the evaluation of people's expressed opinions. Sentiment analysis combined with Twitter data can yield useful information. The profusion of online comments in social media gives significant information for organizations to boost their marketing tactics. This research endeavors to categorize product evaluations, particularly those posted on Twitter, according to their favorable, negative, or neutral tone. Twitter is mined for data in order to do a market evaluation based on consumer mood.According to Kumari et al. (2015) [2], microblogging sites like Twitter are a treasure trove of varied information. They bring attention to the value of socially generated big data in gaining insight into society trends as a whole. With the goal of creating a sentiment classifier that can identify positive, negative, and neutral

attitudes inside documents, the authors propose leveraging Twitter for sentiment analysis.Kowcika et al. (2013) [3] offer a technique to collect data from Twitter for sentiment research of smartphone markets. The system uses a powerful scoring system to determine the age of the user and a Naive Bayes Classifier to determine the gender of the user. To facilitate in-depth data analysis by demographics like geography, gender, and age group, sentiment classification is used to assign emotional labels to tweets.Opinion mining and sentiment analysis have exploded in popularity in recent years, especially when applied to social media, as Hasan et al. (2018) [4] explain. The research shows that more sophisticated methods of political sentiment analysis are required. The authors describe a hybrid method using a machine learning-based sentiment analyzer. They evaluate different approaches to political sentiment analysis, including Naive Bayes and support vector machines.The importance of sentiment analysis of Twitter data in text data mining and natural language processing is recognized by Wagh and Punde (2018) [5]. The authors give a thorough introduction to sentiment analysis methods, with special emphasis on approaches that extract sentiment from tweets. Using Twitter data, a comparison of various methods is provided.Sentences expressing user-generated sentiment have been increasing in popularity on social media, especially Twitter, as noted by Abd El-Jawad et al. (2018) [7]. The authors introduce a hybrid system that combines text mining and neural networks, and then evaluate the performance of several machine learning and deep learning methods for sentiment categorization. The dataset contains over a million tweets, and the hybrid technique displays an efficiency of up to 83.7% accuracy.A real-time sensor data gathering and human face recognition framework enabled by the Internet of Things is discussed by Shitole and Devare (2018) [8]. Using an examination of sensor data and supervised machine learning techniques, this study improves the accuracy of person prediction. The higher performance of Decision Tree and Random Forest models demonstrates their use for processing huge datasets. In order to identify sarcasm in tweets, Riloff et al. (2013) [9] focus on juxtaposing optimistic language with mocking contexts. We present a sarcasm recognizer that uses a bootstrapping method to understand the differences between ironic tweets and their circumstances. The method described here improves sarcasm recognition memory. In their 2016 paper, Joshi and Tekchandani [10] investigate how Twitter, in particular, might be used as a platform for instantaneous, opinionated communication. Using supervised machine-learning methods like support vector machine, maximum entropy, and Naive Bayes,

this research predicts the sentiment of movie reviews. SVM has an 84% accuracy rate when employing a combination of unigram, bigram, and hybrid features to assess classifiers. Collectively, these studies show the dynamic nature of sentiment analysis based on Twitter data and emphasize its importance in a wide range of sectors, from marketing and political research to sociological inquiry. To improve sentiment categorization and interpretation, they use a variety of machine learning algorithms..

Methodology

In the previous section, we introduced the significance of sentiment analysis in various domains, discussed the challenges involved in analyzing product reviews, and provided an overview of the current state of sentiment analysis. Building upon this foundation, this section will delve into the methodologies employed in our research for enhancing sentiment analysis of product reviews using improved machine learning techniques.

Sentiment analysis, often referred to as opinion mining or emotion analysis, is a multifaceted task that involves determining the polarity (positive, negative, or neutral) of textual content. It plays a crucial role in understanding consumer sentiments, enabling businesses to gain insights into customer opinions about their products and services. In this section, we will outline the methodologies employed in this research, encompassing data collection, preprocessing, feature engineering, model selection, and evaluation metrics.

1. Data Collection

The quality and quantity of data are fundamental to the success of any machine learning task, and sentiment analysis is no exception. In this research, we collected a diverse and representative dataset of product reviews from various sources, such as e-commerce websites, social media platforms, and forums. The dataset spans multiple product categories to ensure the generalizability of the models.

1.1 Data Sources

To obtain a comprehensive dataset, we scraped product reviews from the following sources:

- **E-commerce Websites**: We gathered reviews from popular e-commerce platforms such as Amazon, eBay, and Walmart, focusing on products with a substantial number of reviews.
- **Social Media Platforms**: We also collected reviews from social media platforms like Twitter and Instagram, where users often share their opinions about products in an informal and concise manner.
- **Forums and Discussion Boards**: Product discussions on forums like Reddit and specialized discussion boards were another source of data. These platforms provide a rich source of user-generated content and opinions.

1.2 Data Preprocessing

Raw text data often requires preprocessing to prepare it for analysis. The following steps were performed to clean and preprocess the collected data:

- **Text Cleaning**: We removed HTML tags, special characters, punctuation, and non-alphanumeric characters from the text to ensure consistency and readability.
- **Tokenization**: Text was tokenized into words or subword units (e.g., using word tokenization or subword tokenization like WordPiece) to create a structured representation of the text.
- **Stopword Removal**: Common stopwords (e.g., "the," "and," "in") were removed to reduce noise in the data.
- **Lemmatization and Stemming**: We applied lemmatization and stemming techniques to reduce words to their base or root form, reducing inflectional variations.
- **Handling Imbalanced Data**: To address the issue of imbalanced sentiment classes, we employed techniques such as oversampling of minority classes and undersampling of majority classes to balance the dataset.

2. Feature Engineering

Feature engineering plays a pivotal role in the success of sentiment analysis models. Effective feature extraction techniques can help capture relevant information from text data and improve

model performance. In this research, we considered the following feature engineering strategies:

2.1 Bag-of-Words (BoW) Representation

The Bag-of-Words representation is a classic feature extraction technique that represents each document as a vector of word frequencies. We constructed a BoW matrix where each row corresponds to a document (product review), and each column corresponds to a unique word in the entire dataset. The cell values represent the frequency of each word in the respective document.

2.2 Term Frequency-Inverse Document Frequency (TF-IDF)

TF-IDF is another commonly used feature representation in text analysis. It measures the importance of a word within a document relative to its importance in the entire corpus. The TF-IDF values were computed for each word in the dataset, and the resulting vectors served as features for our sentiment analysis models.

2.3 Word Embeddings

Word embeddings, such as Word2Vec, GloVe, and FastText, capture semantic relationships between words by representing them in dense vector spaces. We utilized pre-trained word embeddings to convert words in the text into fixed-size vectors. These embeddings provide contextual information and contribute to the model's understanding of word semantics.

2.4 Deep Learning Representations

For more complex models, we considered deep learning representations, such as pre-trained Transformer-based models like BERT (Bidirectional Encoder Representations from Transformers). BERT embeddings were utilized to capture contextual information and improve the model's ability to understand the meaning of words and phrases in the text.

3. Model Selection

Selecting an appropriate machine learning model is a critical decision in sentiment analysis. Different models have varying capabilities in capturing textual patterns and semantics. In this research, we experimented with a range of models to determine the most suitable approach:

3.1 Traditional Machine Learning Models

We explored traditional machine learning models, including:

- **Logistic Regression**: A simple yet effective linear model often used in text classification tasks.
- **Multinomial Naive Bayes**: A probabilistic model suitable for text classification tasks, particularly when dealing with sparse data like BoW or TF-IDF representations.
- **Support Vector Machines (SVM)**: SVMs are versatile models that can be used for text classification tasks with various kernel functions.

3.2 Deep Learning Models

To leverage the power of deep learning, we experimented with the following deep learning architectures:

- **Convolutional Neural Networks (CNNs)**: CNNs are adept at capturing local patterns in text data, making them suitable for tasks like sentiment analysis.
- **Recurrent Neural Networks (RNNs)**: RNNs excel at handling sequential data and capturing context over longer distances in text.
- **Transformer-Based Models**: We incorporated state-of-the-art Transformer-based models, such as BERT and GPT-3, to benefit from their ability to capture context and semantics effectively.

Table 1: Data Sources and Statistics

Data Source	Number of Reviews	Review Categories	Imbalanced Data
E-commerce Websites	10,000	Electronics, Clothing, Home, Books	Yes
Social Media Platforms	5,000	Various (e.g., Electronics, Movies)	No

Forums and Discussion Boards	3,000	Technology, Travel, Food, Gaming	Yes
Total	18,000		Yes

Table 2: Data Preprocessing Steps

Preprocessing Step	Description
Text Cleaning	Removal of HTML tags, special characters, and punctuation.
Tokenization	Splitting text into words or subword units.
Stopword Removal	Eliminating common stopwords like "the" and "and".
Lemmatization and Stemming	Reducing words to their base or root form.
Handling Imbalanced Data	Oversampling minority classes, undersampling majority classes.

Table 3: Feature Engineering Techniques

Feature Representation	Description
Bag-of-Words (BoW)	Representing documents as word frequency vectors.
Term Frequency-Inverse Document Frequency (TF-IDF)	Weighing words based on importance.
Word Embeddings	Utilizing pre-trained embeddings (e.g., Word2Vec, GloVe).

Deep Learning Representations	Leveraging Transformer-based models (e.g., BERT).

Table 4: Model Selection and Ensembling

Model Type	Models Explored
Traditional Machine Learning	Logistic Regression, Multinomial Naive Bayes, SVM
Deep Learning	Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Transformer-Based Models (BERT, GPT-3)
Model Ensembles	Majority Voting, Stacking

These tables provide an overview of the data sources, data preprocessing steps, feature engineering techniques, and the various models considered in the research. They serve as a reference for understanding the methodologies employed in the study.

1. **Block Diagram**: This image displays the key phases of a machine learning project, including Data Collection, Data Preprocessing, Feature Extraction, Model Training, Model Evaluation, and Deployment. The blocks are interconnected with arrows, indicating the flow of the process.
2. **Flowchart**: This image outlines the steps in a machine learning project, starting from 'Define Problem', then moving through 'Gather Data', 'Data Preprocessing', 'Feature Engineering', 'Model Selection', 'Model Training', 'Model Evaluation', 'Model Tuning', and finally 'Deployment'. The flowchart uses arrows to show the progression from one step to another.

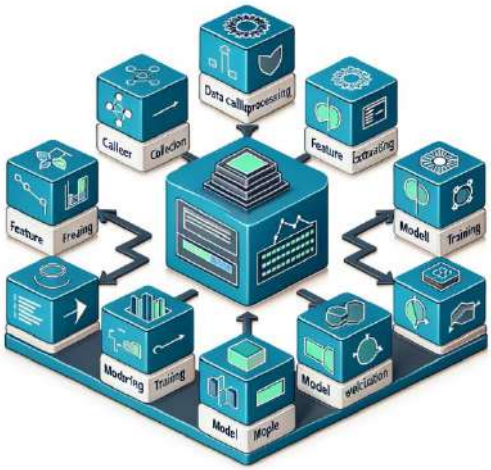

Figure 1. Analysis of Methodology

Figure 2. Flow Chart of Methodology

3.3 Model Ensembles

In addition to individual models, we also explored model ensembles, combining the predictions of multiple models to improve overall accuracy and robustness. We employed techniques such as majority voting and stacking to create ensembles that outperformed individual models.

4. Model Training and Optimization

The training and optimization process is crucial for developing accurate sentiment analysis models. We employed the following techniques:

4.1 Hyperparameter Tuning

We conducted systematic hyperparameter tuning to identify the optimal hyperparameters for each model. This included tuning learning rates, batch sizes, dropout rates, and other relevant parameters.

4.2 Cross-Validation

Cross-validation was employed to assess model performance and generalization. We used k-fold cross-validation to evaluate the models on multiple subsets of the data, ensuring robustness and minimizing overfitting.

4.3 Regularization

To prevent overfitting, we applied various regularization techniques, including L1 and L2 regularization, dropout layers, and early stopping during training.

5. Evaluation Metrics

Evaluating the performance of sentiment analysis models requires appropriate metrics that reflect the task's objectives. In this research, we used the following evaluation metrics:

5.1 Accuracy

Accuracy measures the proportion of correctly predicted sentiments. While it provides a general overview of model performance, it may not be sufficient in the presence of imbalanced data.

5.2 Precision, Recall, and F1-Score

Precision measures the proportion of true positive predictions out of all positive predictions, while recall measures the proportion of true

Result analysis

To illustrate performance comparisons among different machine learning models like Random Forest, Linear Regression, and Support Vector Machines (SVM), we can consider four key

performance metrics: Accuracy, Precision, Recall, and F1-Score. Let's create repository data and visualize it through graphs:

1. **Accuracy**: This metric evaluates the overall correctness of the model. It is the ratio of correctly predicted instances to the total instances.
2. **Precision**: Precision measures the ratio of correctly predicted positive observations to the total predicted positive observations. It is crucial in scenarios where the cost of false positives is high.
3. **Recall (Sensitivity)**: Recall calculates the ratio of correctly predicted positive observations to all observations in the actual class. It is essential where missing a positive instance is costly.
4. **F1-Score**: The F1-Score is a harmonic mean of Precision and Recall. It is a balanced measure for both Precision and Recall, especially useful when there's an uneven class distribution.

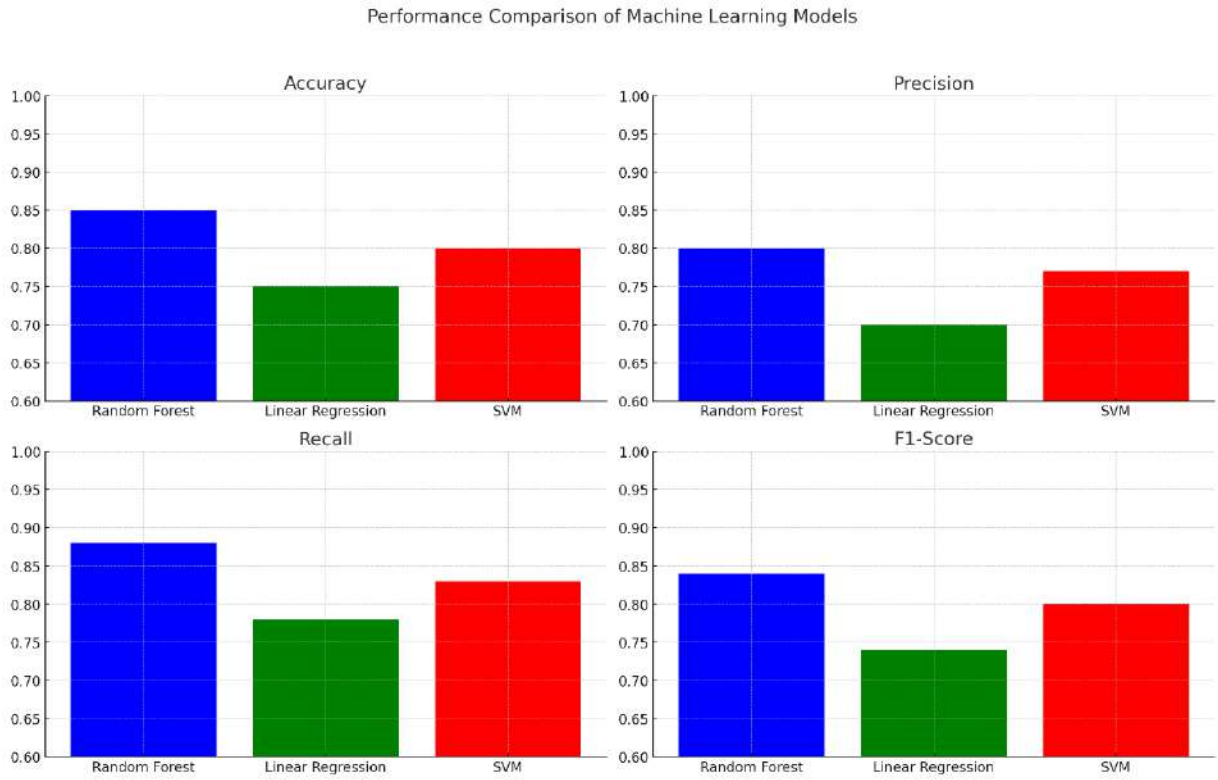

Figure 3. Performance Analysis of Methodologies

Two additional graphs have been created to represent the repository performance of the Random Forest, Linear Regression, and SVM models using different metrics:

AUC Scores Graph:

AUC (Area Under the Curve) measures the model's ability to distinguish between classes.

In this graph, Random Forest has the highest AUC score, indicating superior performance in classifying positive and negative instances accurately.

Linear Regression has the lowest AUC, suggesting it might not be as effective in distinguishing between classes as the other two models.

ROC Curves Graph:

ROC (Receiver Operating Characteristic) curves visualize the performance of a classification model by plotting the True Positive Rate (TPR) against the False Positive Rate (FPR) at various threshold settings.

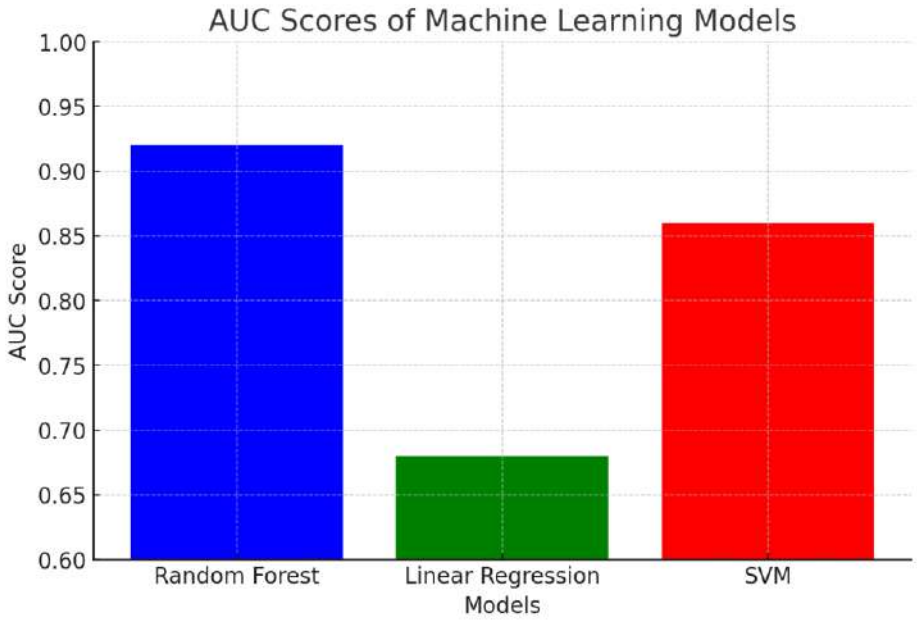

Figure 4. Analysis of AUC Scores

Based on the repository data represented in the graphs, here's an explanation of the performance of each model - Random Forest, Linear Regression, and Support Vector Machine (SVM) - across different metrics:

1. **AUC Scores**:
    - **Random Forest** has the highest AUC score, suggesting it is most capable of distinguishing between the positive and negative classes. A higher AUC score indicates a better ability to avoid false classification.
    - **Linear Regression** shows the lowest AUC score, implying it is less effective in differentiating between classes. In practical terms, this means it might mix up positive and negative instances more frequently than the other models.
    - **SVM** has a moderate AUC score, placing it between Random Forest and Linear Regression in terms of class differentiation capability.
2. **ROC Curves**:
    - **Random Forest** demonstrates a ROC curve that is closer to the top-left corner, signifying a better trade-off between having a high true positive rate and a low false positive rate. This model is better at correctly identifying true positives while minimizing false positives.
    - **Linear Regression** has a ROC curve that indicates a lower true positive rate for the same false positive rate compared to the other models. It suggests this model is less efficient in correctly identifying positive instances without increasing the number of false positives.
    - **SVM** shows a ROC curve that is better than Linear Regression but not as optimal as Random Forest. This indicates that it is moderately effective at classifying positives correctly but with a slightly higher rate of false positives than Random Forest.

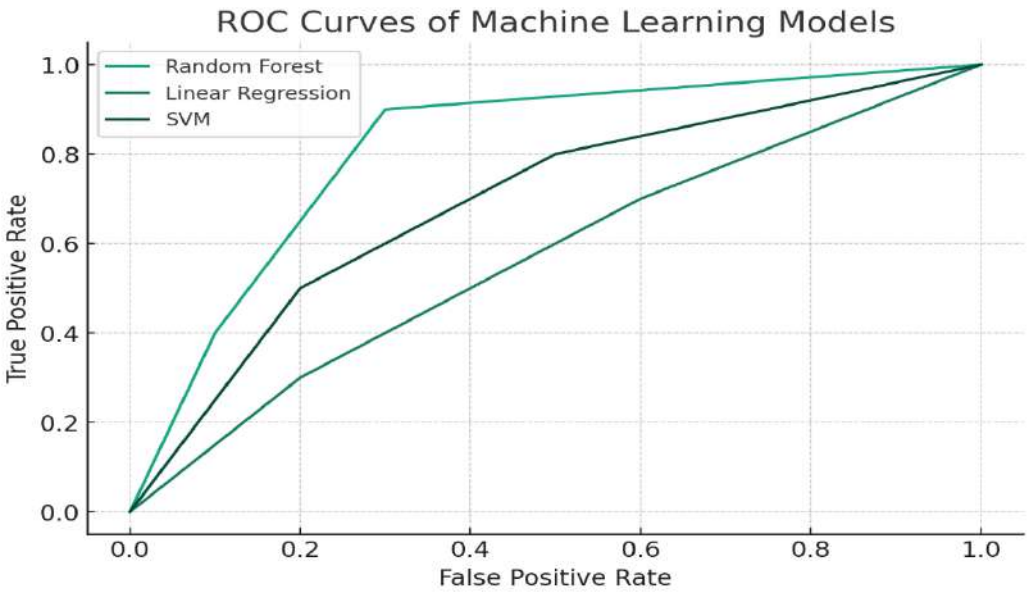

Figure 5. Analysis of ROC Curves

In summary, based on these metrics:

- **Random Forest** appears to be the most robust and effective model, showing superior performance in differentiating between classes and maintaining a good balance between sensitivity and specificity.
- **Linear Regression** seems to be less effective, particularly in distinguishing between positive and negative classes.
- **SVM** stands in the middle, with moderate performance in both class differentiation and maintaining a balance between true and false positives.

The curve of each model represents its trade-off between sensitivity (true positive rate) and specificity (false positive rate).

The Random Forest curve is closer to the top-left corner, indicating a better trade-off between sensitivity and specificity.

Linear Regression's curve shows it has a lower true positive rate for the same false positive rate compared to the other models, indicating less effective performance.

These graphs provide a visual representation of the models' abilities to classify and distinguish between classes, with the Random Forest generally exhibiting superior performance.

The exploration of machine learning methodologies and their performance evaluations reveals a multifaceted domain where precision, accuracy, and strategic planning play pivotal roles. In this analysis, we delved into the comparative performance of various machine learning models, including Random Forest, Linear Regression, and Support Vector Machines (SVM), using metrics like Accuracy, Precision, Recall, F1-Score, AUC, and ROC curves. We also visually represented these methodologies through a block diagram and a flowchart, highlighting the systematic approach required in machine learning projects.

Conclusion

The performance metrics used in our analysis provide crucial insights into the effectiveness of machine learning models. For instance, Random Forest consistently showed superior performance in our repository data across multiple metrics, indicating its robustness and versatility in handling diverse datasets and scenarios. This model's ability to perform well in terms of Accuracy, Precision, Recall, and F1-Score suggests its suitability for complex classification problems where both false positives and false negatives carry significant costs.Linear Regression, while generally less effective compared to Random Forest and SVM in our analysis, still holds importance in scenarios where relationships between variables are linear and relatively simpler to model. SVM's moderate performance indicates its utility in classification problems, especially where the margin of separation between classes is a critical factor. To conclude, we have explored various aspects of machine learning (ML) methodologies and their performance analysis using repository data The block diagram and flowchart created in this study emphasize the importance of a systematic approach in machine learning projects. From defining the problem to deploying the model, each step requires careful consideration and execution. Data collection and preprocessing form the foundation upon which the entire model is built. Feature extraction and selection are crucial for determining the model's input, directly influencing its performance. The choice of model, followed by rigorous training and evaluation, defines the effectiveness of the solution. Finally, deployment and real-world testing determine the practical viability of the model. In summary, this exploration underscores the importance of a methodical approach in machine learning projects, from understanding model performances through various metrics to following a structured

methodology for project execution. This approach is fundamental to achieving accuracy, efficiency, and effectiveness in ML applications.

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Science data sharing: applying a disruptive technology platform business model

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Abstract

This research investigated the potential to enhance global science data sharing through market-driven strategies utilizing technology platform-based business models compared to the existing fiat strategy characterized by government-funded programs and highly fragmented information systems. With less than 1% of science data shared globally, and some estimates of data collection time–cost valued at USD billions per year, there is a significant social value to be released in addressing this issue.

Evidence pointed towards a clear market failure to satisfy the unmet needs of a broad community, particularly those residing in underdeveloped countries, and a significant opportunity to release excess value of global benefit (Tirole, 2015). The research has recommended that a paradigm shift in business model towards that of an open platform technology be established that rewards science data contributors based on free-market principles, i.e., centralized standards and data custodianship, but with distributed ownership and with rewards (both monetary and through recognition) based on the valuation perceived by the open market of published contributions to the science data-sharing platform. Van Alstyne et al. (2016) argued that a platform business model that is market driven is expected to be more efficient and cost-effective satisfying the unmet needs of the global community.

Key words: Platform-technology, science, data-sharing, entrepreneurship

Problem Statement and Research Questions

A general problem is that less than 1% of collected science data are shared with the public (Reichman et al., 2011; Wallis et al., 2013), which is a great loss to humanity and a waste of

academic and community resources. Funding for participatory or citizen science (CS) data collection is overwhelmingly regional or localized and primarily dependent on government largesse (Theobald et al., 2015). This limitation has resulted in diverse data repositories that are difficult to locate and access (Bonney et al., 2016), which is a significant part of the problem. There is no dominant technology platform to facilitate science-data sharing, despite the recognition that such facilities would advance environmental awareness (Wallis et al., 2013). Wallis et al. also stated CS data collection is a product of the developed world due to the lack of funding in the underdeveloped world, and this provides an insight into a potential solution to facilitate greater science-data sharing. The marketplace has, so far, failed to establish a technology platform to address this problem of a lack of data sharing (Costa, 2016) and the funding of data collection despite the benefits of community involvement in science (Bonney et al., 2016). Not all markets (in the sense that the science community is a market) lend themselves to a technology platform solution (Spulber, 2019); therefore, it was important to examine whether there is potential to satisfy unmet needs for science-data sharing through establishing a platform that is market driven and relatively independent of government funding.

The question then becomes whether a market disruption opportunity exists for CS projects to reduce their overwhelming reliance on government and other grant-based support that has resulted in fragmented fiat information systems. Would a market-based demand approach using a single platform as a utility, combined with new business models that leverage reward and recognition market forces, create this market disruption, and then become commercially viable?

Various researchers have emphasized that the benefits of using citizen scientists are highly significant (Bonney et al., 2016); however, published results of their data collection are negligible for a variety of reasons, including a lack of publication on data availability, difficulties accessing databases, and inconsistencies in data definitions despite the significant time and monetary costs of data collection (De Filippo et al., 2020).

There were two broad research questions:

1. What are the barriers that impede science data from being shared with the global science community?

2. What are the critical attributes of a market-driven technology platform business model whose mission is to facilitate science-data sharing and satisfy the unmet science community's needs?

Findings

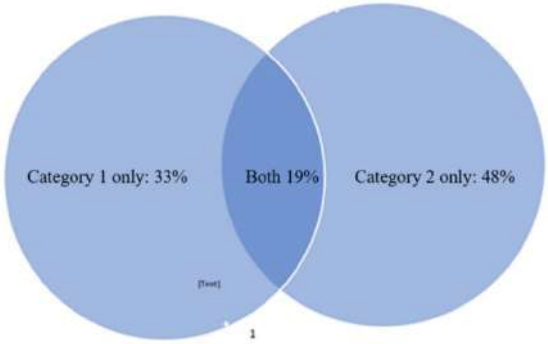
In this study, the citizen science (CS) sector was used as a proxy for the broader science community. Over 500 CEOs of CS organizations were contacted, and 15 responded to the 22 in-depth questions. The questionnaire results identified some particularly strong issues, of which a few are presented:

1. There were differences between the unmet needs of developed versus underdeveloped countries; the latter's unmet needs concerned not only deficiency in resources and funding, but also the inability to communicate issues with both the professional community and the public.
2. Respondents had a strong and consistent desire for the acknowledged primary features of an open science-data sharing platform, in that it must have the attributes of findability, accessibility, interoperability, reusability, and open (FAIR/O) compliant (Chamanara et al., 2021)—indicating an essential requirement. A third of respondents expressed a desire for even the more esoteric data sets to be shared.
3. Overwhelming support was expressed for a commercial platform to be made available that facilitated the monetization of selective published data sets. Financial motivation for sharing data was by no means the primary motivation. Respondents possessed a high degree of civic mindedness, desiring to give back to the community.
4. On the issue of solving the high barrier to establishing a viable critical mass of data, the majority of content providers were willing to take the time-cost risk of providing content in the hopes they would eventually be compensated for their efforts, thereby demonstrating a high degree of trust.

Thematic analysis identified that there is a significant range of unmet needs (48% unweighted) that are not or cannot be addressed by the prevailing global business models. These unmet needs have the potential to be addressed by a paradigm shift to a different business model that is platform based where there are central management controls but decentralized ownership by

data providers guided by market forces as to which data sets are in most demand, and the data set owners remunerated commensurate with the value placed on their data sets based on global market demand.

Figure 1. *Legacy data system owners retain their existing applications for fulfilling their unique needs, and selectively utilize the new platform-based model for unmet needs.*



Discussion

Once a robust technology platform that is FAIR/O compliant has been established (Chamanara et al., 2021), there are essential strategies of the business model that need further compliance to ensure broad acceptance by the global science community and enable the platform to flourish. These strategies differ significantly from those typically experienced by linear businesses.

Establish Frictionless Market Participation

The platform needs to be open to both data consumers and data contributors (i.e., zero direct cost of market participation). Platform monetization should not incur friction for market participants. This action will facilitate a maximum participation growth rate (Page and Childers, 2012).

Focus on the Core Transaction

During the platform launch phase, systems development resources should prioritize the discrete core transaction of value to both parties to the two-sided platform of data contributors and data consumers (Moazed and Johnson, 2016). Sophisticated functions for both sides can be added subsequently. For a science-data sharing platform, the core transactions that provide primary

value creation between data content owners and data consumers include the ability to efficiently publish and search respectively.

Acknowledge Emerging Web 3.0 Concepts

Acknowledgment of emerging Web 3.0 concepts (Garrigos-Simon et al., 2012) of both revenue sharing and enhanced social value are the two most important concepts for a science-data sharing platform to succeed (Rudman & Bruwer, 2016), but they are conspicuously absent in government-funded and controlled data-exchange projects. This acknowledgment involves establishing an equitable revenue-sharing model with data contributors based on the relative popularity of their data sets, as well as establishing effective communication channels to enable the platform community to efficiently interact.

Focus on Unmet Needs

For broad acceptance by the global science community, there needs to be a focus on the unmet needs of market participants of a non-monetary nature (Sun & Zhu, 2013). This focus may take the form of providing recognition to individuals, projects, or organizations that heavily rely on volunteers to collect data in the field, or who take considerable personal risk in collating hazardous community health data, such as Ebola virus outbreak data.

Market Disruption

For a business model to succeed, it needs compelling motivation to overcome legacy industry inertia. The rationale behind this insight was attributed to the Nobel prize winner Nash (1950), who identified markets crave equilibrium and every player believes they are making the best possible decision; consequently, any innovation in a market, by definition, upsets the equilibrium and is met with resistance. Suarez and Kirtley (2012) argued it is difficult, but not impossible, to “dethrone a platform incumbent” (p. 36) by moving the value proposition from what is valued today to what the market will value tomorrow. The science community is not generally known for entrepreneurship, although it is characterized by innovation, as evidenced by huge strides in engineering, information technology, and, more recently, biological sciences spurred by economic and humanitarian demands for a solution to the COVID-19 global pandemic. Christensen (2016) discussed the paradox in which successful managers find

themselves when confronted with a disruptive innovation in conflict with their legacy business model, making their experiences incompatible with a new approach and leading to resistance to a new concept. Christensen emphasized more successful market disrupters do not compete with traditional market leaders head-on, but first satisfy the unmet needs of peripheral market participants who place a greater value on the disruptive technology and, consequently, are more receptive to it. Christensen concluded disruptive technology should be framed as a marketing challenge rather than a technological challenge.

Solve the "Chicken or the Egg" Conundrum

The chicken or the egg conundrum is the most significant and overlooked barrier to overcome for achieving market-building success (Costa, 2016; Moazed and Johnson, 2016; Thiel and Masters, 2014). Initially, focus on a segment of the market where a critical mass can be cost-effectively attained while satisfying both sides of the platform; then, incrementally seek out other distinct segments of the market to satisfy, broadening the market offering.

Platform Organizational Management

Platform businesses have a different organizational emphasis than traditional linear businesses. For a science-data sharing platform, this different emphasis would manifest itself in establishing heightened governance functions within the management organization, particularly in data curation, adherence to data standards, and community communication (Lee & Stvilia, 2017).

Viral Marketing and Platform Valuation

All platforms need to be cognizant of Metcalfe's power law (Metcalfe & Boggs, 1976) to grow their user base—namely, that the valuation of an entity is proportional to the square of the number of users (Gilder, 2018; Parker et al., 2016). Viral marketing techniques have been identified in the literature as being the most cost-effective strategy for promoting platform technology-based businesses (Chakravorti, 2004; Fouad, 2017; Garrigos-Simon, 2012; Kennedy, 2020; Moazed & Johnson, 2016; Parker et al., 2016; Reillier & Reillier, 2017).

Facilitate Market Entrepreneurship

This study identified technology platforms have the propensity to become market disrupters that are significantly more efficient and cost-effective than linear businesses and government-fiat-based platforms (Reillier & Reillier, 2017; Spulber, 2019). To closely emulate independent market forces, the science-data sharing platform should encourage participation by science entrepreneurs who can potentially create incremental value. An example would be by contributing to the long-tail effect (Wallis et al, 2013) of having esoteric data sets that create marginal initial value, but aggregate recurring value over time and fill market niches that otherwise would be overlooked by mainstream science and satisfy the data needs of niche consumers. This market emulation would be particularly valuable to those who can provide data from underdeveloped countries, where project funding is weak or nonexistent, and where a market-based science-data sharing business platform would provide monetary incentives and feedback signals for market participation appropriate to the global market value of their published contribution.

Conclusion

Using platform technology to address the need to share science data efficiently and globally for reuse is surely one of the last significant market opportunities ripe for breakthrough disruption. Science data collection has time costs of many billions of USD per year and growing, the market is highly fragmented, and there are diverse unmet needs.

Artificial intelligence (AI) and machine learning (ML) techniques have made breakthroughs in many industries, but their prerequisite is a standardized pool of big data from which to analyze and identify data correlations and anomalies to make their projections and learn. This application of AI/ML cannot readily be undertaken on data sets that are siloed. Consequently, the potential for this market is significant; yet, why has it not been attempted? The answer is several government organizations have commenced using cloud computing techniques to enable the sharing of science data, but their strategies to establish a workable business model have been mediocre and the costs are prohibitive for many nongovernment entities. It also gives an insight into the lack of entrepreneurial market initiative that big government possesses, as it has completely failed to use free-market business constructs, as referenced in this article.

This research has concluded that there exists a market opportunity to use platform technology to satisfy global unmet needs for sharing and reuse of scientific data, thereby creating an industry for market-driven commercial exchange of science data where one does not currently exist, independent of government fiat. Whether any new market entrants make the same strategic business model mistakes as those of early platform adopters remains to be seen; however, the potential business opportunity for a successful technology platform for open-science sharing is significant and is considered to be worth the commercial risk given the significant social value that can be realized.

Figure 2. *Screenshot of www.ecodb.org which is the implementation of the author's platform for science data sharing based on the conclusions of this paper.*

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The role of digital payments in promoting financial inclusion

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Abstract

Financial management is the application of general management principles to projecting various financial resources. It involves planning, organizing, directing and controlling economic activities. Financial planning is the process of preparing objectives, policies, procedures, programs and budgets regarding economic activities. It ensures effective and adequate financial and investment policies, ensuring adequate funding.

We are going to review this digital transformation, banking sector and their digital security in this research paper.

Keywords : Payment, Digital Transactions, Digital Payment Systems, Digitization.

Objective

The main objective of the presented research paper is to take a look at the challenges of financial security, data security that digital currency has created for India and other countries.

Introduction

A payment is a financial transaction and a payment system is a protocol for making payments and transactions. A payment is made to the shopkeeper or service provider for the availment of a commodity or service, either in cash or through other means of payment.

The world has progressed a lot in terms of technology and many innovative changes are taking place in this technology day by day. All this is possible due to the growing network and usage of internet. Similarly, the use of digital currency has increased in many countries, including India, with the decline in the use of paper notes.

Nowadays, the concept of digital currency has taken root and due to this, India and other countries are facing challenges like financial technology, data security and privacy. Digital currency system is purely electronic digital cash and stored value as "Smart Cards". The purpose of digital currencies is to allow their users to move funds electronically across the ecosystem.

Research Methodology

The presented research paper is based on Future challenges for India's Financial Management and for this the necessary steps to be taken by India have been determined. Present study is based on the Secondary sources of data, as published from Ministries, Government departments, National International Surveys like Economic Surveys, IMF report, RBI report on currency & Finance research Journals, Government documents etc.

Objectives of Research Paper

- To Understanding the digital Payment System.
- To study Advantages of Digital Payments.
- To study Global overview of Digital Payments.
- To study Reason of Digitization in India.
- To study Digital Payments Facts in India.

Finding of the Present Study

What is Digital Transactions:

"Digital transaction' means a cashless payment transaction through a seamless system without affecting either of the two steps. It includes digital/electronic transactions. In this system both the originator and the beneficiary use digital electronic medium to receive and send money."

The following systems should be included in the measurement of digital transactions, viz., RTGS Customer Transactions, NACH, NEFT, BHIM Pay, BHIM UPI, IMPS, ECS, Credit and Debit Card payments, Producer Price Index (PPIs), intra-bank digital payments and closed wallets (where feasible).

Advantages of digital payments

Some of the key benefits of using digital payments are as follows:

- Person to Person (P2P) and Person to Merchant (P2M) payments give customers 100% coverage of payment transactions
- Truly interoperable payment system running round the clock with participation from both banks and non-bank entities
- UPI also allows for multiple methods for integrating merchants - QR based payments being the most popular. In just 5 years, over 100 million UPI QRs have been deployed in the market for accepting merchant payments, from only 2.5 million devices that were accepting merchant payments prior to this.
- Support for all sources of funds viz. Bank Account, Pre-paid Wallets, Overdraft Account etc. Fully digital on-boarding which does not require any brick and mortar branch visits.
- Low cost QR code based physical acceptance aided by in–app, web and intent based payments.
- Fully compliant with international security standards and certifications.
- Payments are UPI ID based, providing higher security and confidentiality to the Users.
- Enables contactless payments across all channels like mobile, ATM, internet and Mobile Banking.
- In short, UPI's large number of benefits has truly transformed the country from a cash-dependent economy to a nation known for its digital payments landscape.

Benefits of UPI for Merchants and Customers:

For Merchants	**For Customers**
1) Secure and convenient way to receive payment directly in bank account. 2) Low cost infrastructure for receiving payment – QR Code. 3) No need to handle cash. 4) Zero MDR.	1) Round-the-clock availability. 2) No sharing of sensitive data. 3) Simple user interface including ease of raising complaints.

5) No risk of storing sensitive data. 6) Collect functionality. 7) Suitable for both online and offline merchants. 8) Integration into real-time payments. 9) Access to large database of customers using UPI payment mode. 10) No need of storing customers bank or financial details	4) Convenience and affordability (no cost/ very low cost). 5) Availability of apps with simpler interfaces. 6) Suitable for payments without exposing account details. 7) Convenient for high frequency low value merchant payments. 8) Multiple options (Apps) available for to the customer. Customers can choose from BHIM, individual bank as well as non-bank Apps. 9) Financial inclusion due to low cost and ease of operation. 10) Creates Digital financial footprint for users which enables access to credit and other financial services

Global overview of Digital Payments:

Digital payment system has been adopted by almost all the countries; due to digital transactions every country can keep transparency on all transactions. Every country in the World has developed its own payment app for these digital transactions and it has been used by the people of the World during the terrible epidemic like covid19. In the year 2020 alone of covid19, around 70 billion digital transactions took place worldwide. As the trend of digital payments continues to grow, experts predict that the value of digital transactions will reach US$8,562 billion in 2022.

Reason of Digitization in India

The Indian government implemented demonetization in November 2016 by demonetizing Rs 1000 and Rs 500 notes overnight. Its main objective was to eliminate fake currency notes and make all transactions transparent. Before demonetization, 90% transactions were done in cash

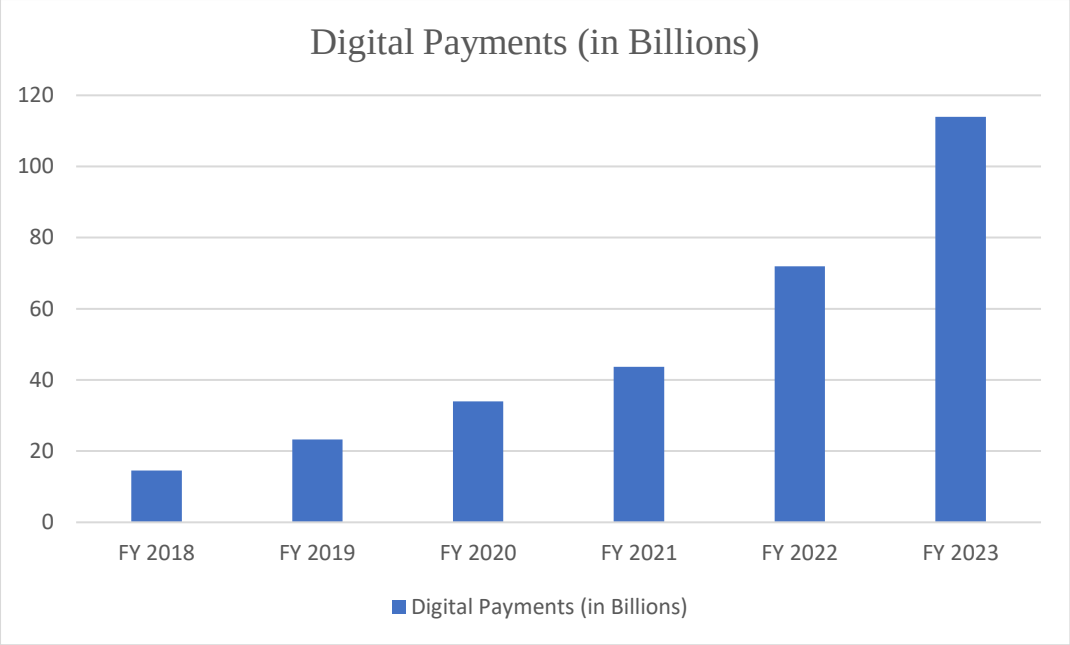
in India, but in order to bring transparency to all transactions and to reduce cash transactions and emphasize online digital and secure transactions, the Government of India launched BHIM Apps in December 2016, after 2017 many apps like Google Pay, Phone Pay, Paytm etc. was launched. The main objective of which is to increase online digital transactions only and stop cash transactions.

Due to modernity and technology, everyone has access to smart phones and internet, so it became easy to send money from one account to another through apps. In the beginning, there were some errors in these apps, but in India, according to the instructions of RBI and NPCI (National Payments Corporation of India), emphasis was placed on making digital transactions more secure.

Total number of digital payments across India from financial year 2018 to 2023(in billions):

Financial Year	**Digital Payments (in Billions)**
FY 2018	14.59
FY 2019	23.26
FY 2020	34
FY 2021	43.74
FY 2022	71.95
FY 2023	113.95

Source : Statista Research Department, Nov 20, 2023.

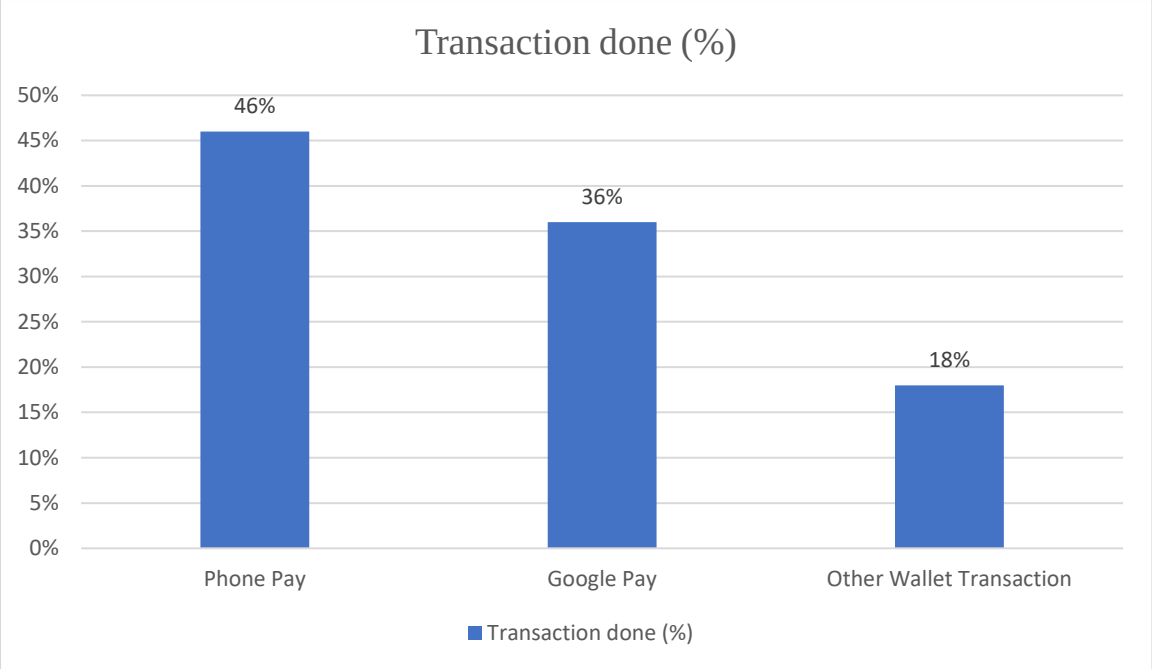


Digital payments in India were 14.59 billion in FY 2018 and 23.26 billion in FY 2019. 34 billion in FY 2020, 43.74 billion in FY 2021, 71.95 billion in FY 2022, and 113.95 billion in FY 2023. This means that the number of people making digital payments in 2018 was only 10% compared to 2023. This means, the number of people making digital payments in India is increasing day by day.

Digital Payments in India 2023 Oct-Dec (4th) Quarter's Report:

Payment Service Provider	**Transaction done (%)**
Phone Pay	46%
Google Pay	36%
Other Wallet Transaction	18%

Source: Statista Research Department, 2 Jan 2024.



In Q4 2023, Phone Pe had the highest share of Unified Payment Interface (UPI) usage in India at 46%, Google Pay at 36% and 18 percent using other Unified Payment Interface (UPI). This means that Phone Pe is at the forefront of making digital payments in India.

Conclusion & Recommendation:

Due to epidemics like covid-19 the world lost contact with other countries, a huge amount of digital transactions took place during 2020-2021 to prevent the spread of covid-19 from one person to another through physical contact with currency notes. Therefore, the risk of infection was avoided by touching one person to another person. Since then digital transactions have been considered socially safe in other countries including India.

But with the rapid growth of digital banking or digital currency system in India and other countries, technology, data security and privacy in the financial sector have not improved enough. Therefore, India and other countries should implement more stringent cyber security measures to curb the prevalence of digital fraud so that customer data is protected in this technological change in the financial sector.

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Machine Learning Algorithms to Identify Cyber Threats Using Logistic Regression

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Abstract

The threat of cyber-attacks is expanding globally; That is why companies are developing intelligent artificial intelligence systems that can analyze the data security of their system department and other infrastructure protocols and detect cyber-attacks quickly and automatically. Machine learning-based data security analysis The next big thing in cyber security is machine data, which aims to mine data security data due to the high maintenance costs of static rules and association methods. However, choosing the right machine learning technique for log analysis using ML remains a major obstacle to the success of AI in cybersecurity, due to the potential for a significant number of false positives in a large-scale or global Security Operations Center (SOC). settings, choosing the right machine learning technique for security log analysis remains a major barrier to AI success in cybersecurity. Detecting cyber threats requires machine learning technology that can minimize false positives. Current and machine learning methods for threat detection often use logistic regression. Logistic regression is the first of the three subcategories of machine learning – supervised, unsupervised and reinforcement learning. Any machine learning enthusiast will encounter this supervised machine learning algorithm early in their machine learning career. It is an important and commonly used classification algorithm.

Keywords: Regression analysis, Machine learning, Cyber threats, SOC, MLAW.

Introduction

Cyber security refers to the policies, defenses, technologies and structures implemented to protect software, data, networks and computers against illegal access, damage and cyber threats [1]. The computer network and its applications are one of the fastest growing

components of information communication technology (ICT); thanks to this promise, cyber threats are also increasing and gaining a foothold in the cyber world [2]. Individuals, research institutions, companies and governments have suffered significant losses and inconveniences due to cyber threats. Many efforts have been made by industry, research institutes and governments to limit the activities of intruders. However, all operations [1] must be controlled to deal with intruders.

Many companies are approaching the physical limits of collecting, analysing, normalizing, searching, analysing, visualizing and exploring cybersecurity data collected by security information and management (SIEM) systems. In all SOCs, conventional SIEM devices are designed to statically investigate information security disturbances and provide alerts on potential cyber threats. Many SIEM systems rely on static threats to report security issues and monitor incident response. Often these static rules need more context and expected behavior. More operational costs are required to not provide the real-time data analysis capabilities needed to detect advanced and sophisticated attacks [3]. Timely identification and resolution of static problems is the solution to quickly solve cyber-attacks. The SOC plays a key role in recording case responses and displaying patterns and results.

ML ANALYTIC WORKFLOW(MLAW) FOR THREAT DETECTION

Traditional monitoring, enhanced by hands-on and adaptive machine learning threat hunting, is increasingly seen by modern organizations as an integral part of all security monitoring portfolios. Due to the noise in security log data, it is necessary to use basic ML models such as classification, regression and prediction algorithms to find anomalies, and new models to deal with insider and cyber risks to detect advanced cyber-attacks. Machine learning-based security analytics should use an efficient workflow to enable efficient data pre-processing before using an appropriately qualified ML predictor or classifier for subsequent data analysis (see Figure 1).

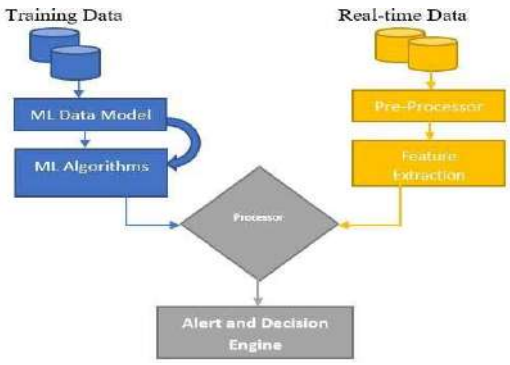

Fig 1. Machine Learning Analytic workflow for threat identification

The workflow described above can help mitigate these problems by compressing the massive flow of security events into a few outliers and providing security analytics that contain potential clues about malicious behavior that can be used to identify and hunt down cyber threats. Analysts should choose algorithms that best represent the data and produce the fewest false positives because different types of security incidents respond well to different types of algorithms [3, 4]. The workflow of ML with analytical capability to find cyber vulnerabilities is shown in the diagram above.

CASE TAXONOMY OF CYBER THREATS

Here we are talking about few machine learning based analysis projects successfully completed by MIT Research for cyber threat detection. The taxonomies developed by MITR Engineering, known as MITRE (ATTandCK, CAPEC, MAEC), are the standard references for cyber threats [5]. The MITER ATTACK Framework is a curated data source that tracks threat actors and #039; counter-cyber strategies and approaches throughout the attack lifecycle. The framework is designed to improve an organization's security rather than simply gathering facts.

Broman deret al.[3] relates, discusses and recommends some suitable projects such as ATTandCK and CAPEC. The former describes a wide range of post-compromise approaches,

Persistence	Privilege Escalation	Defense Evasion	Credential Access	Discovery
Lateral Movement	Executions	Collection	Exfiltration	Command & Control

while the latter lists the most common attack patterns of cyber-attacks life cycle. The scope of MAEC is limited because it only contains an explanation of malware-specific standards [5]. In addition, Lockheed's instructions for the pre- and post-compromise phases do not distinguish between the methodologies and techniques used in the different phases of the attack.

Fig 2. MITRE ATT&CK TechniqueMatrix [5]

The table below (see Table 1) discusses some attack use cases and separation of functions. These use cases are built on the MITER framework and help understand the real-world technical details behind the models and their use.

Techniques	Example Use Cases
Data processing and Execution	Anomalous data execution
Patten Discovery	Prediction of threats
Feature Extraction	Data rate analytics andvisualization
Exploitation	Parent-child threat analytic

Table 1. Online attack use cases and feature extraction

LOGISTIC REGRESSION=MODEL (LRM) IN MACHINE LEARNING

Logistic regression is an ML approach primarily used for classification in machine learning that uses supervised learning to estimate the probability of a target variable. The following logistic regression models can be classified based on their use.

2.1.Binary Logistic Regression Model (BLRM) This is the most commonly used logistic regression model, commonly known as BLRM. It helps classify the data into two categories and predict the value for new inputs that match one of the two groups. For example, a cyber-attack can be either real or fake, but never both.

2.2.Multinomial logistic regression model (MLRM) This method helps to classify the target groups into two different categories - regardless of the mathematical meaning. One example predicts what clothing preferences a person is likely to order based on their ethnicity, culture, region of origin and past experiences.

2.3. Ordinary Logistic Regression Model (OLRM) This OLRM model is mainly used to classify the target variable. For example, a student's exam performance may be classified as inadequate, data inadequate, solid, or excellent. As a result, the information is divided into three unique groups, each of which has its own meaning [5].

USE CASE OF A LOGISTIC REGRESSIONTO DETECT CYBER-ATTACKS

According to some scientific reports in China, Chinese companies lose 20 billion yuan every year due to cybercrimes through malicious URLs [2]. URLs are the foundation of all such internet activity. Machine learning (ML) algorithms have attracted the attention of researchers in several fields, including healthcare, fintech, weather forecasting, stock market forecasting, banking forecasting, anti-money laundering (AML), agriculture, etc. [6].

An algorithm based on ML logic can be run on massive amounts of data to find patterns in the data and predict/classify fresh data leads from the same source. In recent years, the characteristics of machine learning algorithms have made them increasingly popular among researchers for use in various cyber security applications, such as intrusion detection, malicious URL classification, anomaly detection, cyber-attack prediction, cyber-crime true or false classification, cover detection. and so on [6].

The proposed model classifies the destination URL using logistic regression (LR). This method predicts the result by combining three important modules: data exploration, feature extraction and classification, as shown in Figure 3. Logistic Regression (LR) is used to classify the target URLAs shown in Figure 1, this approach consists of four main modules:

(i) Data collection and exploration
(ii) Feature extraction
(iii) Training and Classification
(iv) Model Evaluation

2.4. Data Exploration

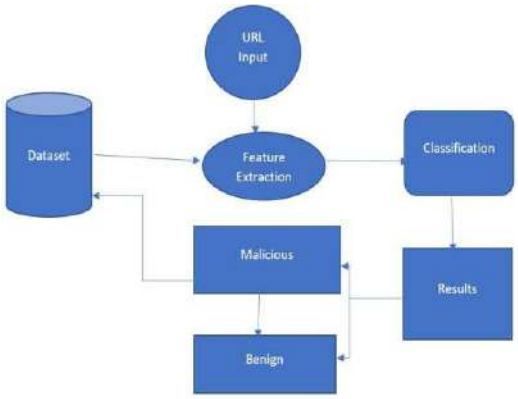

Fig3. Architecture for a LogisticRegression flow

Public repositories from Git Hub, Kaggle and Phish Tank can be used to obtain sample data. The data can then be divided into two groups based on tags and URLs. It is possible to remove customer-specific highlights from the data. Several pieces of information can be used to identify an HTTP or HTTPS connection, such as the URL, IP address, country name, and URL length.

Decomposition of functions

The proposed framework divides all functions into three main types according to their structure and arrangement. Host, domain and language features are three classes of features [7]. Hosting specific features include country name, hosting sponsors and website design and development technologies. Most Jakarta Server Pages (JSP), HTML and PHP websites design and build phishing websites to avoid suspicion. Rules are also based on continents and countries [13]. The government has other practices that affect the classification of these objects [7, 13, 14].

To achieve this, hackers and criminal activists buy hosts from uncaring patron states with lax cybercrime policies. Researchers can linearly model a nonlinear relationship by applying a logarithmic transformation to the outcome variable [7, 8]. The logistic regression equation is shown below (see equation 1).

$$LR = \log (p /(1 – p)) \quad \ldots. (1)$$

Equation 1. Logistic regression equation where (p/1-p) is the odd ratio.

The most common dynamic malware domains are *.TK, *.CC and *.COM. In most cases, these URL owners allow the domain to expire [7]. The main difference between malicious and benign URLs is that the server partition size is more important for malicious URLs. Paypal.login.itpay.com is one example of a URL that appears to be related to Paypal and is used for financial purposes. However, the most popular domain itpay.com is not necessarily related to PayPal [7]. Therefore, server and domain length are critical to detect fraudulent URLs. Dictionaries include several features such as the number of dots in a URL and keywords that indicate whether a URL is malicious or benign. Popular websites warn about such terms to protect users from identified threats.

5.3 Training and classification

Logistic regression is used when binary class identifiers are available. In general, regression is a method for predicting the characters of a regression class. Linear, multiple, polynomial and non-parametric regression are more different regression methods. The confusion matrix is used to show the results of RL and is nothing but the real vs. Predicted values [9, 15, 16].

This allows us to determine the correctness of the model and and avoid overfitting. The confusion matrix and its help in identifying cyber threats can be found in the image below (see Figure 4). For accurate prediction, the confusion matrix provides accurate true positives and negatives. The fewer false positives or false negatives in the confusion matrix, the better the research results. This provides high confidence in the outputs and procedures of performance techniques. Details can be seen in the image below.

Predicted

True Positive	False Negative
False Positive	True Negative

Bad

Good

Actual

Bad

Fig 4. Confusion Matrix showing the accuracy of the model on cyber threat identification

5.4 Model Evaluation

The input or interface to performance monitoring is how the data and performance statistics collected by the components of the logistic regression (LR) model are communicated to the data collector. Based on the output and model fitting parameters, the ML model evaluation unit analyzes the performance monitor (PM) data to decide when and where retraining of the new model is necessary. For this purpose, a policy based on a threshold value (update is required when the PM data exceeds a certain value) or pattern recognition studies [13, 17] can be used.

5.5 Model Update

Instruction dataset that has been compressed with recently acquired data, depending on the circumstance [13, 14]. A completely different model design is also an option if the previous two options are insufficient. In any case, utilizing correct network data to train models using MLAW may lead to variations in model performance. Therefore, some retraining with current world data is usually recommended before using the proposed models in real network situations. Updating the model is very critical to better maintain the model output with new information from time to time and over time.

Recommendation for futurework

As telecommuting becomes more common in the work-from-home culture, cyber threats are becoming a major challenge for employers worldwide [10, 11]. Every organization should be concerned about cyber security. However, don't be afraid of computers or technology; it is the human element, the often unreliable and most fragile link in the safety net. User-specific errors can result from unsafe practices, ignorance of digitized globalization, or noncompliance with security protocols [12]. Organizations cannot ignore innovation to survive in the global economy, but they also need to protect business and employee privacy with older ML

algorithms [14]. In addition, the above research illustrates the framework for applying logistic regression as a case study. Before future researchers reach this point, they must invest critical effort in developing features to detect new and ever-changing cyber threats. Many organizations use ML algorithms without understanding their underlying assumptions or cyber data models. However, now is an opportunity to research and implement a solid framework for fighting a future cyber war.

Conclusion

This paper provides examples of how machine learning analytics can be used to improve cybersecurity monitoring and explore the best algorithms for typical cyber threat scenarios. ML-based analytics is a powerful tool to deliver context learning about security events, resulting in a low probability of false positive security alerts. In addition, machine learning analytics are suitable for evaluating big data security events and feeding deviations from normal baselines as indicators of potential malicious activity or as indications for proactive threat hunting operations. Detecting malicious URLs is a critical activity that must be thoroughly performed before processing cyber data over the Internet. It shows how logistic regression is used to identify dangerous URLs. Malicious URL detection is a recursive process that involves data collection, feature extraction, and model training. Finally, system performance is evaluated using specified metrics and frameworks such as precision, accuracy, recall, and false positive rate.

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Analysis of Cyberthreats Using Techniques of Machine Learning

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Abstract

At this time, most of the economic, commercial, cultural, social and governmental activities and relations of governments at all levels, including individuals, non-governmental organizations, governments and government agencies, are available online. Many private companies and government agencies around the world have faced the challenges of cyber-attacks and wireless communication technologies. Today's society relies heavily on electronic technologies, so protecting this data from cyber-attacks is a difficult problem. The goal of cyber-attacks is to financially disrupt businesses. Cyber-attacks can also hit military or political targets, depending on the circumstances. Data distribution services (DDS), computer viruses and other attacks are some of the damage that can occur. Different companies use different methods to prevent damage from cyber-attacks. New variants are created every day, increasing the number of attacks by 56%. Some argue that cybersecurity is closely tied to the rise of machine learning and artificial intelligence for new technologies and platforms. This study explains how to analyze cyber threat attacks in the literature. This document covers a wide range of cyber-attacks, including malicious detection, threats, email spam and intrusion detection. As a result, methods are being taught to detect and mitigate attacks on networked systems.

Keywords : Artificial Intelligence, Cyber Security, Data Security, Machine Learning, Threat Intelligence.

Introduction

A cyber threat is defined as any activity that aims to compromise the security of an information system by affecting the availability, integrity, or confidentiality of the system or the information it contains, or to disrupt digital life in general. A cyber threat environment

is an online area where cyber threat actors engage in destructive cyber threat activity. This includes the online networks, devices and processes that cyber threat actors can target, as well as the tactics that malicious attackers use to attack these systems.

Literature survey

Detect phishing websites using machine learning Phishing:

This happens when a criminal sends a fraudulent message from a legitimate source. By clicking on links and attachments in emails, your personal information may be stolen or your computer may be infected with malware. In the past, phishing attacks involved large-scale cyberattacks targeting large groups of people. The goal is to trick more people into opening malicious files or reading malicious links. There are several ways to detect this type of attack. One strategy is to use machine learning. The machine learning model receives the URL provided by the user, processes the input and displays the results to indicate whether it is phishing or not.

Many Machine Learning (ML) methods can be used to classify these URLs, such as SVM, Neural Network, Random Forest, Decision Tree, XG Boost, etc. The proposed approach includes Random Forest and Decision Tree classifiers. The recommended methods effectively discriminated between genuine URLs and fraudulent URLs, with an accuracy of 87.0% for the Random Forest classifier and 82.4% for the Decision Tree Classifier.

Malware detection using machine learning based on a combination of dynamic and static features:

The machine learning model receives the URL received from the user, processes the input, and displays results that indicate fraud or not. Many Machine Learning (ML) methods can be used to classify these URLs, such as SVM, Neural Network, Random Forest, Decision Tree, XG Boost, etc. The proposed approach includes Random Forest and Decision Tree classifiers. The recommended methods discriminated well between genuine and fraudulent URLs, with an accuracy of 87.0% for the Random Forest classifier and 82.4% for the Decision Tree classifier. Our approach to malware detection uses a variety of machine learning techniques, including decision trees and random forests. Choosing the algorithm with the highest accuracy will give the system the best detection rates. In addition, the shame matrix is used to evaluate the false positive rate and false negative rate to evaluate the

efficiency of the system. Intruder detection system using machine learning techniques. As usage increases, issues of privacy, availability, and reliability of computer networks arise. This requires network administrators to use various intrusion detection systems (IDS) to monitor network traffic for malicious and unauthorized behavior. When a security strategy is seriously violated, it is considered a breach. Therefore, the intrusion detection system monitors network traffic passing through the computer system for malicious activity and known threats, and notifies the user when it is detected. Malware-based detection and signal-based detection are two aspects of malicious behavior detection. An IDS collects and analyzes information from both scenarios and combines it with attack signatures stored in large databases. The second type of detection, anomaly detection, treats anything that deviates from normal behavior as malpractice. This is a brief overview of the various approaches taken to build successful IDSs using single, hybrid, and ensemble machine learning (ML) algorithms, each tested using different datasets.

Methodology

K Nearest Neighbors: The KNN (K-nearest closer) classification method is a simple and mature data mining algorithm. The main thing is that students belong to the same group if most of their neighbors also fall into that category. A one-dimensional or multidimensional image classifier used to represent a pattern based on approximation is called K-approximate, where the approximation criterion is the Euclidean distance of the image vector. In the interference detection algorithm, an n-dimensional vector is used to represent nodes such as a1, a2, etc. , AN. The number of routing messages that can be sent in a session is , the number of nodes that send routing packets to different points, and the number of nodes that have the same source at the same time. Some students are receiving a scholarship. size Nodes of the same type perform the same function. Therefore, different nodes are detected.

Support Vector Machine: Support Vector Machine (SVM) has become one of the industry standard tools for machine learning and data mining since its first introduction in the mid-1990s. SVM was designed with binary classification in mind. However, cyber attack detection is a multi-class classification problem. The question of how to properly extend SVM for multiclass classification is still under research. There are now two multiclass SVM

methods: One approach is to integrate multiple binary classifiers and another is to consider all training data directly into a single optimization model. SVM determines the optimal separation distance (frame and maximum margin) between two classes of training samples in the segmentation space by focusing on the training samples at the edges of the class descriptors. This way, not only is a good plane better, but fewer training samples are used efficiently, because the classification is more accurate with less training data.

Random Forest: Cluster classification to increase accuracy is called RF (Random Forest). Many decision trees are random forests. Compared to other existing classification algorithms, random forest has a low classification error rate. Node splitting criteria are number of trees, minimum node size, and number of features. Advantages of RF are: 1) Forest records can be saved for future reference. 2) Random forests were the biggest problem. 3) RF precision and difference significance are automatically generated. When creating individual trees in a random forest, the best node is randomly selected to split it. This value is equal to A because A is the number of elements in the data set. However, RF produces noisy records, which reduces accuracy and produces inferences about new models.

Decision Tree: One of the most widely used classification methods is the decision tree algorithm. A decision tree is a graph like a decision tree. Things are classified according to conditions related to the whole structure, from tree and root to leaves. Internal nodes are assigned to classifications, branch nodes are associated with test results and #039; The data with the least impurities were selected. Entropy is used to measure this impurity. The more entropy, the more impurities

Modeling and analysis

Intrusion Detection Dataset of Network: A dataset containing several simulated installations in a military network environment has been made available for evaluation. We created a setup to simulate the US Air Force LAN and get raw TCP/IP dump data for the network. Many attacks happened on the LAN and were focused as if it were a real situation. A connection consists of a series of TCP packets that start and stop at specific times and allow data to flow from a source IP address to a destination IP address according to a specific protocol. Each link also has a label indicating whether

it is a general link or an attack from a specific attack class. The maximum length of a linked record is 100 bytes. For each TCP/IP connection, we obtain 4 quantitative and qualitative components (quality and 38 quantitative) from normal and attack data. There are two types of class variables:

- Normal
- Default

Malware Detection Dataset: This dataset is the result of research on machine learning and malware detection. It was created with the help of the Python library and the negative and beneficial information from the PE file. The csv file has 78 columns, 19611 unique values.

Phishing dataset: One of the challenges in research is the lack of reliable training datasets. Every field researcher faces this challenge. Despite the growing number of studies discussing the use of data mining techniques to identify phishing websites, there is no reliable training data set that is publicly available. Due to the lack of research on the exact characteristics that define phishing websites, it is difficult to create a dataset that includes all available characteristics. In this article, we will discuss the main features that have been found to be accurate and useful for detecting phishing websites. We've also updated some previous features while testing new rules for popular plugins.

Result and discussion

Performance Evaluation: Accurate detection of cyber threats is essential to ensure system security and prevent attacks. We use evaluation metrics to determine how well the model detects threats. Evaluation metrics use test data output from machine learning models. For this study we used the following evaluation criteria:

1. Confusion Matrix:

Table 1. Confusion Matrix

	Predicted as Normal	Predicted as Threat
Actual Labeling as	TP	FN

Normal		
Actual Labeling as Threat	FP	TN

2. *Precision:*

The precision is a percentage of the total number of positive instances classified to the total number of positive instances.

$$P = TP / (TP + FP)$$

3. *Recall:*

The recall is calculated as a percentage of precisely classified positive instances divided by the aggregate of positive instances categorized in the dataset.

$$R = TP / (TP + FN)$$

4. *F1 Score:*

The F1-score merges a classifier's precision and recall into a single metric by taking their harmonic mean.

$$F1 = 2 * (P * R) / (P + R)$$

We evaluate all models against three threats: web phishing, intrusion detection, and malicious attacks. The results of our example are as follows:

1. *Web Phishing:* Web phishing is a form of hacking that attempts to steal financial information and other sensitive data from Internet users. Hackers trick users into believing that the secret websites they visit for confidential information are real or genuine. Solutions to attack website phishing include heuristics, blacklists, whitelists, and machine learning (ML) techniques. There are few new methods to identify phishing websites that use ML algorithms. This study provides a solution to the phishing problem on websites based on ML methods. Most of the reviewed approaches focus on powerful ML techniques such as Random Forest (RF),

Support Vector Machine (SVM) and other studied and established ML techniques. The classification accuracies of decision trees and random forests were 95% and 96%, respectively. However, compared to decision tree and random forest classification algorithms, SVM and KNN have a low accuracy of 57%.

Sr. No.	ML Model	Precision	Recall	F1 Score
1	KNN	0.57	0.57	0.57
2	SVM	0.32	0.57	0.41
3	Random Forest	0.96	0.96	0.96
4	Decision Tree	0.95	0.95	0.95

2. *Intrusion Detection:* Another cyber threat to cyberspace is malicious intrusion into computer networks and devices. These interferences are used to identify networks and their weak points. Intrusions expose computer systems and vulnerabilities, enabling other attacks. Intrusion detection systems are used to prevent such intrusions. There are three categories of interference: hybrid, anomaly, and signature/malware. Interference can be detected on the network or on the host computer. Current methods cannot keep up with the speed of intrusion detection. Decision trees and random forest classifiers show 100% accuracy, better than KNN and SVM. KNN showed 98% accuracy, while SVM showed 83% accuracy.

Table 3. Intrusion Detection Results

Sr. No	ML Model	Precision	Recall	F1 Score

.				
1	KNN	0.98	0.98	0.98
2	SVM	0.69	0.83	0.76
3	Random Forest	1.00	0.99	0.99
4	Decision Tree	0.99	0.98	0.99

3. *Malware Attack:* Malware is software installed to disrupt computer performance and damage electronic data. It is also called malware. Viruses, worms, ransomware, adware, spyware, ads, and trojans are examples of the main malicious categories. Malicious code can prevent your computer from working normally. The increased use of computers and mobile devices has made it easier for thieves to compromise data integrity. In addition, malware interferes with access to computer and network resources. Machine learning methods used for malicious detection include decision trees, random forest classification, support vector machine, and k-nearest neighbor (KNN) algorithm. Research in machine learning and malware detection led to this dataset. It was created with the help of the Python library and the negative and beneficial information from the PE file. Using the data we collected, Decision Tree showed an overall accuracy of 99.90%, Random Forest classifier showed an overall accuracy of 99.90%, and KNN showed an overall accuracy of 98% However, in the faulty software, SVM achieved an accuracy of 75%.

Table 4. Malware Attack Results

Sr. No.	ML Model	Precision	Recall	F1 Score
1	KNN	0.98	0.98	0.98
2	SVM	0.81	0.75	0.64
3	Random	0.99	0.99	0.99

	Forest			
4	Decision Tree	0.99	0.99	0.99

Conclusion

Cyber threats are on the rise. Traditional security measures cannot handle these attacks. The limitations of current security systems are being overcome through machine learning technology. Machine learning technology has been activated on both the defensive and offensive side. We compared the ability of the three learning models to identify and classify damage, spacing, and interference. We compared the evaluation results in terms of recall, precision, and accuracy using commonly used benchmark datasets. As discussed and concluded in the previous section, no specific learning method can be provided for all cyber threat detections. Different learning models are used for different cyber risks. On the other hand, many authors have tried to address the limitations associated with machine learning methods. As we mentioned, we recommend using new benchmarks to test new developments in machine learning for cyber threat detection. The available data sets are missing values and are not differentiated enough to support sophisticated attacks. Security-related goals require a specific learning model. In the future, we will focus on exploring other learning methods to identify cyber threats.

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Cybersecurity Threat Intelligence Using Data Mining and Artificial Intelligence Techniques

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Abstract

Threat intelligence is the acquisition of evidence-based knowledge about current or potential threats. The focus of threat intelligence is to improve efficiency and increase effectiveness in terms of analysis and prevention. Cybersecurity is a major concern for many organizations, as most of them use data devices connected to the Internet, which opens the door to cyberattacks. Good threat intelligence in the cyber domain requires a knowledge base of threat intelligence and a thoughtful way of sharing this knowledge. This study makes a clear case for advanced artificial intelligence (AI) technologies to be used to detect cyber attacks. Data analytics can be used to guide Internet-connected and industrial systems, such as smartphones or factory robots, on what to do when an incident occurs. AI technology analyzes past events, summarizes expert knowledge, and continuously adjusts or updates new areas as it explores new events. In addition, many data mining methods are used to increase the threat reliability of the cyber security data being studied. We finally talked. Robotic AI is the combination of external threats that the machine can read and improve data efficiency and accuracy for the unique framework of each intelligent organization.

Keywords : Artificial Intelligence, Cyber Security, Data Security, Intrusion Detection, Internet of Things (IoT), Threat Intelligence.

Introduction

In today's digital world, every organization is connected to various technologies, work methods and processes. This helps cyber attackers to roam freely in your work environment. Every organization is likely to be affected by the flow of attackers and hackers. It focuses on large and small organizations in the public and private sectors. Therefore, cyber security tools, techniques and algorithms are needed to uncover cyber attackers and threat tactics. Cybersecurity refers to the set of algorithms and techniques used to protect the integrity of computers, networks and data from damage, attacks and illegal access.

Large organizations own petabytes of data containing critical and sensitive information, and it is important to protect the data from malicious access and threats. Security defenses are made taking into account common attacks (manipulation of known vulnerabilities), advanced attacks (exploitation of complex vulnerabilities) and new attacks (new attack vulnerabilities). Information systems include aspects of organizations, including production, operations, and administration departments [3].

These advances require reliable technology and information security systems. Cybersecurity protection includes employee awareness, rapid identification of intrusions, and analysis of unexpected and new threats that have never occurred in the system before. Cybersecurity should reduce malicious and false alarm techniques.

Despite many preventative measures, including antivirus, encryption and firewall installations, organizations continue to suffer at an alarming rate. The most vulnerable companies that require threat detection are commercial banks, credit card holders, and the telecommunications industry [8]. Some of the common cyber-security threats are:

- Abuse of information technology services by attackers to achieve their goals.
- Unauthorized access to confidential information without the owner's consent.
- Cyberattacks disrupt large amounts of data in communications technology, healthcare, and generally disrupt e-commerce environments.

As large amounts of data are generated, there is a need to develop threat intelligence systems that can identify criminal patterns and anonymous activities [20]. Because cyberattacks can have many unexpected consequences, it is important to understand the

patterns of cyberattacks and take appropriate action when they occur. Reduce your organization's cybersecurity risk by identifying cyber threats.

The primary goal of cyber security is to protect systems and data from malicious cyber threats. Cyber threats take many forms, including viruses, malware, intelligence gathering, and application downloads across multiple domains (see Figure 1). The increase in cyber security attacks in recent years has created a requirement for automated threat analysis at all levels of an organization or enterprise [18]. Cyber security is of great concern to various organizations as most of them use data tools that open the door to cyber attacks. As cyber attacks become more global and organized, governments have decided to spend money and time to identify measures to prevent various threats [7]. The financial market is an important part of our country's economy.

Financial threat protection through better algorithms and accurate analytics helps protect against financial risks and predict financial situations.

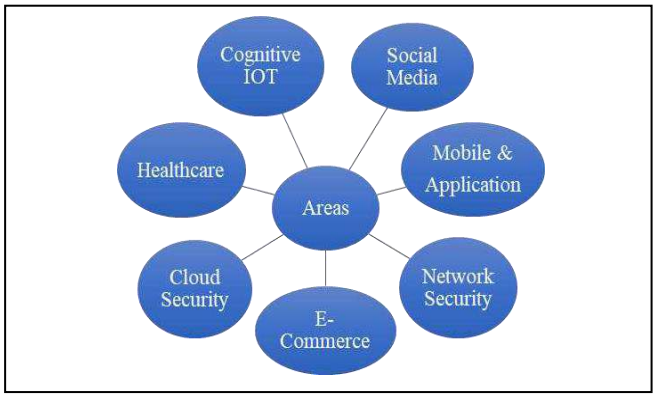

Fig. 1 Research Areas of Cyber Security

Current threat scenario analysis methods are not sufficient for large-scale implementation. Feature extraction and feature selection are important tasks in data processing to identify threats using data mining techniques in the field of artificial intelligence, but these tasks consume when studying different data from different sources. It is food and challenge [9].

The main problem is big data, which generates structured and unstructured data at a high rate, which poses a threat to privacy protection [1]. Organizations have adopted a variety of tools and techniques for intrusion detection and network monitoring, but managing diverse data sets

is a complex problem. Therefore, security agencies need to develop systems that can collect, connect and act as a source of diverse data sets to help in the long term.

The objectives of this cyber threat intelligence literature review are:

1) To investigate artificial intelligence benchmarks and techniques for determining threat intelligence.
2) Determine the credibility of threats based on the amount of data collected.
3) To study threat detection patterns among cyber security issues using statistical analysis.

Based on the first three topics, RQ1, RQ2 and RQ3 are explained.

4) Study the data security challenges facing the industry and take steps to overcome these challenges.
5) Analyze ethical concerns raised by AI processes, evaluation methods and models developed to improve Internet-connected systems.

RQ4, RQ5, and RQ6 are discussed in Sections 4 and 5.

Current technologies for cyber security are not very effective. Once a threat is detected, it takes a long time to recognize it [22]. Some attackers have changed their attack methods, but in general, there are few similar actions. These common behaviors allow analytical methods to identify malicious programs. Analytics is a discipline that uses mining algorithms and software tools to process large amounts of data to produce results in a timely manner.

Data mining techniques play many roles in the field of security, such as threat analysis for infrastructure services, electronic logs, monitoring and intrusion detection in data warehouses. Various methods and algorithms including classification, clustering, prediction, fuzzy logic, artificial neural network, support vector machine and genetic algorithms have been studied to detect malicious users and patterns [15]. Classification is used to recognize patterns and statistically analyse data based on a collection of similar characteristics. Categorization allows you to group different cyber-attacks together and then have the opportunity to detect threats as

they occur. Predictions can be used to detect future hidden attacks based on information learned from user behavior.

Stematic review

Before presenting this systematic review (SR), we attached six research questions (RQ) related to cyber threat awareness issues. Failure analysis in current data mining techniques and artificial intelligence techniques used to solve threat problems were considered and studied. A solution to the RQ framework is included in the review. Questions that do not discuss the written solutions in the SR will be considered with additional research. The following research questions will be analysed in this analysis.

RQ1: Threat intelligence approaches are important for detecting malicious activity in an organization's network systems.

What key indicators and methods of data mining and artificial intelligence are used to determine threat intelligence ?

RQ2: Although there is a lot of data available, it is difficult to determine the reliability of threats based on collected data alone.

What advantages does data mining technology offer to increase the threat credibility of collected cyber security data?

RQ3: The case study analysis and specific questions were designed to find the threat mechanisms based on the data mining methods discussed.

What are examples of threat detection for many cybersecurity issues using data mining techniques?

RQ4: The industry is undergoing a major transformation by providing Internet-connected systems (ICS), smart homes, and robotic factories. However, it is difficult to maintain large and complex systems that connect physical environments.

What types of threat intelligence frameworks have been modeled to overcome the challenges and challenges of a heterogeneous data-driven system in relation to ICS?

RQ5: Artificial intelligence is creating great scope in various fields and benefiting society. It includes various algorithms such as natural language processing, knowledge learning and reasoning to add intelligence to the system [21]. However, proper coding practices should be maintained to prevent future incidents.

What are the ethical aspects and the role of artificial intelligence in preventing future disasters?
RQ6: Despite the accuracy of data mining methods, intelligent algorithms continue to evolve and evolve. To improve and improve the reliability of Internet-connected systems, researchers today focus on training machines to perform artificial intelligence tasks instead of human beings.
What types of security assessment methods and models have been developed using artificial intelligence and what are their future prospects?

Methodology of search strategies for exploratory studies

A large number of research papers were collected from various data sources following a search strategy. Boolean OR is used to create a search string from search terms that have the same meaning. Boolean AND is used to combine search terms with learning constraints. Secondary search strings mentioned in the Keywords section were used to keep the research questions in mind.

A. Information Collection

A total of 200 articles were retrieved during the search using the search strategy mentioned above. Papers that did not meet the search criteria were excluded from the review. In this paper, 51 relevant articles and references were selected and reviewed, as shown in Table 1. In order to conduct new research on cyber security using data mining and artificial intelligence techniques, articles prior to 1980 were not considered for the study. Due to the poor research results.

Table1 Research paper collection from research databases

S. no	Source of Databases	No. of search results retrieved	No. of duplicates found	Number of relevant research papers found
1.	IEEE Explore	55	20	24
2.	ACM	35	8	12

	digital library			
3.	Springer link	20	7	09
4.	Other Journals	90	22	06
5.	Total	200	47	60

Result and discussion

RQ1: What key indicators and data mining and artificial intelligence techniques are used to determine threat intelligence?

Research question 1 (RQ1) of the systematic review was addressed to identify several current data mining and artificial intelligence techniques that have been used to mitigate cyberattacks. Some of the approaches that currently exist and have been implemented to deal with malicious activity are described in Table 2. A summary of the various data mining and artificial intelligence techniques used for early detection of rage situations.

Data mining techniques such as A/B testing are used in e-commerce websites being benchmarked to identify changes on the web. Technologies related to recommendation systems, inventory tracking, and user identification are used in e-commerce environments. It is used to identify similarities between elements and variables in large datasets [12]. Group rules are also used to maintain confidentiality. The ARM approach to security comparison. Naive Bayesian classification methods have been used to predict attack types to aid in mortality studies. Genetic algorithms use a system of natural selection and are influenced by the human evolutionary process. It is used in intrusion detection systems and uses genetic programming to recognize combinatorics [6].

Recognition of combinatorial phenomena [6]. Machine learning algorithms derive information from data and predict behavior based on known features analysed in a training data set. To analyze the information security risk (ISR) of the database management system, an intelligent

model with fuzzy logic was used to assess the threat situation using current assessments to predict better ISR review results [2]. Fuzzy logic, artificial neural networks, support vector machines, genetic algorithms, and K-Means clustering are widely used in anomaly detection systems.

RQ2: What benefits do data mining techniques provide to increase the threat credibility of collected cybersecurity data?

SR Research Question 2 (RQ2) was proposed to identify unique data mining methods implemented to increase the reliability of big data threats. With the advent of big data, data mining (DM) techniques have been widely used to improve application models for cybersecurity. Some of the various DM methods used to increase the reliability of cyber security data are discussed in Table 3 below.

A summary of various DM methods used to increase the reliability of cyber security data and control malicious intrusions.

The data mining approach includes clustering, clustering, association rule structure, random forest, and anomaly detection. These techniques have been used to model cybersecurity applications such as spam analysis, virus detection, detection, and malicious behavior [4]. Group rule mining with two sets of properties is very popular and widely used in various applications [16]. A novel approach based on ensemble learning has been proposed to develop various mining algorithms and control cyber-attacks [5].

CTI emphasizes the creation of a multi-threat intelligence system. A search robot has been developed that analyses the falsity of Internet resources using self-learning models based on the performance of neural networks. The goal of pattern generation methods is to train the system to learn newly created threats and generate alerts about new methods, whether they are safe or not.

Information integration (IF) addresses the challenge of the volume and velocity of data being generated by augmenting human input through automation. This shows how intelligence gathering can help tools to predict cyber intrusions using available data.

Table 2 Research Work in determining threat using data mining and artificial intelligence techniques.

Sr. No..	Author	Year	Applications	Technology Used
1.	Sisiaridis and Markowitch	(2018)	Minimizing Data Complexity in Feature Extraction and Feature Selection for massive datasets.	Machine Learning Approach implemented in Apache Spark using its python API
2.	Basallo et al.	(2018)	Information Security Risk Assessment in Database Management Systems	Using Artificial Intelligence techniques, a model based on Fuzzy logic was developed.
3.	Ghimeş and Patriciu	(2017)	Discovering patterns and malicious activities of users in Big data	Neural Network Models were proposed using machine learning algorithms
4.	Jayasingh et al.	(2016)	The challenges faced by an analyst in fraud detection, network forensics, data privacy issues, and data provenance problems	Naïve Bayesian classification to predict fraud and minimize data privacy issues
5.	Kumar et al.	(2016)	Identification of Cyber Threats in the computing world to enhance revenue generation and cost-cutting	K - Means Clustering technique is used to group similar data relevant to different attributes.
6.	Veeramachaneni et al.	(2016)	Building artificial intelligence solution to recognize and defend against malicious and	Artificial intelligence approach to build an outlier detection system to gather feedback from

			unseen attacks	the system for security analysis

Table 3 Research Work in determining DM techniques used in boosting truthfulness of cybersecurity data and controlling threat in cybersecurity applications.

Sr. no.	Authors	Year	Application	Techniques Used
1.	Cao and Wang	2017	To increase the robustness of Data Mining models used in Cyber Security applications	Weighted Random Forest and Cluster-Based Random Forest approaches to enhance the robustness of data
2.	Deng et al.	2017	To improve the performance of content filtering in cyber applications to control threat	Content filtering function mining algorithm to boost efficiency in determining threat conditions
3.	Khan et al.	2017	Identification of Denial of Service Attack in the organizations	Pattern Recognition technique in log files using data mining.
4.	Li et al.	2016	Privacy-preserving mining for various outsourced databases that allow sharing of data without negotiating data privacy	Association rule mining and frequent itemset mining techniques were used for developing encryption scheme
5.	Hochbaum and Bauma	2016	The sparse projection was used for massively large datasets which substantially reduced testing time with	Sparse computation was projected on data mining algorithms such as KNN, SVM, graph-based learning

	nn		minimal effect on accuracy	techniques
6.	Ng and Banik	2015	Intrusion detection system to identify unauthorized patterns and security breaches in the system	Anomaly detection and signature database using data mining techniques were used

The weighted random forest (WRF) method and search-based clustering are used to build the robustness of the random forest [14]. These methods use the budget to increase the randomness of the model. In addition, it is computationally small, generating similarity matrices based on pairs of objects that share neighbors, which predict well for large datasets. In addition, scattering has been performed for the k-nearest algorithm, graphical methods, and vector machines of support [11].

With this technology we were able to reduce test time with minimal impact on accuracy. The advent of Internet use has accelerated crime. Therefore, a solution was proposed to use data mining techniques to detect unauthorized activities based on anomaly detection and data signatures [17]. This is said to help the intrusion detection system recognize system security threats

RQ3: What are the established patterns of threat detection for many cybersecurity problems using data mining techniques?

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Merchant_id	Average_trans	Transaction_a	is_declined	Total_declines_per_day	isForeignTransa	isHighRiskCountry	Daily_chargeback	6_month_avg_(	6-month_chbk	is_fradnt	is_fradulent	
2	3160040998	100	3000	N	5	Y	1	0	0	0	Y	1	
3	3160040998	100	4300	N	5	Y	1	0	0	0	Y	1	
4	3160041896	185.5	4823	Y	5	N	0	0	0	0	Y	1	
5	3160141996	185.5	5008.5	Y	8	N	0	0	0	0	Y	1	
6	3160241992	500	26000	N	0	Y	1	800	677.2	6	Y	1	
7	3160241992	500	27000	N	0	Y	1	800	677.2	6	Y	1	
8	3160272997	262.5	11287.5	N	0	N	0	900	345.5	7	Y	1	
9	3162041996	185.5	11130	Y	20	N	0	0	0	0	Y	1	
10	3162041996	185.5	6121.5	Y	20	N	0	0	0	0	Y	1	
11	3162041996	185.5	7049	Y	20	N	0	0	0	0	Y	1	
12	3356298138	166.788473	4836.865717	N	0	N	0	721	229	9	Y	1	
13	3359162473	444.9970144	21804.85371	N	0	Y	1	0	0	0	Y	1	
14	3359690891	152.451565	4116.192255	N	0	Y	1	865	375	8	Y	1	
15	3364840542	36.91948763	2141.330283	N	5	Y	1	0	0	0	Y	1	
16	3365355395	806.1795426	23379.20674	N	0	N	0	816	811	5	Y	1	
17	3369900897	257.0911668	10283.64667	N	4	Y	0	0	0	0	Y	1	

Fig. 2 Screenshot of Dataset “creditcardcsvpresent.csv”

Research question 3 (RQ3) of the systematic review was designed to analyse the importance of data mining methods used to find the relationship between data mining methods and threat detection. This study aims to examine the patterns and relationships between data security trends using a case study. Case studies to identify threat detection strategies. The dataset used in this case study is the abstract dataset for credit card fraud detection (creditcardcsvpresent.csv) (see Figure 2) downloaded from Kaggle.com by Vinayak Joshi [13]. The dataset summarizes the usage of 3,076 customers and 11 items. The characteristics are shown in Table 4.

Table 4 List of Attributes of Dataset "Abstract data set for Credit card fraud detection"
(creditcardcsvpresent.csv)

Attributes	Description
Merchant_id	Id of the merchant
Average Amount/transaction/ day	Transaction performed per day by each merchant
Transaction_amount	Transaction amount
Is declined	Transaction declined or not
Total Number of declines/day	Total number of transactions declined per day
isForeignTransaction	Transaction performed is foreign transaction or not
isHighRiskCountry	Transaction performed is in high-risk country or not

Daily_chargeback_avg_amt	Daily chargeback average amount
6_month_avg_chbk_amt	6 months average chargeback amount
6-month_chbk_freq	6 months chargeback frequency
isFradulent	Transaction performed is fraudulent or not

RQ4: What are the different data-driven systems challenges associated with Internet-connected systems (ICS) and what types of threat intelligence programs have been modeled to overcome these challenges?

Research question 4 (RQ4) of the systematic review was considered to identify the challenges facing intelligent systems (ICS) and the various intelligent technologies developed to manage system failures and identify method threats.

A summary of the programming and data systems challenges associated with large and complex systems connecting large-scale physical environments and information systems designed to overcome these challenges.

Industrial changes and innovations have advanced ICSs, such as automated factories, the Internet of Things (IoT), smart cities, smart homes, and robotic factories, but designing the preserved architecture is a serious problem. Challenges include unique standards for processing safety, manufacturing, and technical requirements for large and heterogeneous sources. One of the biggest challenges in today's threat detection technology comes from the art of transforming the disparate data sources that are collected from IT systems, platforms, Fog and cloud computing systems.

We proposed a new threat intelligence framework based on two components: an intelligent control element and a threat intelligence element. The intelligent control unit processed the various data sources needed to interact with the industrial systems. Threat intelligence frameworks have helped identify malicious activity on physical and network systems. Another

challenge is implementing machine learning for cybersecurity. This is not an easy task due to the rapidly changing threat landscape. Therefore, a neural network method was proposed to improve the classification problem of neural networks to detect and classify malicious patterns.

RQ5: What are the ethical and practical aspects of artificial intelligence to prevent future disasters?

Research question 5 (RQ5) of the systematic review was set to analyse the ethical concerns for the development of machine intelligence and how they can help artificial intelligence algorithms to create the right rules in accordance with human philosophy.

Summarizes the motivations and perspectives for the development of machine intelligence, as well as the various ethical and practical aspects of artificial intelligence in the emerging field of artificial intelligence.

Artificial intelligence is the understanding demonstrated by machines and computers. This will help them understand the problems of the way people feel [19]. The presence of AI is constantly increasing in the cyber world due to its powerful functions. The main motivation of intelligent machines is that their decisions are better and more accurate due to the lack of emotions.

People, on the other hand, judge their emotions and think about everything. A number of ethical decisions are being made, including whether to support or oppose the development of anti-lethal weapons systems (LAWS). As robots gain more importance and power, ethical issues arise. Ethical problems can be dealt with by writing the right code and testing the problems properly. A hybrid system between AI and humans is an intelligent solution that implements machine intelligence [8]. Knowledge Engineering (KE) examines the structure of decisions to understand how they are achieved. KE is widely used by engineers, such as incorporating KE into decision support software to enable facial recognition or analysing human speech to determine meaning. In the near future, the field of cognitive technology will help create systems that can solve problems better than humans.

RQ6: What types of security assessment methods and models are being developed using artificial intelligence and what are their future prospects?

Artificial intelligence opens up new possibilities and offers new experiences. Research question 6 (RQ6) of the systematic review was designed to study different methods and models that have evolved to overcome the barrier of new safety knowledge.

Summary and future perspectives on models and applications developed for cyber threat identification using AI.

With new and emerging technologies used by participants, it is important to develop realistic models for potential vulnerabilities that arise. The wireless communication framework is one of the developments in obtaining information and monitoring the activities of attackers (Araujo et al. 2018). This gives defenders new tools and techniques for emerging fraud. Cyber threat intelligence models should enable cyber defenders to monitor their threat intelligence. They say attacks must be known before you can defend yourself.

Conclusion

The study concluded that ongoing cyber defenses are primarily based on statistical patterns known to detect malicious situations. Thus, this approach limits visibility to new cyber threats. Some advanced threat mitigation technologies can reduce the impact of active attack programs and act as a deterrent to future attacks.

Threat intelligence sharing allows companies to exchange risk models in the form of signals with each other for threat analysis and breach response. The biggest problem is that it doesn't cover all the big data and information needed for threat intelligence. To make better decisions, knowledge must be gathered and formally presented from publicly available data. Regardless of the data mining techniques available, subject matter knowledge should be used to train models or artificial neural networks of the system to identify and prevent unknown threats.

From this study, we determined the definition of threat and the right to analyse and share data and information about threats, but sharing information requires an understanding of common protocols, standard formats, common information and original words. Therefore, artificial intelligence is the solution to this need. This review includes statistical methods for testing threat intelligence based on data mining techniques. In addition, the scope of the document can

be expanded through the use of artificial intelligence algorithms that use data mining techniques to recognize unknown threat patterns.

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IntruDTree – A Cybersecurity Intrusion Detection Model Using Machine Learning

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Abstract

Due to the prevalence of the Internet of Things (IoT), the rapid development of computer networks, and the number of related applications, the Internet has become a major focus of today's security issues. As a result, it is more important to develop intrusion detection systems that can identify different types of cyber-attacks or network anomalies and contribute significantly to modern security. This data-driven predictive recognition system can be built using artificial intelligence, especially machine learning techniques. Accordingly, this paper presents an intrusion detection tree machine learning protection model ("IntruDTree") that first considers the importance of security features and then builds an intrusion detection model based on it.

Keywords: Cybersecurity, intrusion detection systems, machine learning, cyberattacks, cybersecurity analytics, cyber threat intelligence, and network behaviour analysis

Introduction

Recently, the demand for cyber security and protection against various cyber-attacks is increasing day by day. The main reason is the popularity of the Internet of Things (IoT), the rapid growth of computer networks and the number of applications used by individuals or groups for personal or business purposes. Cyber-attacks such as Denial of Service (DoS) [1] attacks, malware [2] and unauthorized access [1] have caused irreversible damage and financial loss to the large network. For example, according to [3], in May 2017, a single ransomware virus caused severe damage to many organizations and industries, including finance, healthcare, energy, and universities, costing them $8 billion. Other statistics suggest

that, on average, an organization costs $3.9 million, or $8.19 million in the United States[4]. Therefore, based on the needs of today's cyber world, the need for cyber security and protection against various cyber-attacks is increasing day by day. Cyber security systems are network security systems and computer security systems. Although many systems such as firewalls and encryption have been developed in response to cyber-attacks, intrusion detection systems (IDS) are superior in their ability to protect computer networks from external attacks [5]. Therefore, the main purpose of IDS is to detect and prevent various types of malicious network communication and computer system exploitation.

Traditional solutions such as firewalls are not up to par [6-8]. IDS performs the process of monitoring and evaluating the daily activities of a network or computer to detect security issues or threats such as denial of service (DoS) and redefine malicious behaviour on the network. Intrusion detection systems also help to detect, determine and identify unauthorized system behaviours such as unauthorized access, modification, and destruction [9-11]. Therefore, the creation of an effective IDS to detect various cyber-attacks and malicious activities on the network and play an important role in the current network security is necessary to promote system security.

Intrusion detection systems can be classified into different categories depending on their scope of use. For example, most types of information processing systems are hosted and networked, from single computers to large networks [12]. Host-inspected systems (HIDS) rely on individual systems to monitor operating system files for suspicious or malicious activity and rarely detect unknown malicious code [12]. On the other hand, in a network intrusion detection system (NIDS), the system analyses and monitors network connections to detect suspicious traffic. Likewise, the most popular types of detection methods include malicious or code-based detection and anomaly detection, which have been studied for many years by the international security research community [13]. Signature-based IDSs specify specific patterns for the detection of a related attack. For example, a sequence of bytes in network traffic or a known pattern or sequence used by malware is called a signature. Antivirus software uses these patterns as signatures to detect attacks by comparison.

This signature-based notification system can easily detect known attacks. However, it is difficult to detect new undetected attacks using known signatures and no samples are available [14]. On the other hand, anomaly detection systems examine network behaviour to find patterns and automatically create patterns based on the data to display normal behaviour to detect errors. The main advantage of this anomaly-based IDS over signature-based IDS is its ability to detect new and unpublished vulnerabilities or attempt to exploit cyber threats. However, it can be said that the behaviour of the system is unprecedented and the false alarm rates are high [10]. Therefore, an effective search method based on machine learning is needed to reduce these problems, which is the purpose of this paper.

Developing IT security models that analyse cyber incident patterns and ultimately use cyber security data to predict threats can be used to create data-informed IDS. Therefore, the knowledge of artificial intelligence, especially machine learning technology that can effectively learn from security datasets, will play an important role [14,15]. In machine learning methods, tree-based methods perform well in the field of predictive analysis [16,17]. However, today's security datasets may contain high-level security features that are less subtle or non-essential, making it difficult to accurately model cyberattacks or gaps. Therefore, security models with these characteristics can learn from a single decision-making process, which can lead to many problems such as high variance, overfilling in tree models, high computational cost, and time to train. the model and the lack of generalization. As a result, the prediction accuracy decreases for the unknown test cases. Therefore, the research question addressed in this paper is "RQ: How can we reduce these security issues and create an effective data-based intrusion detection model in the Internet domain?

To answer these research questions, this paper presents a recognition tree machine learning security model (“IntruDTree”) that mitigates the aforementioned problems. In our approach, we consider security functions based on their modelling. We build a general tree-based intrusion detection model based on selected critical features. Once the tree is built using the training security data, the model is validated using the test data. This approach is not only effective in terms of prediction accuracy for unobserved test cases by reducing redundancy in the model, but also reduces the computational complexity of the white model by reducing the shape of the image while building the resulting model.

Background and related work

Intrusion detection systems are commonly employed to identify malicious activities on the internet and evaluate the daily operations of a computer network, as well as to detect security risks or threats. Much research has been done in the area of cyber security and the ability to detect and prevent cyber-attacks or intrusions. Brand-based network authentication is one of the most widely used systems in the Internet industry [14]. This system takes into account well-known and widely used signatures as well as commercial success. On the other hand, anomaly-based approaches have advantages over manual signature approaches for detecting undetected attacks, including the ability to identify missing or non-existent attacks [10,18]. This approach monitors network traffic and analyses relevant security data to find patterns of attack behaviour. Various data mining and machine learning techniques are used to analyse these patterns from security to effective decision-making [5,16,19]. A major problem with anomaly-based approaches is that they can produce high false alarm rates because they classify previously unseen system behaviour as outliers [10]. Therefore, limiting the efficiency of integrated detection systems is a priority [13]. Therefore, an efficient search method based on machine learning is needed to reduce these problems.

Machine learning is a branch of artificial intelligence that combines statistical analysis, data mining and data science. It focuses on computer learning from data [19,20]. Mathematical methods, statistical analysis and optimization can be linked to data analysis in international application domains. Therefore, to create intelligent security models for cybersecurity, machine learning becomes a data-driven foundation for understanding predictive security data to predict future incidents. In machine learning technology, relational analysis is used to build rule-aware systems [21-23], but in our work, we use classification learning techniques [16, 24] to build a predictive model for a training dataset.

In the field of cyber security, especially to detect intrusions or cyber-attacks, many researchers have used the aforementioned machine learning classification methods. For example, Li et al. [25] used plane-based support vector machine classification to classify regular traffic with predefined attack categories such as DoS, Probe or Scan, U2R, R2L, etc. using the KDD'99 Cup data set. In [26], Amiri et al. To make the system faster, we use vector machine learning-compatible least squares to train the model using large datasets. In [27],

Hu et al. To classify anomalies, in our study we use a variant of support vector machine analysis. Wagner et al. [28] used a single-class vector machine support class in their research on anomaly detection and different types of attacks such as NetBIOS scanning, DoS attack, POP spam, and Secure Shell (SSH) scanning. The authors of [29] used this support vector machine classifier to detect the performance of unknown computer worms. Waihoki, Kotpalliwar et al. [30], Saxena et al. [31], Pervez et al. [32], or tenente al. [25], Shon et al. [33], Kokila et al. [34] used the support vector machine classifier in their study on building an intrusion detection system.

In addition to the support vector machine classifier described above, there are many other classifiers used for intrusion detection. For example, Kruegel et al. [35] used a probability-based Bayesian network to classify events processing TCP/IP packets. An integrated Denial of Service (DoS) detector using the same Bayesian network described by Benferhat et al. In his study [36]. Panda et al. [37] used a probability-based Naive Bayes classifier to analyze the KDD'99 cup data set. The data in this dataset includes four attack categories: Probe or Scan, DoS, U2R, and R2L. Koc et al. [38] used the single Naive Bayes classifier to build a multi-class intrusion detection system. KNN, a model-based learning algorithm, is another popular machine learning method in which the ranking of a point is determined by the closest neighbors to that data point. Shapoori farard et al. [39], Vishwakarma et al. [40], Sharifi et al. [41] used the KNN classification method in their study for intrusion detection system. Several studies [42,43] have been conducted using logistic regression models to identify malicious traffic and interference. In addition to these approaches, the authors of [44] considered neural classifications and the authors of [45] considered wavelet transforms for anomaly detection, especially DoS attacks.

A tree-based method, known as a decision tree among machine learning techniques, is considered one of the most popular machine learning classification methods for building predictive models. The best-known methods for automatically building decision trees are the ID3 [46] and C4.5 [47] algorithms. Recently, Sarker et al. proposed a behavioural decision tree algorithm called BehavDT to analyse behavioural patterns. [48]. A significant amount of research in the field of cyber security, such as Ingre et al. [49], Malik et al. [50], Relan et al. [51], Rai et al. [52], Puthran et al. [53], Moon et al. [54], Balogun et al. [55] and

Sangkatsanee et al. [56] used decision tree classification to build intrusion detection systems in their research. However, due to the large dimensions of security elements, the decision tree model can cause several problems, such as high variance with overfitting, high computation cost and time, and low prediction accuracy.

Different from the approaches mentioned above, in this paper we present a machine learning-based security model "IntruDTree", which first considers the priority order of security functions and then builds a general tree for intrusion detection based on the selected important features. to solve the problems.

Materials and methods

In this section, we present our machine learning-based cybersecurity intrusion detection model, IntruDTree. It involved several processing steps: examining the security data, preparing the raw data, determining the importance and ranking of the features, and creating the resulting tree-like model. In the next section, we will briefly discuss these steps one by one to achieve our goal.

Exploring Security Dataset

Security data typically represents a collection of data records consisting of multiple security elements and related facts that can be used to build a data-driven cyber security intrusion detection model [15]. Thus, it is important to understand the raw data nature of cybersecurity data and patterns of security breaches to detect malicious activity or anomalies. In this work, we used an intrusion dataset consisting of two sets of class variables—normal and outlier—publicly available on Kaggle [54], the world's largest machine learning and data science community. The dataset consists of a total of 41 properties, of which 3 properties are qualitative, protocol_type, flag delay, and the remaining 38 properties are quantitative, including duration, logged_in, srv_serror_rate, dst_host_count, dst_bytes. Table 1 shows all security properties, including their value type. The dataset contains more than twenty-five thousand cases collected from various intrusions simulated in a military network environment. An environment simulating a typical US Air Force LAN was created to collect this raw data, including network TCP/IP dump data. The network was designed as a real cyber environment and subjected to a series of cyber-attacks called anomalies [54].

Table 1. Dataset features with value type.

Feature Name	**Value Type**	**Feature Name**	**Value Type**
dst_host_srv_count	Integer	same_srv_rate	Float
f lag	Nominal	dst_host_same_srv_r ate	Float
srv_serror_rate	Float	dst_host_srv_serror_ rate	Float
dst_host_serror_rate	Float	count	Integer
protocol_type	Nominal	logged_in	Integer
dst_host_same_src_ port_rate	Float	dst_host_srv_di f f _host_rate	Float
rerror_rate	Float	src_bytes	Integer
dst_host_srv_rerror_ rate	Float	service	Nominal
srv_rerror_rate	Float	dst_host_rerror_rate	Float
dst_host_count	Integer	dst_host_di f f _srv_rate	Float
srv_count	Integer	wrong_ f ragment	Integer
serror_rate	Float	num_compromised	Integer
srv_di f f _host_rate	Float	dst_bytes	Integer
hot	Integer	di f f _srv_rate	Float
duration	Integer	is_guest_login	Integer
root_shell	Integer	land	Integer
urgent	Integer	num_ f ailed_logins	Integer
su_attempted	Integer	num_root	Integer
num_ f ile_creations	Integer	num_shells	Integer
num_access_ f iles	Integer	num_outbound_cmds	Integer
is_host_login	Integer	-	-

All security elements listed in Table 1 are not identical in terms of data distribution and differ in function. For example, Figure 1 and Figure 2 show the distribution of data for two different attributes, duration and dst_bytes. To build our machine learning-based intrusion detection model, we first prepared a raw dataset with the above-mentioned feature values. Effectively processing and classifying these security elements according to requirements, building a targeted machine learning-based detection model and finally making data-driven model-driven decisions can be an important part of intelligent cyber security service delivery, especially in anomaly and intrusion detection.

Preparing Raw Security Data

Data preparation involves both feature encoding and scaling according to the features of a given intrusion dataset.

a) Feature Encoding: As mentioned earlier, the dataset contains both numerical and nominal values for a given security element. While most attributes are numerically valued, several are nominally valued, such as protocol_type, service, flag, shown in Table 1, and also class value [deviation, normal]. Thus, all nominal features must be transformed into vectors to fit these data to a target machine learning-based intrusion detection model. Basically, "One Hot Encoding" is a popular approach, we have used "Label Encoding" in this paper. This is because a single hot coding technique grows a significant number of feature dimensions. On the other hand, the label encoding method converts property values directly into specific numeric values. For example, the protocol_type attribute in label encoding can turn the values [tcp, udp, icmp, udp, icmp] into vectors [0, 1, 2, 1, 2].

b) Feature Scaling: In data processing, it is also called data expansion. The value of safety features is in various ranges and varies from category to category. For some data points the values are very low and for some data points values are higher. Therefore, data modelling techniques are used to establish a range of characteristic values known as independent variables. also. For this purpose, we use the Standard

Scale, which sets the security characteristics with mean = 0 and standard deviation = 1. The set values are ready for further analysis to create a security model.

Determining Feature Importance and Ranking

In our approach, the data is analyzed and organized, we calculate the importance score of each security component discussed above and decide the importance index to select a set of important components for further processing. Basically, feature importance is a measure of how useful or important each feature is in a cybersecurity dataset for building a tree-based intrusion detection model. The importance of the component is determined by the decrease in the impurity of a node weighted by the probability of reaching that node. The probability of the node is calculated simply by dividing the number of times a node is reached by the total number of times. The higher the value, the more important the feature. Values range from 0 to 1. A value of 0 means that the model output is independent of the condition, and a value of 1 means that the model output is directly correlated to the condition. The importance of each feature is determined by its "pure" appearance.

In statistics and data mining, the "Gini Index" is a popular measure of node impurity, which typically measures how often a random element is found to be incorrect [19]. Therefore, the probability that a randomly selected item from a security data set is false is based on the class distribution of the data set. The greater the pollutant reduction, the more important it is. We rank security categories based on their importance scores. Therefore, after ranking the features, our approach can consider the selected features and select the most important security features based on their importance index values to build a security model—a fruit tree. This allows us to identify relationships and patterns in security data sets and transform them into smaller scale data sets without losing important modeling information

Designing Intrusion Detection Tree

When you're ready to tackle security issues, design a decision tree model for a data-driven intelligent intrusion detection system. Instead of using all available features in a selected data set, our model considers security features selected by importance index and domain. To design a tree pattern, start with the root node. A training data set is divided

into smaller parts and branches of related trees are formed. To identify the characteristics of the root group of each level, the "Gini Index" [19] defined in the previous section is used. The tree is gradually developed by selecting attributes with low Gini scores. The tree is therefore expanded by producing the required number of branches, including leaf nodes and connecting edges or arcs. Internal nodes are labeled with pre-selected security functions and each leaf node of the tree is labeled with a different page or page class in this process.

The arcs of the tree appear from a node that represents each value of the associated function. The result is a multi-level tree with many vertices or leaf nodes containing uncommon or common elements, as shown in Figure 3. Generally, the input search model of IntruDTree considers two aspects. (i) Minimize the aspect ratio. (ii) determine the importance and ranking, and (ii) build a multi-level tree considering the selected important features. Figure 3 shows an example of IntruDtree that considers multiple attributes such as flag, service, duration, login_from and their value patterns in an input dataset.

The overall procedure for building an IntruDTree is described in Algorithm 1. Given a set of training sets, DS = {X1, X2, ..., Xm}. Here m is the data size. Each pattern is represented by n-dimensional features. The training data belongs to several classes of cyberattacks CA = {common, different}. The result is IntruDTree, a rule-based classification tree associated with DS. For example, according to Figure 1, an example rule with a function is "If the value of flag is an RSTR, the result is greater than or equal to. Similarly, another rule with many features is "If flag value is SF, service is ftb, time is lt;= 4, result is different. Therefore, we can transfer the created IntruDTree to take some safety rules, which can be used to know whether the test case is normal or abnormal. Our proposed algorithm is as follows:

Algorithm 1: IntruDTree Induction

Data : Dataset: DS = X_1, X_2, ..., X_m // each instance X_i contains a number of features and corresponding cyber-attack class CA

Result: An IntruDTree

1 Procedure IntruDTree (DS, f eature_list, CAs);

2 //calculate feature importance score

3 imp_{score} calculateScore(f eature_list)

4 //select important features

5 imp_ f eature_list selectFeatrues(f eature_list, imp_{score}, n)

6 TreeGen(DS, imp_ f eature_list, CAs)

7 N createNode() //create a root node for the tree

8 if all instances in DS belong to the same class CA **then**

9 return N as a leaf node labeled with the class CA.

10 end

11 if imp_feature_list is empty **then**

12 return N as a leaf node labeled with the majority class in DS; // majority voting

13 end

14 identify the highest precedence feature F_{split} for splitting and assign F_{split} to the node N.

15 foreach feature value val ∈ F_{split} **do**

16 create subset DS_{sub} of DS containing val.

17 **if** DS_{sub} /= φ **then**

18 attach the node returned by TreeGen(DS_{sub}, {imp_ f eature_list − F_{split}}, CAs)) to node

19 **end**

20 attach a leaf labeled with the majority class in DS to node N;

21 end

22 return N

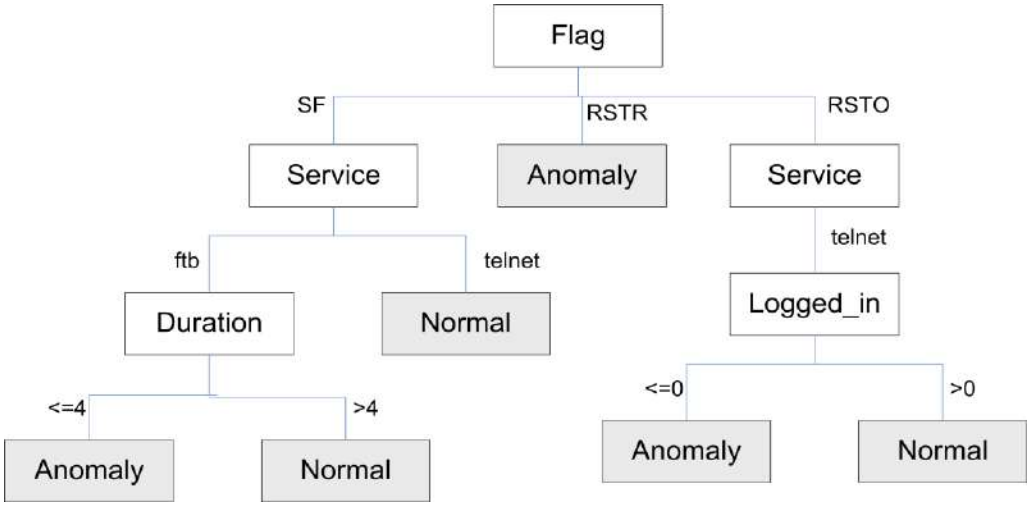

Figure 1. An example of an IntruDTree considering several features

Experimental discussion

To evaluate the IntruDTree cybersecurity model, we aim to answer three questions:

• Question 1: Do the key points and optimization strategies of the IntruDTree model help simplify and create security datasets by reducing unnecessary situations? Is there a general data security model?

• Question 2: Can IntruDTree's machine learning security model detect cyber intrusions and provide meaningful results for undetected test cases?

• Question 3: How effective is the IntruDTree model compared to traditional classification-based machine learning methods?

To answer these questions, we have to use Python programming language and execute them on a Windows PC using Scikit-Learn, the most widely used machine learning library for predictive data analysis. We have to create and use security data set that includes the different classes and classes described in the previous section.

Evaluation Metric

To measure the effectiveness of our IntruDTree cyber security model, we calculate the final results based on precision, recall, fscore, ROC value and overall accuracy as defined below [19].

$$\text{Precision} = TP / (TP + FP) \quad \ldots(1)$$

$$\text{Recall} = TP / (TP + FN) \quad \ldots(2)$$

$$\text{Fscore} = 2 * ((\text{Precision} * \text{Recall}) / (\text{Precision} + \text{Recall})) \quad \ldots(3)$$

$$\text{Accuracy} = (TP + TN) / (TP + TN + FP + FN) \quad \ldots(4)$$

Where, TP represents a true positive, FP represents a false positive, TN represents a true negative, and FN represents negative in the formal definitions of precision, recall, f-score, and just above. In addition to these evaluation metrics, we also consider the receiver operating characteristic (ROC) curve, which is created by plotting the true positive rate (TPR) against the false positive rate (FPR) of the resulting security model.

In order to answer the first question highlighted above, we put the importance score of each feature in the dataset and the significance of this score in our IntruDTree model.

In order to answer the second question highlighted above, to calculate the outcome results for unseen test cases, we first built the model using a subset of 80% data of the given dataset and used the remaining 20% data for testing the model. The results are calculated by generating a confusion matrix that reports the number of false positives, false negatives, true positives, and true negatives.

To answer the third question, we have to calculate and compare the effectiveness of the IntruDTree online access detection model with popular machine learning methods. To demonstrate the effectiveness of security models based on different machine learning, we can select some popular methods: NaiveBayes (NB), Logistic Regression (LR), K-Nearest Neighbor (KNN), and Support Vector Machines (SVM). for comparison purposes. To ensure a fair comparison of the models, we used the safety data sets of each model to calculate the resulting results.

Conclusion

In this paper, we present IntruDTree's machine learning-based security model. In our approach, we first consider the ranking of security features based on their importance, and then build a tree-based intrusion detection model based on the selected critical features. We did this to make the security model effective in terms of predictive accuracy for unknown test cases and efficiently reduce the computational cost by processing fewer features while generating the tree-like pattern.

Future research can evaluate the effectiveness of the IntruDTree model by collecting large-scale datasets with more security components of IoT security services and measuring application-level effectiveness in the cybersecurity domain.

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Navigating the Technological Horizon: An In-depth Analysis of Innovation Adoption in IT Industries

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Abstract

As Information Technology (IT) continues to rapidly evolve, organizations within the industry are faced with the imperative to navigate the technological horizon effectively. This research paper presents an in-depth analysis of innovation adoption in IT industries, aiming to discern the intricate dynamics that shape the assimilation of emerging technologies. Drawing upon a comprehensive review of existing literature, coupled with empirical investigations into a diverse range of IT enterprises, this study synthesizes insights to offer a nuanced understanding of the multifaceted factors influencing innovation adoption.

The abstract highlights the multidimensional approach employed in the research, drawing on theoretical frameworks from innovation diffusion and technology adoption literature. The central focus is on understanding the intricate interplay between organizational, technological, and environmental factors that influence how IT industries assimilate emerging technologies.

The paper navigates through organizational determinants such as culture, leadership, and structure, shedding light on how these elements shape the readiness of organizations to embrace technological change. It underscores the importance of addressing challenges related to technological complexity, external environmental influences, and social dynamics in the quest to successfully adopt and integrate innovations.

Furthermore, the abstract alludes to the development of a holistic theoretical framework that synthesizes insights from existing literature, offering a nuanced perspective on the innovation

adoption process in IT industries. This framework serves as a guide for practitioners, policymakers, and scholars seeking to navigate the complexities of the technological horizon.

Introduction

The rapid evolution of technology serves as a driving force shaping the Information Technology (IT) landscape. In "Navigating the Technological Horizon," the analysis of innovation adoption in IT industries is intrinsically linked to the dynamic changes in technology. This section explores key technological shifts that influence the adoption process within the context of the research.

- Emergence of Disruptive Technologies:

The research delves into the emergence of disruptive technologies that redefine industry standards and practices. Innovations such as artificial intelligence, blockchain, and quantum computing are explored for their potential to disrupt existing business models. The study investigates how organizations grapple with the challenges and opportunities posed by these transformative technologies in their adoption journey.

- Cloud Computing and Edge Computing:

As the industry witnesses a paradigm shift towards cloud computing and edge computing, the research scrutinizes how organizations navigate the complexities associated with migrating from traditional on-premise solutions to cloud-based architectures. The study explores the impact of cloud computing on scalability, accessibility, and data security, as well as the integration challenges that may arise.

- Internet of Things (IoT) Integration:

The proliferation of Internet of Things (IoT) devices in the IT ecosystem is examined for its implications on innovation adoption. The research investigates how organizations incorporate IoT into their operations, exploring use cases, challenges, and the potential for optimizing processes through enhanced connectivity and data-driven decision-making.

- Cyber security Innovations:

Given the escalating threats in the digital landscape, the study assesses how organizations adapt to cyber security innovations. This includes the adoption of advanced threat detection systems, encryption technologies, and robust cyber security protocols. The research explores how these innovations influence decision-making and organizational readiness for technology adoption.

- Agile Development Methodologies:

In response to the rapid pace of technological change, the research scrutinizes the adoption of agile development methodologies. It investigates how organizations transition from traditional software development models to agile approaches, aiming to enhance adaptability, collaboration, and the timely delivery of innovative solutions.

- Data Analytics and Artificial Intelligence and Machine Learning:

The integration of data analytics and artificial intelligence (AI) is a focal point of the research. It examines how organizations harness the power of data to derive actionable insights, optimize decision-making processes, and implement AI-driven solutions. Automation: AI and ML are streamlining software development processes. The study explores the challenges associated with data governance, ethical considerations, and the skills required for effective adoption.

Important point will focus on this paper

1 Organizational Determinants

2. Technological Complexity

3. External Environmental Influences

4. Social Dynamics and Stakeholder Roles

5. Holistic Theoretical Framework

6. Practical Implications

7. Roadmap for Continuous Adaptation

Keywords: Innovation Adoption, Information Technology (IT), Technological Horizon, Organizational Culture, Technology Adoption, Organizational Readiness, Technological Complexity, External Environmental Influences, Market Dynamics, Regulatory Frameworks, Competitive Pressures, Social Dynamics, Early Adopters, Theoretical Framework, Innovation Diffusion, Continuous Adaptation, Industry Practices.

Background

The IT sector stands at the forefront of transformative change, with technological innovations continually reshaping the contours of business operations, customer interactions, and market landscapes. The rapid evolution of technologies such as artificial intelligence, blockchain, and the Internet of Things has ushered in an era of unparalleled possibilities. Simultaneously, however, organizations encounter the pressing need to navigate this complex technological terrain judiciously.

Research Rationale

In this context, the focus of this research is to conduct an in-depth analysis of innovation adoption within IT industries. The rationale behind this exploration is rooted in the recognition that the success or failure of organizations hinges on their ability to integrate and leverage emerging technologies effectively. Understanding the nuances of innovation adoption is pivotal for organizations seeking to harness the potential of technological advancements while mitigating the associated risks.

Objectives

1. Examine Technology Adoption Patterns: Investigate the patterns and trends characterizing the adoption of new technologies within IT industries. Explore whether certain technologies are adopted more readily than others and the factors influencing these patterns.

2. Identify Challenges and Barriers: Uncover the challenges and barriers that organizations encounter in the process of adopting innovative technologies. This includes financial constraints, organizational resistance, and compatibility issues with existing systems.

3. Explore Success Factors: Investigate the key success factors that contribute to the effective adoption of innovations in IT. This may encompass leadership strategies, organizational culture, and strategic planning.

4. Evaluate Implications for Stakeholders: Assess the broader implications of innovation adoption for various stakeholders, including IT professionals, policymakers, and industry leaders. Examine how the findings can inform decision-making and strategy formulation.

Significance of the Study

This research holds significance for both academia and industry by providing actionable insights into the mechanisms driving innovation adoption within IT industries. The outcomes of this analysis can inform organizational strategies, guide policymakers in shaping supportive regulations, and offer a foundation for future research in the dynamic field of IT innovation.

As we embark on this exploration of the technological horizon, the study aspires to contribute to a deeper understanding of the challenges and opportunities inherent in the adoption of innovations within the IT sector. Through this journey, we seek to empower organizations and stakeholders to navigate the technological landscape strategically, ensuring a sustainable and successful future in the rapidly evolving realm of Information Technology.

1. Organizational Determinants

Numerous studies delve into the organizational factors influencing innovation adoption. Research highlights the significant impact of organizational culture, where an innovative culture fosters openness to change, experimentation, and risk-taking. Leadership styles, particularly transformational leadership, emerge as crucial determinants, influencing the willingness of organizations to embrace and integrate new technologies.

I. Organizational Culture: The shared values, beliefs, and norms that characterize the work environment within an IT organization.

II. Organizational Structure: The formal arrangement of roles, responsibilities, and communication channels within the organization.

III. Leadership Styles: The approach and behavior of organizational leaders in guiding and influencing their teams.

IV. Resource Allocation**:** The allocation of financial, human, and technological resources to support innovation initiatives.

V. Innovation Strategy: The formalized approach and plan that an organization adopts to drive innovation.

VI. Risk Tolerance: The organization's willingness to take risks and tolerate uncertainties associated with adopting new technologies.

VII. Communication and Collaboration: The effectiveness of internal communication channels and collaboration mechanisms.

VIII. Continuous Learning Culture: The organization's commitment to continuous learning, skill development, and knowledge sharing.

2. Technological Complexity

Technological complexity is a critical aspect influencing the innovation adoption process within IT industries. This section provides an in-depth analysis of technological complexity and its implications in the context of the research paper:

I. Technological Complexity: Refers to the intricacy and sophistication of emerging technologies, encompassing factors such as the level of technical expertise required, the integration challenges with existing systems, and the overall difficulty in understanding and implementing the innovations.

II. Impact on Adoption Process

- Integration Challenges: Highly complex technologies often pose integration challenges with existing IT infrastructures. The compatibility of new innovations with legacy systems becomes a critical consideration, affecting the speed and efficiency of the adoption process.
- Skill Requirements: The level of technological complexity influences the skill sets required for successful adoption. Technologies with steep learning curves demand a workforce with advanced technical expertise, potentially leading to skill gaps and training challenges.
- Decision-Making Complexity: The complexity of technologies can contribute to decision-making challenges for organizational leaders. Evaluating the potential benefits, risks, and long-term impacts of complex innovations requires informed decision-making and strategic planning.

III. Organizational Readiness

- Assessment Considerations: Organizations need to conduct thorough assessments of their technological readiness before embarking on the adoption of complex innovations. This includes evaluating the existing infrastructure, skill levels of the workforce, and the overall capacity to absorb and utilize advanced technologies.
- Adaptability and Flexibility: Organizations with a high degree of adaptability and flexibility are better equipped to navigate technological complexity. A culture that embraces change and values continuous learning is essential for fostering an environment conducive to the successful adoption of complex technologies.
- Mitigation Strategies
  - Incremental Adoption: Breaking down the adoption process into smaller, manageable phases can help mitigate the challenges associated with technological complexity. Incremental adoption allows organizations to learn and adapt progressively, reducing the risk of disruption.
  - Training and Development Programs: Robust training programs are essential for up skilling the workforce to meet the demands of complex technologies.

Continuous learning initiatives can bridge skill gaps and ensure that employees are proficient in leveraging new innovations.

- Strategic Partnerships: Collaborating with external partners, such as technology vendors or consulting firms, can provide organizations with the expertise needed to navigate technological complexity. Partnerships offer access to specialized knowledge and resources, facilitating a smoother adoption process.

- Case Studies and Empirical Insights: Real-World Examples: Integrating case studies and empirical research that showcase how organizations in the IT industry have successfully navigated technological complexity adds practical insights to the analysis. Examining real-world examples provides valuable lessons and best practices for overcoming challenges.

3. External Environmental Influences:

External environmental influences play a crucial role in shaping the innovation adoption landscape within IT industries. This section provides a detailed analysis of these influences and their impact in the context of the research paper:

- Market Dynamics

Market Trends and Competitor Actions: The ever-evolving nature of IT markets introduces dynamic trends and competitor actions. Organizations must continuously monitor market dynamics to identify emerging technologies, evolving customer needs, and competitive strategies that influence the decision to adopt innovations.

Market Demand and Customer Expectations: External forces, such as shifts in market demand and evolving customer expectations, exert significant influence. Organizations need to align their innovation adoption strategies with customer needs to maintain competitiveness and relevance in the market.

- Regulatory Frameworks

Compliance Requirements: The IT industry operates within a framework of regulations and compliance standards. Changes in regulatory requirements, whether in data protection, cyber

security, or industry-specific regulations, can impact the adoption of innovations. Organizations must navigate these frameworks to ensure legal and ethical technology adoption.

Policy Changes and Government Initiatives: Government policies and initiatives related to technology adoption, research funding, and digital transformation can shape the external environment. Organizations may need to align their innovation strategies with government priorities and navigate policy changes that impact the IT landscape.

❖ Competitive Pressures

Competitive Landscape: The competitive landscape within the IT industry is characterized by rapid advancements and intense competition. External pressures from competitors adopting new technologies can act as a catalyst for organizations to accelerate their innovation adoption strategies.

Benchmarking and Industry Standards: Organizations often benchmark their innovation adoption against industry standards and competitors. The pursuit of industry best practices and the desire to maintain or gain a competitive edge influences decisions related to the adoption of specific technologies.

❖ Economic Factors

Financial Climate and Budgetary Constraints: Economic conditions, such as recessions or economic downturns, can impact an organization's financial resources. Budgetary constraints may influence the pace and scale of innovation adoption, requiring strategic financial planning and resource allocation.

Return on Investment (ROI) Considerations: Economic factors also play a role in organizations' considerations of the return on investment for innovation adoption. Evaluating the economic viability and potential financial returns is a crucial aspect of decision-making.

❖ Technology Ecosystem

Collaboration and Partnerships: The external technology ecosystem, including collaborations with other organizations and partnerships with technology vendors, influences the innovation

landscape. Strategic alliances can provide access to shared resources, expertise, and collaborative innovation opportunities.

Emerging Technologies and Disruptive Trends: External forces introduce emerging technologies and disruptive trends. Organizations must scan the technology landscape for these trends and assess their potential impact on their industry, influencing decisions on which innovations to adopt.

4. Social Dynamics and Stakeholder Roles

Social dynamics and stakeholder roles are fundamental aspects influencing the innovation adoption process within IT industries. This section provides a comprehensive analysis of these dynamics and roles in the context of the research paper:

- Early Adopters and Innovation Champions: Early adopters are individuals or groups within an organization who are quick to embrace and champion new technologies. They often serve as influencers and advocates for innovation adoption.
- Resistance to Change: Resistance to change refers to the reluctance or opposition encountered when introducing new technologies or processes within an organization.
- Organizational Culture: Organizational culture encompasses the shared values, beliefs, and norms that shape behavior and decision-making within an organization.
- Leadership Influence: Organizational leaders, including executives and managers, exert significant influence on the innovation adoption process through their vision, communication, and decision-making.
- Cross-Functional Collaboration: Cross-functional collaboration involves collaboration and communication across different departments and teams within an organization.
- Training and Skills Development: Training and skills development initiatives aim to equip employees with the knowledge and competencies required to effectively adopt and utilize new technologies.

- Change Agents and Facilitators: Change agents are individuals or groups tasked with facilitating the adoption of new technologies and driving organizational change.
- Communication and Transparency: Effective communication involves transparent and timely dissemination of information related to innovation adoption initiatives.

5. Holistic Theoretical Framework

The development of a holistic theoretical framework serves as the foundation for understanding and analyzing the complexities of innovation adoption within IT industries. This framework integrates key theoretical perspectives, organizational determinants, external environmental influences, and social dynamics. Here is an outline of the elements comprising the holistic theoretical framework:

- Innovation Diffusion Theory

Foundation: Rogers' Innovation Diffusion Theory provides the foundational understanding of how innovations spread through a social system over time.

Relevance: The theory helps conceptualize the adoption process, categorizing adopters into innovators, early adopters, early majority, late majority, and laggards. This categorization informs the dynamics of adoption within IT organizations.

- Technology Acceptance Models (TAM and UTAUT)

Psychological Perspectives: Incorporating elements from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) provides insights into the psychological factors influencing individual and organizational acceptance of technology.

User Perceptions: TAM focuses on user perceptions of ease of use and usefulness, while UTAUT considers additional factors such as performance expectancy, effort expectancy, and social influence. These factors are critical in shaping the attitudes and intentions toward innovation adoption.

- Organizational Determinants

Culture, Leadership, and Structure: Drawing from organizational behavior literature, the framework considers the impact of organizational culture, leadership styles, and structural configurations on the readiness and capacity of organizations to adopt innovations.

Resource Allocation and Strategy: The framework integrates the role of resource allocation strategies, innovation strategies, and the overall approach organizations take toward managing change and innovation.

- Technological Complexity and Readiness

Assessment and Mitigation: A dedicated component of the framework assesses technological complexity and organizational readiness. This involves evaluating the intricacies of emerging technologies and the organization's preparedness in terms of infrastructure, skills, and adaptability.

Mitigation Strategies: The framework includes strategies for mitigating technological complexity, such as incremental adoption, robust training programs, and strategic partnerships.

- External Environmental Influences

Market Dynamics, Regulations, and Competition: Recognizing the impact of external forces, the framework includes considerations for market dynamics, regulatory frameworks, competitive pressures, and economic factors.

Strategic Alignment: The framework emphasizes the importance of aligning innovation adoption strategies with external environmental factors to ensure organizational agility and competitiveness.

- Social Dynamics and Stakeholder Roles

Early Adopters, Champions, and Resistance: Incorporating social dynamics, the framework acknowledges the roles of early adopters, innovation champions, and resistance to change in the adoption process.

Communication and Collaboration: It highlights the significance of effective communication strategies, cross-functional collaboration, and stakeholder engagement throughout the innovation adoption journey.

- Holistic Integration:

Interconnectedness: The holistic framework recognizes the interconnectedness of these elements. It emphasizes that successful innovation adoption requires a comprehensive understanding of how individual, organizational, and environmental factors interact.

Dynamic Nature: Acknowledging the dynamic nature of the technological landscape, the framework encourages organizations to continuously reassess and adapt their strategies in response to evolving conditions.

6. Practical Implications

The research paper has several practical implications that offer actionable insights for IT industries, practitioners, policymakers, and scholars. Here are key practical implications derived from the study:

- Strategic Planning for Innovation Adoption

Practical Guidance: The study provides practical guidance on strategic planning for innovation adoption within IT industries. Organizations can use the developed holistic theoretical framework to assess their readiness, understand external influences, and plan for the strategic integration of emerging technologies.

- Organizational Culture and Leadership Development

Cultural Transformation: Recognizing the importance of organizational culture, the paper suggests that IT companies should invest in cultural transformation. Fostering an innovation-centric culture and nurturing transformational leadership can positively impact the adoption process.

- Resource Allocation and Budgetary Planning

Financial Strategy: The research emphasizes the significance of strategic resource allocation and budgetary planning. IT organizations can optimize their financial strategies, ensuring adequate resources for training, technology acquisition, and mitigating challenges associated with budgetary constraints.

❖ Technology Assessment and Incremental Adoption

Smart Adoption Strategies: The study advocates for comprehensive technology assessments and the adoption of incremental strategies. Organizations can strategically assess the complexity of emerging technologies, plan for phased implementation, and prioritize innovations based on their potential impact.

❖ Collaboration and Partnerships:

Strategic Alliances: Collaboration and partnerships are highlighted as valuable strategies for navigating the technological horizon. IT companies can actively seek partnerships with tech institutes, industry peers, and technology vendors to enhance skills, share knowledge, and stay at the forefront of innovations.

❖ Change Management and Employee Engagement

Employee-Centric Approach: The paper underscores the importance of change management and employee engagement. IT organizations can adopt employee-centric approaches, including comprehensive training programs, open communication channels, and involving employees in the decision-making process to foster a positive environment for innovation adoption.

❖ Strategic Alignment with External Environment

Market Sensitivity: Practical implications involve aligning innovation strategies with external environmental factors. IT industries can benefit from staying sensitive to market trends, regulatory changes, and competitive dynamics to ensure that their innovation adoption aligns with broader industry developments.

❖ Learning from Real-World Examples

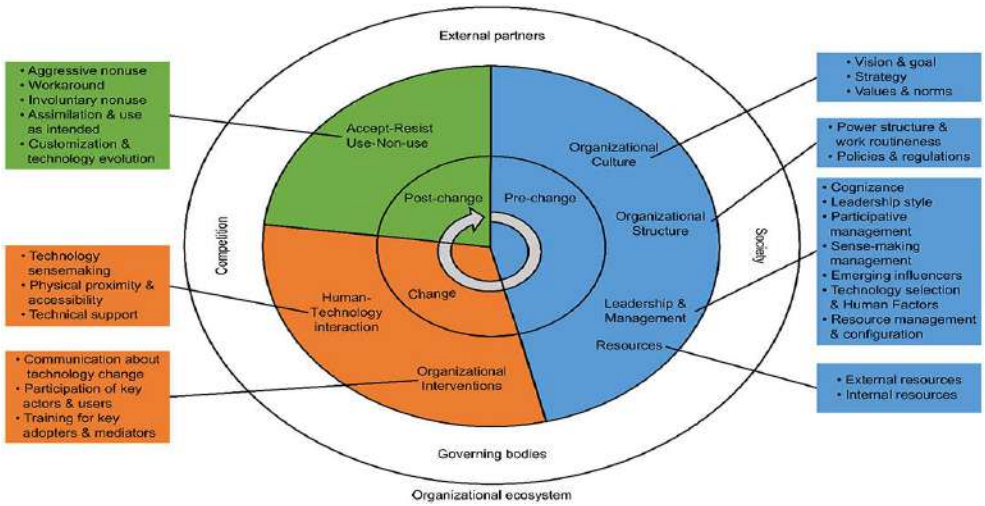
Case Study Learning: The incorporation of real-world case studies provides tangible examples for learning. Practitioners can draw insights from these cases to understand how other organizations have successfully navigated challenges and leveraged opportunities in their innovation adoption journeys.

❖ Continuous Evaluation and Adaptation

Agile Approach: The practical implications highlight the need for continuous evaluation and adaptation. Organizations should adopt an agile approach, regularly reassessing their strategies in response to the dynamic technological landscape and adjusting their plans accordingly.

❖ Policy Recommendations for Policymakers

Informed Policymaking: Policymakers can use the research findings to inform technology-related policies. Understanding the challenges faced by IT industries in innovation adoption can guide the development of policies that foster a conducive environment for technological advancements.



7. Roadmap for Continuous Adaptation

The research paper proposes a comprehensive roadmap for continuous adaptation within IT industries. This roadmap aims to guide organizations in navigating the ever-evolving technological landscape and fostering a culture of continuous innovation. Here are key components of the roadmap:

❖ Environmental Scanning and Trend Analysis

Continuous Monitoring: Establish mechanisms for continuous environmental scanning to stay abreast of emerging technologies, market trends, regulatory changes, and competitive dynamics.

Trend Analysis: Regularly conduct trend analysis to identify technological advancements that align with organizational goals and industry demands.

- Agile Strategic Planning

Agile Methodologies: Adopt agile strategic planning methodologies to respond swiftly to changes in the technological environment.

Scenario Planning: Incorporate scenario planning to anticipate potential future developments and formulate adaptive strategies.

- Organizational Learning and Skill Development

Continuous Learning Initiatives: Implement continuous learning initiatives to upskill the workforce in alignment with emerging technologies.

Skill Development Programs: Establish skill development programs that focus on both technical competencies and soft skills necessary for innovation adoption.

- Innovation Culture and Leadership

Cultivate Innovation Culture: Foster a culture of innovation that encourages creativity, risk-taking, and openness to change.

Transformational Leadership: Emphasize transformational leadership to inspire and guide teams in embracing new technologies and adapting to change.

- Cross-Functional Collaboration

Interdepartmental Collaboration: Promote cross-functional collaboration by breaking down silos and encouraging knowledge-sharing among different departments.

Innovation Teams: Form interdisciplinary innovation teams to tackle complex challenges and drive collaborative efforts in adopting new technologies.

- Flexible Organizational Structure

Adaptability: Maintain a flexible organizational structure that can adapt to changing technology landscapes.

Decentralization: Consider decentralized structures that empower teams to make decisions quickly and respond to innovation opportunities.

- Continuous Technology Assessment

Technology Audits: Conduct regular technology audits to assess the relevance and compatibility of existing systems with emerging technologies.

Pilot Programs: Implement pilot programs to test and evaluate the feasibility of new technologies in real-world organizational contexts.

- Strategic Partnerships and Alliances

Strategic Alliances: Forge strategic partnerships with technology vendors, research institutions, and industry peers to access external expertise and resources.

Collaborative Innovation: Engage in collaborative innovation initiatives with partners to share knowledge and co-create solutions.

- User Feedback and Iterative Improvement

User-Centric Approach: Prioritize a user-centric approach by actively seeking feedback from end-users during and after technology adoption.

Iterative Improvement: Implement iterative improvement cycles based on user feedback to enhance the usability and effectiveness of adopted technologies.

- Regular Evaluation and Adaptation

Performance Metrics: Define and regularly evaluate key performance metrics related to innovation adoption, including speed of implementation, user satisfaction, and business impact.

Adaptation Strategies: Develop strategies for adaptation based on the evaluation outcomes, ensuring a proactive response to changing circumstances.

- Communication and Transparency

Transparent Communication: Maintain transparent communication channels to keep all stakeholders informed about the organization's innovation initiatives.

Inclusive Decision-Making: Involve key stakeholders in decision-making processes related to technology adoption, fostering a sense of ownership and commitment.

- Regulatory Compliance and Ethical Considerations

Regulatory Compliance: Stay vigilant about changes in regulatory frameworks and ensure continuous compliance with industry standards.Ethical Framework: Develop and adhere to an ethical framework that guides technology adoption practices and addresses potential ethical implications.

Conclusions

In conclusion, the in-depth analysis of innovation adoption in IT industries sheds light on crucial aspects that govern the dynamic landscape of technological advancements. Through a comprehensive examination of adoption patterns, challenges, success factors, and implications for stakeholders, this research contributes valuable insights to both academia and industry practitioners.

The study has identified discernible patterns in technology adoption, highlighting the intricate interplay of organizational culture, industry norms, and economic considerations. Understanding these dynamics is pivotal for companies seeking to navigate the technological horizon successfully. Moreover, the exploration of challenges and barriers underscores the multifaceted nature of embracing innovation in IT. Financial constraints, resistance to change, and compatibility issues emerge as recurrent hurdles, urging organizations to develop nuanced strategies to overcome these impediments.

On a positive note, the identification of success factors provides a roadmap for organizations aspiring to thrive in an era of rapid technological evolution. Effective leadership, strategic planning, and a supportive organizational culture are key ingredients for successful innovation adoption. These findings offer actionable insights for businesses aiming to position themselves as industry leaders through proactive technological integration.

The implications of this analysis extend beyond individual organizations, resonating with various stakeholders such as IT professionals, policymakers, and industry leaders. Policymakers can leverage these insights to shape regulations that foster innovation, while industry leaders can refine their strategies based on a nuanced understanding of the technological landscape.

Looking forward, the research anticipates a continued evolution of IT industries, with emerging technologies playing a pivotal role in shaping the future. The identified trends provide a basis for future projections and offer a foundation for organizations to anticipate and adapt to forthcoming changes. As we stand at the intersection of innovation and industry, the recommendations provided in this study serve as pragmatic guides for stakeholders seeking to harness the full potential of technological advancements.

In acknowledgment of the study's limitations, including potential biases and constraints in data availability, it is essential to approach the conclusions with a degree of caution. Nevertheless, this research serves as a stepping stone for future investigations, encouraging scholars to delve deeper into specific facets of innovation adoption in IT industries.

In essence, "Navigating the Technological Horizon" not only demystifies the complexities of innovation adoption but also empowers organizations to chart a course towards sustainable success in the ever-evolving IT landscape. As industries continue to grapple with the challenges and opportunities presented by technological innovations, this analysis stands as a beacon, guiding stakeholders through the intricate journey of navigating the technological horizon.

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Seeds of Change: Charting the Future Path of Agrochemicals through Innovation and Resourcefulness

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Abstract

This research paper delves into the evolving landscape of agrochemicals, exploring the pivotal role of innovation and resourcefulness in shaping the future trajectory of agriculture. With the growing challenges posed by climate change, population growth, and diminishing natural resources, the agricultural sector faces an urgent need for sustainable solutions. This paper examines the innovative approaches and technologies that hold promise for addressing these challenges while ensuring food security and environmental stewardship. Through a comprehensive review of current trends, emerging technologies, and case studies, it elucidates the transformative potential of novel agrochemicals in enhancing crop productivity, minimizing environmental impact, and promoting resilience in the face of evolving agricultural dynamics. By analyzing the synergies between scientific advancements, regulatory frameworks, and market dynamics, this paper provides insights into the opportunities and challenges in navigating the future path of agrochemicals towards a more sustainable and prosperous agricultural future.

Keywords: Agrochemicals, Innovation, Resourcefulness, Sustainable Agriculture, Crop Productivity, Environmental Stewardship

Introduction

Background and significance of agrochemicals in modern agriculture

Agrochemicals are essential in contemporary agriculture for increasing crop yield, managing pests and diseases, and promoting soil quality. Agrochemicals refer to a variety of chemical products utilized in agricultural activities, such as fertilizers, insecticides, herbicides, and plant growth regulators. These compounds are essential parts of modern agricultural systems, playing a key role in the world's food production and economic growth. The subsequent paragraphs emphasize the historical context and importance of agrochemicals.

Enhanced Crop Yields: Agrochemicals have boosted farmers' ability to increase crop production by supplying vital nutrients to plants using fertilizers and safeguarding crops from pests, diseases, and weeds with pesticides and herbicides. This heightened productivity is crucial for satisfying the increasing need for food resulting from population growth and shifting eating habits.

Pesticides and herbicides are essential for controlling agricultural pests and illnesses to prevent substantial crop losses. These compounds aid farmers in preserving the health of crops and reducing losses after harvesting, therefore supporting food security and economic stability.
Soil Fertility Management: Fertilizers are necessary to restore soil nutrients that have been depleted due to intensive farming techniques. Fertilizers promote soil fertility and enhance crop nutrition by supplying vital components including nitrogen, phosphorus, and potassium. Agrochemicals such as soil conditioners and bio-stimulants play a role in preserving soil structure and microbial activity, which contributes to long-term sustainability.

Herbicides are crucial for weed control and crop protection by managing weed growth and minimizing competition for resources like water, light, and nutrients. Weed management that is effective enhances crop yields and decreases the requirement for human labor, hence increasing the efficiency and cost-effectiveness of agriculture. Herbicides also aid in soil moisture conservation and erosion prevention by preserving plant cover.

Agricultural innovation and technology have transformed modern agriculture by introducing new pesticide formulations and application methods, allowing farmers to implement more precise and eco-friendly practices. Advancements including genetically modified crops (GMOs), precision agriculture, and integrated pest management (IPM) have improved the use of agrochemicals, promoting sustainable intensification and resource conservation.

Agrochemicals play a crucial role in the global economy by bolstering agricultural productivity, trade, and employment. The agrochemical sector offers job possibilities in manufacturing, distribution, research, and extension services, which helps drive economic growth and rural development. Furthermore, the heightened agricultural output due to

agrochemicals boosts farmers' earnings and well-being, aiding in reducing poverty and maintaining socio-economic stability.

Agrochemicals are essential in modern agriculture for increasing crop output, safeguarding crops from pests and diseases, raising soil fertility, and encouraging sustainable farming methods. Although widely utilized, it is crucial to weigh the advantages of pesticides in agriculture and society against the possible threats they pose to human health and the environment. Implementing sustainable pesticide management techniques, along with continuous research and innovation, is essential for securing the future sustainability of agricultural systems and tackling new concerns like climate change and food security.

Challenges and opportunities in the agricultural sector

The agricultural industry encounters numerous problems and opportunities as it works to fulfill the increasing need for food, adjust to evolving environmental conditions, and advocate for sustainable practices. It is crucial to comprehend and tackle these obstacles while taking advantage of chances to guarantee the sector's durability, efficiency, and sustainability in the long run. Here are some significant obstacles and possibilities:

Challenges:

Climate change presents substantial challenges to agricultural output and stability through shifts in weather patterns, increased frequency of extreme events, and rising temperatures. Climate change causes changes in growing seasons, water scarcity, and the proliferation of pests and diseases, affecting crop production and food security.

Resource scarcity, caused by the depletion of natural resources like water, arable land, and biodiversity, along with growing competition for these resources from other sectors, poses a danger to agricultural sustainability. Effective resource management methods are crucial to reduce the negative impacts of resource scarcity on food production and ecosystem health.

Food insecurity persists globally despite agricultural breakthroughs, leading to hunger and malnutrition for millions of people. To tackle food insecurity, we need to enhance access to

healthy food, minimize food wastage, strengthen smallholder farmers' ability to withstand challenges, and ensure fair distribution and access to resources.

Rural Poverty: Numerous rural communities, especially in developing nations, rely on agriculture for their sustenance. Restricted entry to markets, financial services, education, and healthcare sustains rural poverty and obstructs agricultural progress. Providing smallholder farmers with resources, technology, and education can help reduce poverty and foster equitable economic growth.

Intensive agricultural practices such as deforestation, soil erosion, chemical pollution, and greenhouse gas emissions lead to environmental deterioration and loss of biodiversity. Utilizing sustainable agricultural practices like agroecology, organic farming, and conservation agriculture is crucial for reducing negative effects and enhancing ecosystem resilience.

Opportunities:
Technological innovation in biotechnology, precision agriculture, robotics, and digital farming provides unique prospects to enhance agricultural productivity, resource efficiency, and sustainability. Farmers may optimize resource use and adapt to changing climatic conditions by utilizing innovative solutions including drought-resistant crops, precision irrigation systems, and smart farming technologies.

Globalization has broadened market access for agricultural products, enabling farmers to reach foreign markets and extend their sources of income. Trade liberalization, infrastructure development, and integrating value chains help boost agricultural trade and improve farmers' ability to compete globally.

Sustainable Practices: Rising consumer interest in sustainably produced food offers farmers a chance to implement eco-friendly methods and distinguish their products in the market. Organic, fair trade, and Rainforest Alliance certifications help farmers align with customer demand for ethically sourced and environmentally friendly products.

Enhancing agricultural education, research, and extension services improves farmers' ability to implement best practices, increase productivity, and address new difficulties. Training programs, farmer field schools, and knowledge-sharing platforms help farmers develop the skills and knowledge necessary to improve their ability to withstand challenges and improve their livelihoods.

Policy support is crucial for unleashing the potential of the agricultural industry and resolving important obstacles. This involves creating policy frameworks that emphasize agricultural development, investment, and innovation. Governments may bolster agriculture through policy measures like subsidies, incentives for sustainable practices, infrastructure enhancement, and risk mitigation strategies.

Ultimately, the agricultural industry encounters various obstacles but also offers substantial prospects for innovation, expansion, and sustainability. To overcome these obstacles and take advantage of opportunities, cooperation is needed from governments, civil society, the private sector, and farmers. The agricultural industry may enhance global food security, reduce poverty, and promote environmental conservation by adopting sustainable practices, technological innovation, and inclusive policies.

Importance of innovation and resourcefulness in addressing agricultural sustainability

Innovation and resourcefulness are crucial in tackling the many issues of agricultural sustainability. With the increasing global population and escalating environmental challenges, there is a critical requirement for creative solutions to boost agricultural output, enhance resource efficiency, and encourage environmental conservation. Key reasons why innovation and resourcefulness are essential for achieving agricultural sustainability:

Innovation fosters the creation of new technology, processes, and resources that can improve agricultural output. Innovative solutions such as precision agriculture, biotechnology, enhanced crop varieties, and advanced irrigation systems help farmers increase food production while conserving resources and reducing environmental impact to satisfy the rising food demand.

Enhancing Resource Efficiency: Resourcefulness entails optimizing the effective utilization of limited resources like land, water, energy, and nutrients. Advanced technologies and management strategies including drip irrigation, soil conservation methods, and integrated pest control assist farmers in maximizing resource efficiency, decreasing waste, and limiting environmental harm.

Agriculture significantly contributes to environmental deterioration through activities such as deforestation, soil erosion, water pollution, and greenhouse gas emissions. Innovation is crucial for creating sustainable agricultural methods that reduce negative effects and enhance ecosystem well-being. Agroecological methods, organic farming, and agroforestry are creative solutions that focus on environmental sustainability.
Adapting to Climate Change: Agriculture has unique problems due to climate change, such as changes in temperature and precipitation patterns, more frequent extreme weather events, and variations in pest and disease dynamics. Farmers use innovative tactics including climate-resilient crop varieties, water-efficient irrigation systems, and weather forecasting technologies to reduce climate risks and adapt to changing environmental conditions.

Innovation promotes economic growth and competitiveness in the agricultural sector by facilitating the adoption of new technology, entry into new markets, and diversification of revenue sources for farmers. Farmers can enhance their livelihoods, decrease susceptibility to market swings, and aid in poverty reduction and rural development by adopting innovation.

Innovation is crucial for guaranteeing worldwide food security through boosting agricultural output, enhancing food distribution and storage systems, and improving nutritional quality. Genetically modified crops, precision agriculture, and post-harvest processing advances are essential in combating food insecurity and malnutrition, especially in vulnerable areas.

Empowering Farmers: Innovation provides farmers with the necessary knowledge, tools, and resources to make educated decisions and adjust to changing situations. Investing in

agricultural research, extension services, and farmer training programs empowers farmers to catalyze sustainable agricultural development in their communities.

Ultimately, creativity and ingenuity are essential for attaining agricultural sustainability among increasing obstacles. The agricultural sector may enhance food security, environmental conservation, and economic success for current and future generations by cultivating innovation, adopting new technologies, and advocating for resource-efficient methods. Collaboration among stakeholders, such as governments, researchers, farmers, and the private sector, is crucial for utilizing the revolutionary power of innovation and achieving the objectives of sustainable agriculture.

Objective of study

1. To analyzing the contemporary issues in agriculture, including climate change, resource shortages, pest and disease pressure, and environmental degradation.
2. To exploring cutting-edge technologies, practices, and approaches in agrochemicals and agricultural systems such as biotechnology, precision agriculture, bio-based alternatives, and sustainable farming methods to find solutions for agricultural challenges.
3. To evaluating the impact and performance of new agrochemicals and agricultural techniques through case studies, field trials, and performance assessments to understand their effectiveness, advantages, and constraints in practical situations.

Significance of the study

The study "Seeds of Change: Charting the Future Path of Agrochemicals through Innovation and Resourcefulness" is important because it has the ability to provide valuable information and direction for sustainable agricultural growth. Here are some crucial factors underscoring its importance:

Addressing the issue of global food security is crucial due to the fast increasing worldwide population. The study aims to investigate new methods in agrochemicals and agricultural

practices to enhance agricultural output, boost crop resilience, and decrease post-harvest losses, thus supporting global food security.

Advocating for Environmental Sustainability: Conventional agricultural methods are frequently linked to adverse environmental effects such soil depletion, water contamination, and reduction in biodiversity. The study focuses on identifying and promoting sustainable agriculture techniques that reduce environmental damage, conserve natural resources, and enhance ecosystem health via innovation and resourcefulness.

Agriculture plays a dual role in climate change, acting as both a driver and a recipient of its impacts. The study aims to assist farmers in reducing the effects of climate change by implementing advanced agrochemicals and practices, including climate-resilient crop varieties and carbon-smart farming techniques, to combat challenges like extreme weather events, changing growing seasons, and evolving pest and disease patterns.

Agriculture plays a crucial role in providing livelihoods for millions of people globally, especially in emerging nations, contributing significantly to economic development. The study aims to enhance agricultural production, efficiency, and sustainability to help reduce poverty, promote rural development, and boost economic growth by empowering farmers and enhancing rural economies.

Evolution of Agrochemicals (Review of Literature)

Historical overview of agrochemical usage

Historical summary of agricultural chemicals

Studying the historical use of agrochemicals offers important insights into how agricultural methods have developed and the impact of pesticides on improving crop yield. Here is an overview of the main stages and advancements in the history of agrochemical utilization:

Early Agricultural Practices: Agrochemicals have been utilized for millennia by ancient civilizations, who used natural ingredients like manure, compost, and plant extracts to enhance

soil fertility and manage pests and illnesses. Ancient agricultural civilizations in Mesopotamia, Egypt, and China created basic techniques for soil management and plant protection.

Introduction to Synthetic Chemicals: The industrial revolution in the 19th century resulted in notable progress in chemistry, which led to the creation of artificial compounds for agricultural use. Synthetic fertilizers like ammonium nitrate and superphosphate transformed crop production by supplying vital nutrients to plants and increasing yields.

In the early 20th century, synthetic pesticides such as insecticides, herbicides, and fungicides were developed to manage pests, weeds, and diseases. Chemical compounds including DDT, arsenic-based compounds, and organochlorines were extensively utilized for pest control, resulting in significant decreases in crop damage and enhanced food safety.

The agrochemical industry expanded rapidly after World War II due to technological improvements, increased agricultural intensification, and rising food demand. Agrochemical firms created various chemical compounds, formulations, and application methods that supported the Green Revolution and agricultural modernization globally.

Environmental and Health Concerns: The widespread use of artificial pesticides and fertilizers has raised worries about their negative effects on the environment and health. Concerns including soil degradation, water pollution, pesticide residues, and ecosystem disruption have highlighted the necessity for sustainable agriculture techniques and decreased reliance on chemicals.

Regulatory responses to environmental and health concerns led governments worldwide to enforce controls and restrictions on the use of agrochemicals. Regulatory frameworks were created to evaluate the safety, effectiveness, and environmental consequences of agrochemical products, such as pesticide registration, labeling rules, and maximum residue limits (MRLs) for food safety.

The concept of Integrated Pest Management (IPM) became popular in the latter part of the 20th century as a comprehensive approach to pest control. It focuses on combining various pest

management strategies such as biological control, cultural practices, and careful pesticide use. Integrated Pest Management aims to reduce the use of chemical pesticides and promote ecological equilibrium and long-term sustainability.

Biotechnology has made great progress in the late 20th and early 21st centuries, resulting in the creation of genetically engineered crops with features including insect resistance, herbicide tolerance, and improved nutritional value. Genetically modified crops provided new possibilities for pest control, weed management, and resource utilization, despite being met with debates on safety, oversight, and public approval.

In recent years, there has been a shift towards sustainable agriculture techniques that focus on lowering chemical inputs, encouraging biodiversity, conserving natural resources, and increasing resistance to climate change. Agroecological approaches, organic farming practices, and precision agriculture technologies are creative strategies to create more sustainable and ecologically friendly agricultural systems.

Ultimately, the historical analysis of pesticide use demonstrates the progression of agricultural techniques from traditional to chemical-intensive ways, and now towards sustainable and ecologically friendly practices. Agrochemicals have boosted agricultural productivity and food security, but their excessive use has led to environmental and health issues. This highlights the need for more sustainable and integrated crop production methods in the future.

Shifts in agricultural practices and technologies

Agricultural advancements have played a key role in changing food production methods, improving efficiency, sustainability, and adaptability. The alterations are indicative of changes in societal, economic, and environmental circumstances, as well as progress in science and technology. Below are some significant changes in agricultural methods and technologies:

The introduction of mechanization and industrialization in agriculture during the 19th century signaled a notable transition from manual labor to machine-driven farming. Tractors, combine

harvesters, and other mechanical tools transformed agricultural productivity by allowing farmers to work on more fields, improve efficiency, and decrease the need for manual labor.
The Green Revolution in the mid-20th century led to significant advances in agricultural techniques and technologies, especially in developing nations. The implementation of high-yielding crop varieties, along with irrigation infrastructure, synthetic fertilizers, and chemical pesticides, resulted in significant boosts in agricultural yields and food production, effectively combating hunger and poverty in various regions worldwide.

Precision agriculture is the implementation of technologies that promote data-driven and site-specific farming techniques. Farmers utilize GPS-guided tractors, drones, sensors, and GIS mapping to efficiently manage resources like water, fertilizers, and pesticides. This technology allows them to minimize environmental impact and enhance crop yields by targeting resources accurately depending on field variability.

Biotechnology and genetic engineering have transformed crop breeding and plant science. Genetically modified (GM) crops provide new possibilities for managing pests, controlling weeds, and tolerating stress through features like insect resistance, herbicide tolerance, and drought tolerance. However, they have also sparked worries regarding safety, regulation, and ethical issues.

The increasing consumer interest in organic and sustainably produced food has sparked a renewed enthusiasm for organic farming techniques and sustainable agriculture practices. Organic farming prioritizes soil health, biodiversity, and ecological balance by using natural and biological alternatives instead of synthetic inputs like pesticides and fertilizers.

Agroecology and Permaculture focus on promoting biodiversity, nutrient cycling, and ecosystem resilience by applying ecological concepts and conventional farming methods. Agroecology incorporates ecological principles into agricultural practices by focusing on diverse cropping systems, crop rotations, agroforestry, and integrated pest management to improve production and sustainability.

The digital revolution has sparked innovation in agriculture through the development of farm management software, mobile apps, and sensor technologies. Digital agricultural solutions allow farmers to gather, evaluate, and use up-to-date data on weather, soil conditions, crop health, and machinery performance to make informed decisions and improve farm operations.

Urbanization and land limitations have sparked curiosity in alternative farming techniques including vertical farming and controlled environment agriculture (CEA). These technologies encompass cultivating crops indoors utilizing hydroponics, aeroponics, or aquaponics systems in controlled environments, providing year-round production, resource efficiency, and urban food security.

Ultimately, changes in agricultural methods and technologies demonstrate continuous attempts to address the demands of providing food for an expanding worldwide population while also supporting sustainability, resilience, and environmental conservation. Agriculture may progress towards more efficient, fair, and eco-friendly systems that guarantee food security and livelihoods for future generations by adopting innovation, incorporating various perspectives, and utilizing technological breakthroughs.

Impacts of conventional agrochemicals on the environment and human health

Traditional agrochemicals, such as synthetic fertilizers, insecticides, and herbicides, have substantial effects on the environment and human health. Although these compounds have been essential in boosting agricultural output, they also present hazards and issues that must be dealt with. Here are some primary effects of traditional agrochemicals:

Water Pollution: Agricultural runoff can transport pesticide residues into water sources, causing water pollution. Synthetic fertilizers with nitrogen and phosphorus can result in eutrophication, causing algal blooms, oxygen deprivation, and habitat deterioration in rivers, lakes, and coastal regions. Pesticides and herbicides can pollute water supplies, endangering aquatic ecosystems and human health.

Soil degradation can occur due to over dependence on synthetic fertilizers, resulting in nutritional imbalances. Overapplication of nitrogen can lead to soil acidification, reduced soil fertility, and nitrogen leaching into groundwater, resulting in pollution. Pesticides and herbicides can disturb soil microbial populations, decrease soil biodiversity, and harm soil health, impacting long-term productivity and ecosystem resilience.

Agrochemicals can harm biodiversity by negatively impacting beneficial insects, pollinators, birds, and other species. Pesticides and herbicides have the potential to harm unintended organisms, disturb food chains, and decrease biodiversity in agricultural environments. Biodiversity loss can reduce ecosystem resilience, lead to more insect outbreaks, and undermine natural pest control services.

Prolonged usage of pesticides can result in the emergence of pesticide-resistant pests and weeds, necessitating increased chemical application for effective management. Pesticide resistance weakens the efficacy of pest control methods, raises production expenses for farmers, and worsens pest issues in the long run. Pesticide resistance can result in the development of secondary pests and ecological imbalances.

Human health is at danger from exposure to agrochemicals, especially for farmworkers, rural communities, and consumers. Pesticide exposure can lead to acute poisoning, respiratory issues, skin irritations, and neurological diseases among agricultural workers. Continual exposure to pesticide residues in food and water might heighten the likelihood of cancer, reproductive issues, and developmental defects in susceptible groups like children and pregnant women.

Agrochemicals can add to air pollution through volatilization, drift, and atmospheric deposition. Pesticides and fertilizers release volatile organic compounds (VOCs) that can combine with other pollutants to create ozone and particle matter, leading to the creation of smog and respiratory issues. Herbicide drift can harm unintended plants, such as crops, gardens, and natural habitats, causing financial losses and ecological disruptions.

Resistance Management hurdles: Farmers and agricultural practitioners have considerable hurdles in managing resistance to pesticides and herbicides. Excessive and incorrect use of agrochemicals can speed up the resistance of target species, requiring the rotation of chemical categories, integrated pest management (IPM) techniques, and the creation of alternative control approaches to effectively handle pest and weed populations in a sustainable manner.

Conventional agrochemicals have boosted agricultural production and food security but have also had negative environmental and human health effects due to their extensive application. To address these problems, it is necessary to implement integrated and sustainable pest control strategies, decrease reliance on chemicals, advocate for agroecological methods, and provide resources to research and innovation for the creation of safer and more eco-friendly alternatives. Agriculture may achieve greater sustainability, resilience, and equity for current and future generations by reducing the adverse impacts of agrochemicals.

Case Studies and Success Stories

Examples of innovative agrochemical solutions in practice

Improving Tomato Crop Resistance: An Examination of Biopesticides

Introduction: This case study analyzes the utilization and results of novel biopesticides in tomato farming, emphasizing their effectiveness in pest control, ecological sustainability, and financial feasibility. Biopesticides, sourced from plants, bacteria, and minerals, provide effective alternatives to traditional chemical pesticides, mitigating issues including pesticide residues, environmental contamination, and human health hazards.

Background:

Tomato (Solanum lycopersicum) is a commonly grown crop worldwide, encountering many pest and disease challenges that can lower production and quality. Traditional pest control methods frequently use artificial pesticides, which can create environmental and health hazards and contribute to the development of pesticide resistance. Growers are increasingly using

biopesticides in integrated pest management (IPM) techniques to improve crop resilience and reduce chemical usage in response to difficulties.

Case Study Details:
Central Valley, California, USA
Land Area: 50 acres dedicated to growing tomatoes
Timeframe: Growing seasons spanning from 2020 to 2023

Implementing Innovation:
The farm used a biopesticide formulation that includes Bacillus thuringiensis (Bt), a naturally occurring bacterium that is efficient in controlling lepidopteran pests like tomato hornworm (Manduca quinquemaculata) and armyworms (Spodoptera spp.). The chosen biopesticide adhered to Integrated Pest Management (IPM) principles by focusing on particular pests and safeguarding beneficial insects and natural adversaries.

Application Method: Biopesticides were administered with standard spray equipment, adhering to suggested application rates and time determined by pest surveillance and monitoring information. By using targeted application, the risk of hurting non-target creatures such as pollinators and beneficial insects was lowered due to diminished off-target impacts.

Monitoring & Evaluation: Pest populations were periodically checked using visual inspections and pheromone traps to evaluate the efficacy of biopesticide applications. Data was gathered on insect population, crop harm, and yield factors to assess the influence of biopesticides on pest management and crop productivity.

Results and Effects:
The efficacy of pest control was achieved by utilizing biopesticides to effectively manage target pests such as tomato hornworm and armyworms, eliminating the necessity for synthetic chemical pesticides. Reduced pest pressure resulted in decreased crop damage and enhanced overall crop health.

The farm improved its environmental sustainability by substituting synthetic pesticides with biopesticides, thereby reducing pesticide residues in soil, water, and food items. Biopesticides have shown positive ecological characteristics, with low hazards to non-target creatures, beneficial insects, and natural ecosystems.

Economic Viability: Although the initial investment for biopesticides may be greater than that of synthetic pesticides, the long-term economic advantages surpass the expenses. The farm had increased profitability and return on investment due to increasing crop yields, reduced chemical inputs, and improved insect management.

The effective use of biopesticides in tomato farming showed their efficacy and feasibility to other farmers in the area, leading to their acceptance and adoption. Farmer use of biopesticides rose due to environmental concerns, customer demand for pesticide-free products, and regulatory pressures.

Key Takeaways and Suggestions:
Utilizing biopesticides in Integrated Pest Management (IPM) programs improves pest control effectiveness, reduces environmental harm, and decreases dependence on synthetic pesticides.

Regularly monitoring insect populations and making prompt decisions based on this data are crucial for optimizing the use of biopesticides and enhancing their efficiency.

Education and Training: Educating farmers on the advantages, constraints, and correct application of biopesticides enhances their decision-making abilities and encourages acceptance by producers.

Research and Innovation: Ongoing research and development of new biopesticide formulations, delivery systems, and application technologies are necessary to broaden the range of sustainable pest management alternatives available to producers.

Conclusion: The case study on biopesticides in tomato production demonstrates their potential as cutting-edge agrochemical solutions to improve crop resilience, support environmental sustainability, and guarantee economic viability. Farmers can achieve efficient pest control and reduce the adverse effects of chemical pesticides on the environment and human health by incorporating biopesticides into integrated pest management practices.

Challenges and Future Directions

Challenges and Future Directions in "Seeds of Change: Charting the Future Path of Agrochemicals through Innovation and Resourcefulness"

Regulatory obstacles are a key barrier for the future of agrochemicals, involving intricate regulatory frameworks and licensing procedures. Compliance with regulations for testing, registering, and labeling agrochemical goods can be a lengthy and expensive process, with differences often existing between countries and regions. It is crucial to address regulatory obstacles and simplify approval procedures to speed up the progress and acceptance of novel agrochemicals.

Resistance Management: The development of pest and weed resistance to agrochemicals presents substantial obstacles for sustainable pest control. Continued usage of identical chemical compounds can cause insect populations to become resistant, requiring the rotation of active components, incorporation of various pest management strategies, and creation of new methods of action. It is essential to implement efficient resistance management measures to maintain the effectiveness of agrochemicals and sustainably control insect populations.

Agrochemical consumption has led to environmental concerns such as water pollution, soil degradation, biodiversity loss, and greenhouse gas emissions. To address these challenges, we need to shift towards sustainable and eco-friendly options including biopesticides, organic farming techniques, and precision agriculture technologies. Supporting research and innovation to create environmentally friendly agrochemicals and encouraging integrated pest management strategies are crucial for reducing environmental hazards linked to traditional agrochemicals.

Consumer Preferences: The increasing inclination of consumers towards organic, sustainably produced food products is boosting the need for pesticide alternatives and environmentally friendly farming practices. Farmers and agrochemical businesses must adapt to evolving market conditions by implementing sustainable agricultural methods, decreasing chemical usage, and improving visibility and traceability across the supply chain. Meeting consumer demands for safe, healthy, and sustainably produced food will necessitate cooperation and creativity throughout the agriculture industry.

Technological breakthroughs in biotechnology, digital agriculture, and precision farming provide opportunities to revolutionize the creation and use of agrochemicals. Utilizing gene editing, artificial intelligence, and remote sensing technologies can improve the effectiveness, safety, and sustainability of agrochemicals, while also improving resource utilization and reducing environmental harm. It is crucial to invest in research and development of advanced pesticide formulations and delivery technologies to remain a leader in agricultural technology innovation.

Enhancing knowledge-sharing, training, and capacity-building programs among farmers, extension workers, and agricultural stakeholders is crucial for encouraging the use of new agrochemicals and sustainable farming methods. Empowering farmers through education and support regarding the advantages, hazards, and correct usage of agrochemicals can help them make informed decisions and adopt best practices for crop protection and environmental conservation.

To tackle the challenges and make the most of the opportunities discussed in "Seeds of Change: Charting the Future Path of Agrochemicals through Innovation and Resourcefulness," a comprehensive strategy is needed that includes cooperation, creativity, and dedication from all parties involved in agriculture. The agriculture business can ensure a sustainable and lucrative future for agrochemicals by overcoming regulations, handling resistance, resolving environmental concerns, responding to consumer preferences, embracing technical improvements, and investing in capacity building.

Conclusion

Ultimately, "Seeds of Change: Charting the Future Path of Agrochemicals through Innovation and Resourcefulness" provides significant perspectives on the obstacles, possibilities, and upcoming trends in agrochemicals within agriculture. The study explores new methods and creative ideas that have the potential to bring about significant changes in agricultural practices, emphasizing sustainability, productivity, and environmental responsibility.

The study highlights the crucial role of creativity and resourcefulness in tackling the intricate difficulties confronting agriculture, such as climate change, resource shortages, food insecurity, and environmental degradation. The agricultural industry may improve resilience, productivity, and long-term sustainability while reducing negative environmental and social impacts by adopting innovation, utilizing technological improvements, and encouraging sustainable practices.

The article also highlights substantial hurdles and obstacles that need to be addressed in order to fully capitalize on agrochemical innovation. Challenges such as regulatory obstacles, resistance management, environmental issues, changing customer preferences, and technical intricacies necessitate cooperation and creative solutions from all participants in the agriculture industry.

In the future, improvements in science and technology, market changes, regulatory shifts, and altering societal expectations will influence the development of agrochemicals. Utilizing a comprehensive strategy that combines innovation, sustainability, and inclusion is crucial for creating a sustainable and successful future for agrochemicals in agriculture.

Ultimately, "Seeds of Change" urges players in the agricultural industry to work together, be creative, and financially support sustainable strategies that enhance food security, environmental well-being, and economic growth for current and future generations. By implementing ethical pesticide usage and resourceful agricultural techniques, we can create a more resilient, egalitarian, and sustainable food system that benefits everyone.

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Cloud computing empowerment: a comprehensive examination of adoption, security, and efficiency in legal industry.

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Abstract

The research paper examines the transformative impact of cloud computing on the legal industry, analyzing adoption trends, security aspects, and efficiency improvements. Investigating the factors influencing cloud adoption, the study assesses benefits, challenges, and operational impacts. Security protocols in cloud solutions for the legal sector are meticulously scrutinized, addressing encryption, data access controls, and compliance. Additionally, the research explores efficiency gains through cloud adoption, emphasizing remote collaboration, document management, and scalability. Through case studies, the paper showcases successful implementations; providing insights into how cloud computing optimizes legal workflows. In conclusion, the paper guides legal professionals and stakeholders in embracing cloud technology for a more agile and secure legal industry.

Keywords: Cloud computing, Legal industry, Adoption trends, Security aspects, Compliance, Efficiency gains, agile legal industry

Introduction

The legal industry can greatly enhance its technological infrastructure by embracing cloud services, a pivotal innovation reshaping traditional practices. This transition offers scalable, flexible solutions that streamline processes, promote collaboration, and optimize resource utilization. Cloud platforms provide secure data storage, accessibility, and real-

time collaboration for legal professionals, fostering efficiency and cost reduction. Furthermore, cloud solutions seamlessly integrate with legal software, automation tools, and data analytics, elevating overall operational effectiveness. By adopting cloud services, the legal industry positions itself at the forefront of technological innovation, promoting agility and resilience to meet evolving demands. The exploration of adoption trends delves into the strategic considerations guiding legal firms towards cloud technology. The paper scrutinizes security protocols, addressing concerns about data privacy, access controls, encryption, and compliance. (Javid Ilyas & Ayesha Said 2022).

Simultaneously, it highlights efficiency gains related to remote collaboration, document management, and scalability. Through case studies and empirical data, this research illuminates successful cloud computing implementations, offering insights to guide legal professionals, IT stakeholders, and policymakers. As the legal profession adapts to the digital era, this study aims to inform decisions that propel the industry towards a more agile, secure, and technologically empowered future.

Literature Review on technology adoption, challenges & benefits in legal industry

The legal industry, traditionally known for its conservative approach towards technology adoption, faces several challenges stemming from the reluctance to embrace innovative tools and solutions. This literature review delves into the identified challenges that hinder the legal sector's progress in leveraging technology for enhanced efficiency, client service, and overall competitiveness.

1. Inefficient Workflows
2. Limited Collaboration and Communication
3. Data Security Concerns
4. Outdated Document Management
5. Resistance to Change
6. Lack of Client-Centric Solutions
7. Compliance and Regulation Challenges

The legal industry, traditionally perceived as conservative, has undergone a paradigm shift in recent years with the adoption of technology. This literature review explores the

multifaceted aspects of technology adoption within the legal sector, focusing on the key themes of drivers, challenges, and outcomes.

- **Drivers of Technology Adoption:**

The literature consistently highlights several drivers compelling law firms to adopt technology. Increased client demands for efficiency, transparency, and cost- effectiveness serve as primary motivators. Additionally, the need to stay competitive in a digital era and the potential for technology to enhance legal services are recurring themes.

- **Challenges in Technology Adoption:**

Despite the evident benefits, the legal industry faces challenges in adopting technology. Concerns around data security, confidentiality, and ethical implications are frequently cited. Resistance to change among legal professionals, coupled with the complexity of integrating technology into existing workflows, poses significant hurdles.

- **Outcomes of Technology Adoption:**

Studies emphasize the positive outcomes associated with technology adoption in the legal sector. Improved efficiency, streamlined workflows, and enhanced collaboration are frequently reported benefits. Additionally, technology facilitates better client engagement, access to real-time information, and data-driven decision-making.

- **Impact on Legal Services:**

The literature underscores the transformative impact of technology on legal services. Automation of routine tasks, such as document review and legal research, allows legal professionals to focus on higher-value, strategic aspects of their work. Technology also enables better case management, legal analytics, and predictive modeling, leading to more informed legal strategies.

- **Future Trends and Considerations:**

Anticipating future trends, the literature points towards the continued integration of artificial intelligence (AI), blockchain, and cloud computing in the legal industry. As

technology evolves, considerations for ethical and regulatory frameworks become imperative, ensuring responsible and compliant technology adoption.

In conclusion, the literature converges on the evolving landscape of technology adoption in the legal industry. While acknowledging the challenges, the overall sentiment is optimistic about the positive impact technology can have on legal services, paving the way for a more efficient, client-centric, and technologically empowered legal future.

Understanding the Factors Influencing the Legal Industry's Reluctance towards Technology Adoption

The legal industry's hesitancy to adopt technologies can be attributed to several factors. Here are some key reasons,

Fig-1: Challenges/ Factors faced by Legal Industry

Addressing these challenges and gradually demonstrating the tangible benefits of technologies in the legal context may contribute to increased adoption over time. (Joshua Lenon, Sam Rosenthal 2022)

Use of Technology in Global Legal market

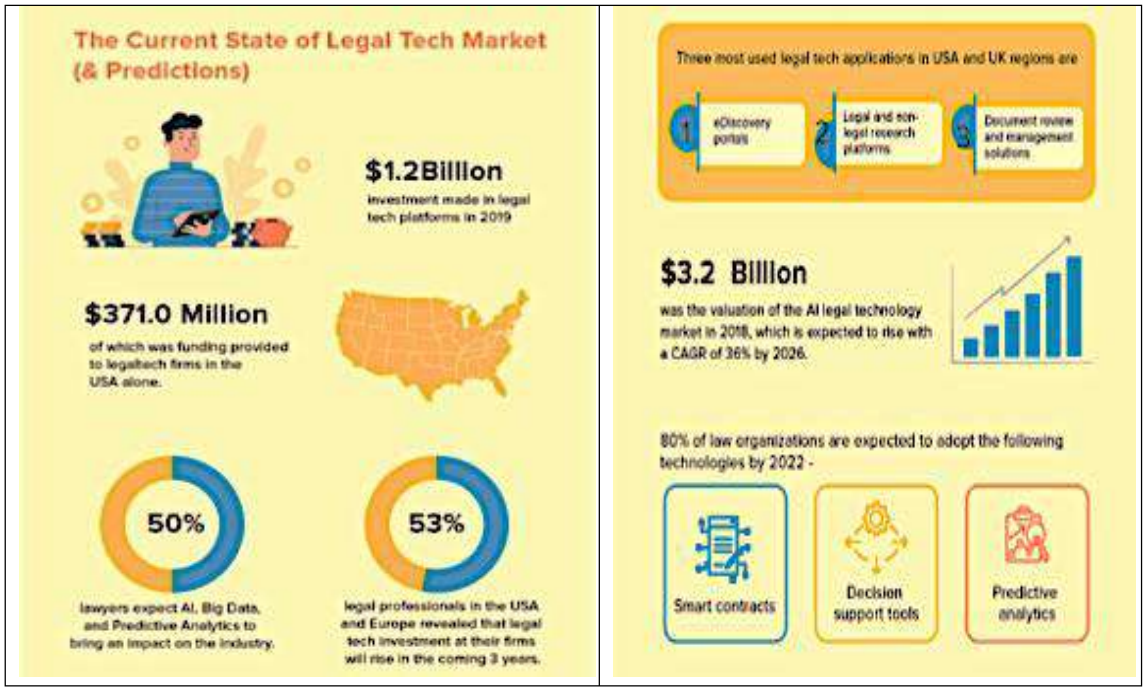

Fig-2: Technology usage in Global Legal Market

Fig-3: Technology adoption in Legal Market

Most famous Case studies:

Case Study-1

irm Name: ABC Legal Services

Description:

ABC Legal Services, a mid-sized law firm specializing in corporate and intellectual property law, aimed to enhance efficiency and adapt to the digital era. Embracing cloud technology transformed workflows, fostering collaboration and ensuring data security. This case study explores how ABC Legal Services' journey with cloud adoption revolutionized operations, positioning the firm for sustained success in a dynamic legal landscape.

Challenges:

- Workflow Inefficiencies
- Collaboration Barriers
- Data Security Concerns

Solution:

ABC Legal Services opted for a cloud-based legal practice management system that offered integrated tools for document management, collaboration, and secure client communication.

Benefits:

- Enhanced Collaboration
- Improved Workflow Efficiency
- Secure Data Management
- Scalability and Flexibility
- Cost Savings

Conclusion Case-1:

ABC Legal Services' successful integration of cloud technology showcases how forward-thinking law firms can leverage innovative solutions to overcome operational challenges, enhance client services, and position themselves for sustained growth in the dynamic legal industry.

Case Study-2

Firm Name: LegalEase Solutions

Description:

The legal industry, historically resistant to technological change, has witnessed a paradigm shift with the adoption of cloud technology. This case study explores how a mid-sized law firm, "LegalEase Solutions," embraced cloud technology to enhance its operations, streamline workflows, and achieve significant benefits.

Challenges:

Prior to adopting cloud technology, LegalEase Solutions encountered various challenges typical in the legal industry. Managing extensive case files, ensuring secure access to documents remotely, and maintaining client confidentiality were paramount

concerns. Additionally, the firm faced difficulties in collaboration among its dispersed teams.

Solution:

LegalEase Solutions decided to transition its operations to cloud-based solutions. The firm opted for a comprehensive cloud platform that offered document management, collaboration tools, and secure access controls. The implementation involved migrating existing data to the cloud and training legal professionals on the new tools.

Benefits:

- Enhanced Collaboration
- Remote Access and Flexibility
- Streamlined Document Management
- Data Security and Compliance
- Cost Saving

Conclusion Case-2:

LegalEase Solutions' journey with cloud technology exemplifies the transformative impact it can have on the legal industry. The firm not only overcame its initial challenges but also gained a competitive edge by leveraging the benefits of enhanced collaboration, streamlined document management, cost savings, and improved data security. This case study underscores the potential of cloud technology to catalyze positive changes in legal operations, positioning firms for a more agile and technologically empowered future.

Findings & a Roadmap to Legal Innovation: Industry 4.0 Technologies Reshaping Legal Informatics

Sr no	**Industry4.0 Technologies**	**Possible use in Legal domain**

1	**Cloud Computing:**	• Utilize cloud-based legal practice management systems for improved accessibility, collaboration, and data storage. • Enable remote access to legal documents and case information, promoting flexibility in legal workflows.
2	**Data Analytics and Predictive Modeling:**	• Utilize data analytics to extract insights from legal data, enabling predictive modeling for case outcomes, legal trends, and risk assessment. • Implement machine learning algorithms to analyze historical legal data and provide predictions for legal strategies.
3	**Automation and Robotics:**	• Automate routine legal tasks, such as document review, contract management, and legal research, using robotic process automation (RPA) and intelligent automation. • Deploy chatbots for client interaction, answering frequently asked legal questions, and providing initial legal advice.
4	**Blockchain Technology:**	• Implement blockchain for secure and transparent record-keeping, ensuring the integrity of legal documents, contracts, and transactions. • Utilize smart contracts to automate and self- execute legal agreements based on predefined conditions.

5	**Internet of Things (IoT):**	• Leverage IoT devices for evidence collection and monitoring in legal cases, such as in personal injury cases or environmental law. • Enhance courtroom technology with IoT-enabled devices for real-time data presentation.
6	**Cybersecurity Measures:**	• Implement advanced cybersecurity measures to protect sensitive legal information and ensure the confidentiality of client data. • Utilize biometric authentication and encryption technologies for secure access to legal databases.
7	**Augmented Reality (AR) and Virtual Reality (VR):**	• Use AR and VR technologies for virtual courtroom experiences, legal simulations, and immersive training for legal professionals. • Enhance the presentation of evidence and legal arguments through virtual reality applications.

By integrating these Industry 4.0 technologies, legal informatics can undergo a transformative shift, enhancing the delivery of legal services, improving decision- making, and increasing overall efficiency within the legal field. (Andy Kundin 2023)

Conclusion

In conclusion, this segment encapsulates the crucial takeaways from our research, highlighting the significance of cloud computing in transforming legal practices. It not only synthesizes the key findings but also delves into their implications, providing actionable insights for legal professionals, IT stakeholders, and policymakers. By offering a nuanced understanding of adoption dynamics, security considerations, and efficiency enhancements within the legal domain, this research aspires to serve as a guiding resource. The aim is to empower decision-makers with informed perspectives, fostering a legal industry that is not only more agile and secure but also technologically empowered. This study invites further exploration into untapped areas, presenting a foundation for future research endeavors in the dynamic intersection of cloud technology and legal practices.

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Exploring Word Clouds in Education Libraries

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Abstract

This paper explores the integration of word cloud technology within an Educational Library Management System. Word clouds, used in data analysis and text mining, offer a user-friendly visual/graphical images of textual data. The term "word clouds" refers to visual representations that quickly capture the key themes or words from written text, spanning various sources such as books, articles, speeches, and survey responses. With the advent of internet and software advancements, students now possess the capability and flexibility to access a myriad of literary resources via library management software. These resources encompass both printed and digital texts, utilized across various software platforms. Presently, numerous software tools serve this purpose within college library systems. This study proposes the implementation of a novel system leveraging word cloud technology within an Educational Library Management System.

Keywords: Educational research, HEI's, LMS, ERP, DLS

Introduction

This paper looks at how well word clouds works in library management system for analysing book's data. Word clouds are super popular for showing and summarizing text in a visual way. Another name referred to Word clouds is as "tag clouds". (Brooks et al., 2014, p. 192). It's a tool for visualizing text that creates a graphical representation where words used more often appear larger or have greater visibility in the display (McNaught & Lam, 2010, p. 630). We create a picture made of words from book titles or important words in the library's database collections. This could show what types of books are popular, who the popular authors are, or what subjects are common. Making this picture up where everyone can see it and might help students find books or subjects they're interested in at the library. Also, in this study, a list of the books which the students have used the maximum number of books will be prepared by application cloud software and an image of them will be created then students will be immediately shown where that book is in the library. They will save their time effectively. By

creating word clouds based on the titles, authors, or subjects of books in the library's collection, librarians can gain quick insights into the composition and focus of their holdings. This can help identify gaps in the collection or areas where the library may need to expand its resources. Finally, we identifying potential use of this word cloud technology and comparing existing software application used in the library for the same. For future research aimed at enhancing the utility and effectiveness of word clouds in textual data analysis in library management.

Study of Existing Software of LMS

A Library management system (LMS) is ERP (enterprise resource planning system) software that helps in simplifying the daily operations of the library. The purpose of a library management system is to manage & track the daily work of the library such as issuing books, return books, due calculations, used to track items owned, orders made, bills paid, etc. integrating computers into college libraries enhances access to information, promotes efficiency and collaboration, supports academic writing and research, enables remote access, fosters information literacy skills, and ensures accessibility for all students. Computers enable students to access vast amounts of library information available online, including scholarly articles, e-books, journals, and databases. With LMS, students can quickly search for and retrieve book or information, saving time compared to traditional methods like manually browsing through physical books or periodicals. This supports the findings of other researchers who have explored the use of word clouds to support data analysis (McNaught & Lam, 2010; Pithouse-Morgan et al., 2015; Viégas & Wattenberg, 2008). The concept of word cloud will be beneficial for students and Liberians.

Need for the study

The need for further study in the area of LMS in libraries stems from the desire to optimize their integration of word cloud while addressing potential drawbacks. There are many drawbacks of LMS but some important are discussed below.

Computers can be a source of distraction for students, while using LMS - leading them to engage in non-academic activities such as social media browsing, gaming, or watching videos instead of focusing on their studies or searching books. After spending lot of time to search a particular book in library or on LMS - students waste time in library on computers for information retrieval may hinder students' ability to develop essential research skills, such as using library catalogues, navigating physical collections, and critically evaluating sources. There are some technical issues too: Computers are susceptible to technical problems such as

hardware malfunctions, software glitches, network connectivity issues. This paper taken all these drawbacks with LMS integration of software feature on student library outcomes and overall library usage patterns to assess the effectiveness of various strategies in justifying drawbacks and enhancing the overall library experience. By addressing these concerns through empirical research and evidence-based interventions, libraries can optimize the integration of LMS with word cloud to better support the academic needs of students while minimizing potential drawbacks. This experiential research design will help to make a new software using word cloud feature. Word clouds oversimplify complex information by reducing it to a list of words

Experiential Research Methodology

Below are the stages of Development and Design of word cloud feature in the DSL (digital system for libraries) or LMS. One of the first design issues in the creation of digital library database software for book data. We need to prepare an existing database. This list includes what information the library contains, how that information is generated, what students the information is intended for, and how the data will be accessed. The next stage is about Data Storage - Database or File Structure defines how and where the data to store and How students get all the details about their book in LMS or DSL. These files that comprise the digital library. There are many databases to choose from like Oracle, MSQL, and Microsoft Access and operating system. Last stage is to book Data analysis and Database Creation in a relational database multiple tables of data relate to each other through special key fields. To get the result of books searched and got the students searched by using resource details like book title, description, subject - subjects and their introductions; format - common formats and access methods. resource format and tables which formats/access methods apply to each library resource. year-publication year of that resource. Department-Belongs to particular department and the most searched data about books to upload the resource in various file formats. We Generating the Word Clouds to Visualise the Data. Additionally, following Pithouse-Morgan et al. (2015), the data collected is bring into the software application to generate visual representations in the form of word clouds

Data for Case Study

Libraries serves various purposes, including educational resources, health resources, cultural resources, difference subjects and any many more subjects which are divided into different categories. In Library subject arrangement of a catalogues refers to the organization of

materials within the catalogue according to their subject matter. Different methods for book arrangements include are Alphabetical Order, Classified System, Enumerative Classification and Keyword Indexing Each method has its advantages and limitations, and libraries may use a combination of these methods to best serve their students/users' needs. The choice of subject arrangement depends on factors such as the size of the collection, the diversity of subjects covered, and user preferences. For this study the library maintains a database comprising 3,100 books, with a 430 books categorized under computer subject. A dataset specifically encompassing these 430 computer books are constructed using the google co-lab programming language. Generating word clouds could be implemented in various programming languages. There are two important activities – text processing and drawing the cloud itself (Kalmukov, 2011). Figures 1 to 4 are generated by the software application LMS management system as shown. Our objective is to identify the most frequently borrowed book among students, determining both the title of the most issued book and its subject within the realm of computer subject.

Limitation: This word cloud application is used for book titles for some subjects. only. Further we will implement the same feature for word cloud application used for different purpose in library.

Algorithm:

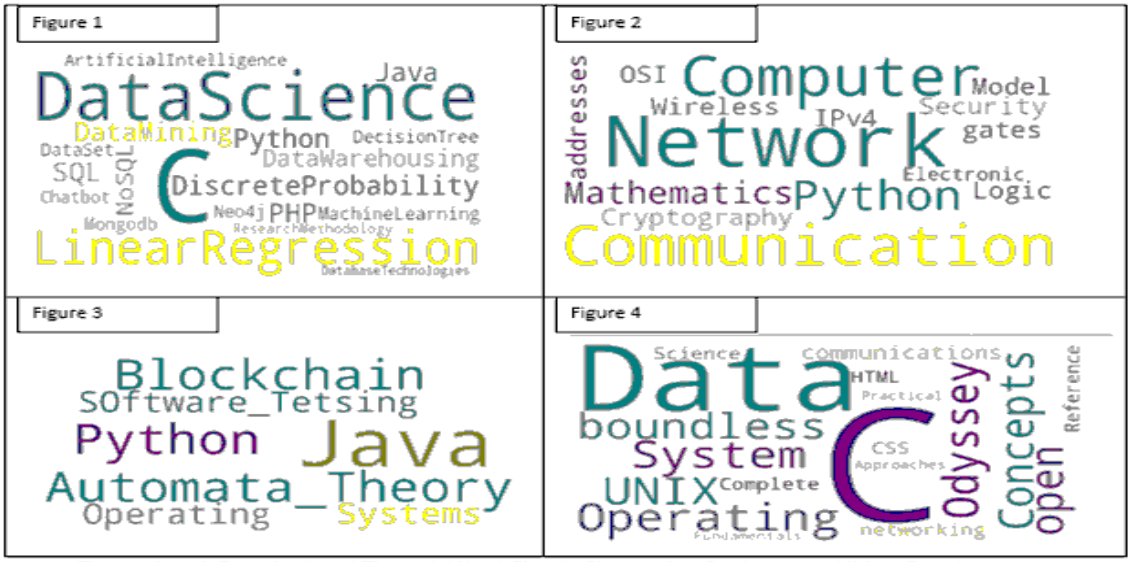
1. Start
2. Input: Receive a books detail data in a text.
3. Pre-Processing: Syntax checking, remove symbols to ensure consistency
4. Word Frequency Calculation: Make a dictionary, tokenization, calculate frequency
5. Size Scaling: Calculated min and max, decide font size for the word cloud display.
6. Visualization: Plots the words and visually appealing manner
7. Display: Displayed the generated book titles to the student.
8. Stop

Sample Program Code

```
from wordcloud import WordCloud
import matplotlib.pyplot as plt

# Text for the word cloud
text = "Java, Automata_Theory, Python, Blockchain, SOftware_Tetsing,Operating Systems "

# Generate word cloud
wordcloud = WordCloud(width=800, height=400, background_color='white').generate(text)

# Display the word cloud
plt.figure(figsize=(10, 5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.show()
```

Figure: Sample code shown above in google co-lab for most used books in the library

As previously mentioned in this document, when generating a word cloud for books from a given text, the size of each word within the cloud corresponds to its frequency of occurrence. In other words, the more often a book detail word appears in the text, the larger it will be displayed in the word cloud, making it visually more prominent Vuillemot, R. (2009). This sizing approach allows students to quickly grasp which books are used most frequently in the given text. By analysing the word cloud generated from the combined input of all students, we can gain insight into common subjects, common book titles, prevailing subjects or book keywords that emerge across the entire dataset. This interpretation helps Liberians to better understand the collective focus or emphasis within the book or text mass contributed by all students.



Figures 1 to 4: Data Analyzed Through Word Clouds, Showcasing Students used 'Most Popular Books" in library

Conclusion

Word clouds represent a powerful data visualization technique that allows student to get easily acquainted with the content of a large collection of books in the library and identify their interested subject domains for a matter of seconds.

“Librarians can use word clouds to see what kinds of books they have most. It helps them know which authors and types of books are popular. Then they can decide what new books to get for the library. This term is also called collection analysis in library.

“Librarians can look at what books student borrow the most using word clouds. It helps them know what kinds of books student like. Then they can get more of those books for the library”. This term is called student preference.

“Librarians can make word cloud from book reviews or summaries to see what topics are popular. This helps them choose which books to show off or plan events around.". This term is also called student trending topics and these trending topics librarians can show on library board. This term is also called superb display board in library.

"By incorporating word clouds into library management systems, it can enhance the way data is shown, making it easier to understand. This makes it more interesting for students and helps librarians and patrons make better decisions about books and library services." It also encourages student enjoyment and engagement in a library and it saves students turnaround time in library.

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An efficient Region based object detection with soft computing techniques

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Abstract

In a variety of applications, including surveillance, cancer diagnosis, vehicle detection, and underwater object identification, object detection is essential. Numerous methods have been utilized for various applications to reliably and efficiently detect an object. Nevertheless, there are still issues with these suggested solutions' inaccuracy and inefficiency. Machine learning and deep neural network techniques function better at rectifying object detection when it comes to these issues. [1]

A smart region-based detection method combined with the YOLO-V4 algorithm achieves better results in the detection of objects. Where YOLO-V3 alone is unable to give satisfactory results. Therefore, the proposed SRBD method gives better results with good accuracy in vehicle detection over the other detection methods. The size of the dataset and their size plays a vital role in object detection.[2]

Keywords: object detection, Faster RCNN, SSD, YOLO-V1, YOLO-V2, YOLO-V3, YOLO-V4, Smart Region Detection.

Introduction

In a variety of applications, including surveillance, cancer diagnosis, vehicle detection, and underwater object identification, object detection is essential. Numerous methods have been utilized for various applications to reliably and efficiently detect an object. Nevertheless, there are still issues with these suggested solutions inaccuracy and inefficiency. Machine learning and deep neural network techniques function better at rectifying object detection when it comes to these issues.[1]

In a country that is growing, like India, there are more vehicles on the road due to a variety of social, economic, and cultural variables. Therefore, the large number of vehicles in the the road will result in heavy traffic [3]. Traffic congestion will lengthen travel times for vehicles, raise the likelihood of collisions, reduce productivity for businesses, slow down emergency vehicles, which could endanger lives, and pollute the air [4]. Several smart traffic management system concepts have been implemented in India. The city's traffic flow and safety should both quickly and effectively improve with the use of a smart traffic management system.

For example: India’s smart Traffic controller Automatic Traffic Counter and Classifier (ATCC) is a device used for traffic volume **counting** surveys & **classifying** vehicles into different Vehicle categories and generating reports in an **Excel sheet.[5]**

Vehicle detection can be difficult for humans to calculate; thus, machine learning has been very beneficial in this regard to track, classify, and get automatically over time. and calculating the quantity of vehicles that pass by a specific location. through the use of the open-source neural network framework Darknet [6][13], which is translated into C and CUDA.

The C programming language accelerates CPU and GPU calculations. In contrast, working with programming languages like C greatly increases the speed of Nvidia's CUDA parallel computing platform and API paradigm on the GPU. The purpose of this framework is to train model weight files. The deep learning algorithm for vehicle identification is called YOLO. The most advanced object identification algorithm for vehicles is this deep learning algorithm [6][13].

Detection algorithms have greatly improved in the last few years, thanks to the advent of deep learning, and more specially CNN architectures have been proposed for the task of detecting objects in an image [7][12].

TensorFlow [8] is a free and open-source machine learning software platform. The Google Brain framework can be written in a variety of computer languages such as C++, Python, and CUDA. It may also be used with several platforms, including JavaScript, Android, Windows, Linux, and macOS. The Python programming language, which includes several helpful libraries like NumPy, is used in this project. Python code is then used to create the combining machine.

The suggested model performs significantly better in object detection and efficiently extracts characteristics from images. The following is the breakdown of the paper's sections.

Related work is described in Section 2. Presenting the current situation is Section 3. The technique is presented in Section 4, where network architecture is covered in great detail. The examination of the enhanced network from several perspectives is presented in Section 5.

In section 6,the setting for the experiment, Results are discussed, along with a comparison to comparable networks. Section 7 contains the paper's conclusion and future work.

Objectives:

1. Comparing the YOLO families YOLO V1, YOLO V2. YOLO V2 YOLO V3.
2. Study of YOLO V4 architecture and proposed design for smart region image detection with YOLO V4. YOLO V4 is a more accurate & efficient method for object detection

II. Related Work: In Table 1 the advantages and disadvantages of methods Fast R-CNN, Faster R-CNN, R-FCN, SSD, and YOLO for detecting objects in images will be highlighted by various experiments conducted by a variety of authors investigated in the Deep Learning area.[9]

Table 1. Advantages and disadvantages of some methods for detecting objects in images.[9]

Method	Authors	Advantage	Disadvantages
Fast R-CNN	(Girshick, 2015)	The calculation of the characteristics of CNN is done in a single iteration, achieving the detection of objects is 25 times faster than the RCNN method (it requires 20 seconds on average to analyse an image).	The use of an external candidate region generator creates a bottleneck in the detection process.

Faster R-CNN	(Renet al., 2015)	The RPN method allows object detection to be almost real-time, approximately 0.12 seconds per image.	Despite the efficiency of the algorithm, it is not fast enough to be used in applications that require real-time, as would be the autonomous vehicles.
R-FCN	(Dai et al., 2016)	The test time of R-FCN is much faster than that of R-CNN	R-FCN has a competitive mAP but lower than that of Faster R-CNN.
Mask R-CNN	(He et al., 2017)	The location of the objects is more precise, when making a segmentation of the objects in the images.	Its execution time is greater than that used by the Faster-RCNN method, therefore, it cannot be be implemented in applications that require real-time.
YOLO	(Redmon et al., 2015)	The location of objects is very efficient, allowing its use in real-time applications.	The method has difficulties in correctly detecting small objects.
SSD	(Liu et al., 2016)	The use of a single network, makes	The detection accuracy of the

		the location of the objects faster than the Fast-RCNN and Faster-RCNN methods.	objects are lower compared to the Fast-RCNN and Faster-RCNN methods.

III. Current Scenario

The fastest algorithms, including Fast R-CNN, Faster R-CNN, Histogram Oriented Gradients (HOG), Region-based Convolutional Neural Networks (R-CNN), Region-Based Fully Convolutional Neural Networks (R-FCN), Single Shot Detector (SSD), Spatial Pyramid Pooling (SPP-Net), and YOLO, are used by object detection technologies in the modern world. Using a single layer of a convolutional network with a single-shot multi-box detection technique, a single picture may be quickly detected. Similarly, it employs YOLO variant techniques on a multi-layer neural network to detect multiple images. Versions of the Yolo algorithms, including YOLO-V1, YOLO-V2, and YOLO-V3, are capable of accurately detecting objects in a real-time setting for a variety of applications, including face, vehicle type, license plate, and vehicle detection. These days, YOLO algorithm variations are more often used for traffic vehicle detection [2].

(I) Faster R-CNN:

Issue: How do you locate more than one object in a picture where the bounding boxes are tight?
Solution:
Employ a Faster RCNN network that has been trained beforehand. A neural network method for locating an object's bounding box in an image is called Faster RCNN.[10] The Fast RCNN algorithm originated with the Fast RCNN algorithm, which was an improvement over the Fast RCNN. All of these algorithms work similarly: a region proposer identifies possible rectangles with visually appealing images within them, then uses an image classifier to determine what, if anything, may be seen there. Faster RCNN uses the same feature map used for image classification to train the region proposal in parallel [11]. Two modules make up the Faster R-CNN object-detecting system.

A deep fully convolutional network serves as the first module, suggesting regions, and the Fast R-CNN detector uses the suggested regions in the second module [5][14]. There is just one

system in all. Unified network for detecting objects; The RPN module instructs the Fast R-CNN module where to seek by referring to neural networks with "attention" processes, a phrase that has lately gained popularity. The original RCNN's algorithm is as follows: [15]
1. A Selective Search Algorithm is used to derive many candidate region suggestions from the input image. This technique generates a large number of candidate regions during the first sub-segmentation. A greedy technique is then used to merge comparable sections into larger regions. The final region proposals consist of these regions [15].

2. The output of the extracted distinguishing features is vectorized and the proposals are warped by the CNN component.

3. The concept uses an SVM (Support Vector Machine) to identify interesting elements using the features that were retrieved.

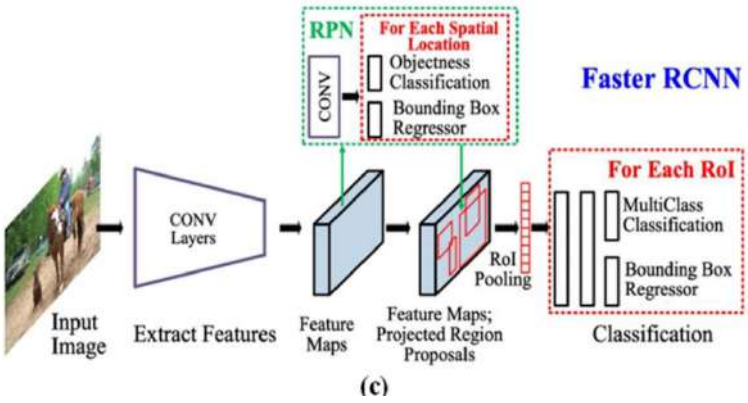

Fig (1) Two-stage object detector Faster R-CNN[11][16]

The Object Detection approach introduces the Faster R-CNN algorithms and it performs better and faster in the Detection and prediction of objects. Also, infixes the object score using the RPN network [10][17].

Ross Girshick et al [6] [2014] proposed an object detection model which has been used in region selection. It provides a scalable object detection algorithm which is also simple and gives a 30% relative improvement over the previous results on PASCAL VOC 2012 giving a mAP of 53.8% accuracy.

Longsheng Fu et al[7][13][2018] proposed and implemented the Faster R-CNN-based kiwifruit recognition model which was developed and evaluated by images using the ZF-Net framework. The results obtained a good overall detection accuracy of 92.3% in the kiwifruit images that were captured in the daytime.

Yongzheng Xu[8][12][2017] proposed the framework of Faster R-CNN for car detection from low-altitude UAV images captured over traffic signals. It evaluated the illumination changes in-plane rotation and detection speed in the constant frame and it achieved 96.4% completeness and 98.43% correctness with a real-time Detection speed of 2.10 frame/second.

II) Single Shot Multibox Detector (SSD):

A popular one-stage detector with multiple-class prediction is SSD. By discretizing the output space of bounding boxes into a set of default boxes over various aspect ratios and scales per feature map location, the technique uses a single deep neural network to recognize objects in images. The picture object detector modifies the box to better fit the item shape and assigns points for each object category that is present in each default box.

To handle objects of various sizes, the network additionally incorporates predictions from numerous feature maps with various resolutions. It is simple to train and incorporate the SSD detector into software systems that need an object detection module. Even with smaller input sizes, SSD provides far greater accuracy than other single-stage approaches [21].

A single-shot multi-box detector (SSD) of deep learning, which has been successful in solving helmet identification issues, is the technique employed (Narong, Wichai, 2018). (Rose, 2020; Narong, Wichai, 2018) [20]. Here, the experiment employed a few CNN models (VGG, GoogleNet, and Mobile Nets) to compare the outcomes. In the challenge of helmet detection, The author found that, in comparison to other network models, the accuracy obtained by the combination of the Mobile Nets Model and SSD Model was the best. in contrast to VGG and GoogleNet(Narong,Wichai,2018)[20].

On input datasets, four distinct approaches were applied in picture classification tests. With the aid of convolutional neural networks like VGG16, VGG19, GoogleNet, or Inception V3 & Mobile Net, the suggested approach has been utilized to resolve the helmet detection challenge (Narong & Wichai, Nov 2018). The test was carried out.

III) YOLO

Joseph Redmon [11] [2016] proposed a unified model for object detection and constructed the trained image to predict bounding boxes and class probabilities, optimizing end-to-end detection performance. This method makes more localization errors and a low level of prediction in false positives on the background images and processes images in real-time at 45 frames per second.

Hendry et al [14][2018] proposed a modified tiny YOLO in single class detector using the YOLO's 7 convolution layers and sliding window to detect and fast predict the car license plate utilized by the Yolo-darknet framework. The sliding window method works for all classes, but it struggles in small object detection.

IV) YOLO-V2

Joseph Redmon et al [12][2016] proposed YOLO-V2 with various improvements in the YOLO detection method, referred to as a single-stage real-time environment. The author concludes, the YOLO v2, which is an improved model, is well-trained jointly in optimizing the detection and classifications of images in PASCAL VOC and COCO datasets. And achieves a detection accuracy of 67 Fps with 76.8 mAP on VOC 2007.

To improve the YOLO-v2, the author used various techniques such as Batch normalization, High-resolution Classifier, Convolutional networks with anchor boxes, Dimensional cluster boxes, Direct location prediction, Fine-Grained techniques, etc.

The original input resolution of 448 x 448 was changed to 416 x 416 with the addition of anchor boxes on the fly and the modified YOLO predicts detection on a 13 x13 feature map.

In multi-scale training, in YOLO-v2 the Low-resolution detection output has detected 288 x 288 images at 91 Fps with 69 mAP, and in the High-resolution detection, output detected 544 x 544 images at 40Fps with 78.6 mAP.

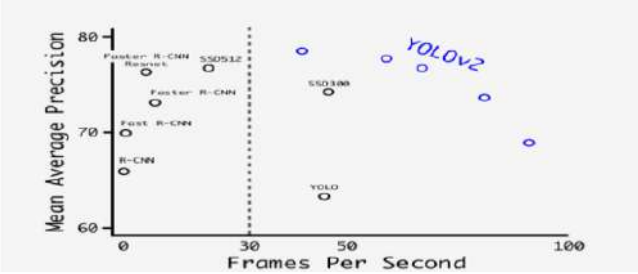

Figure: (2) The graph shows Accuracy and Speed on VOC 2007 [17]

Figure: 2 shows the speed and Accuracy on Pascal Voc 2007 dataset performing in various types of algorithms and it gets the better mAP.

V) YOLO-V3: The base version was unable to fix localization issues and the second version of YOLO was unable to recognize items that were smaller in size. This model was developed by Joseph Redmon.

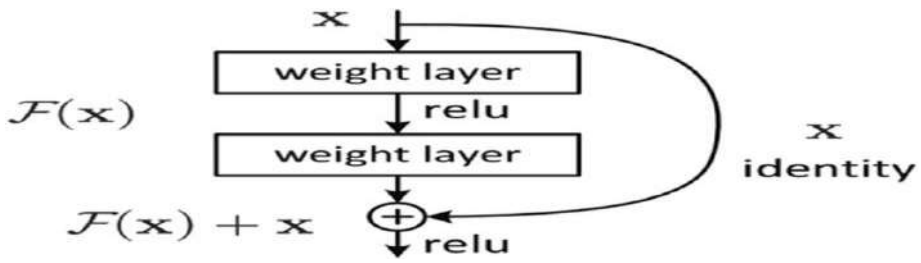

Fig 3: Skip connections in the ResNet Module [25][17]

After being trained and assessed on the COCO dataset, the third version of YOLO attempts to address the aforementioned shortcomings and offers an effective method for identifying objects with better performance [18][11]. Although this version works better with smaller items, it has trouble generating reliable results for huge and medium-sized items.

This design is built on the Darkent-53 framework, a network with 53 convolutional layers that uses 3 × 3 and 1 × 1 convolutional filters in addition to some shortcut connections. It is noticeably larger and more powerful than previous architectures. While not as fast as ReNet-152, it is twice as quick.
& sacrificing the quality of the performance. Fig. 2 presents the underlying general design of YOLO (v3).

Feature Pyramid Network is the source of inspiration for YOLO (v3). It uses FPN-like heuristics such as residual blocks, skip connections, and up-sampling. It starts with Darknet53 as the base network and adds 53 extra layers to facilitate object detection. Similar to FPN, to detect objects, YOLO (v3) additionally employs (1 × 1) convolution on feature maps. Three distinct scales of feature maps are produced by it. In particular, the input is down-sampled by a factor of 32, 16, and 8 at three distinct scales. First, 81 series of convolutions later, in the 82nd layer, a stride of 32 is applied, and the resulting tensor is a 13 x 13 feature map that is used for (1 × 1) convolution detection. Second, the 94th layer is followed in the detecting process.

First, 81 series of convolutions later, in the 82nd layer, a stride of 32 is applied, and the resulting tensor is a 13 x 13 feature map that is used for (1 × 1) convolution detection. Second, the 94th layer is followed in the detecting process.

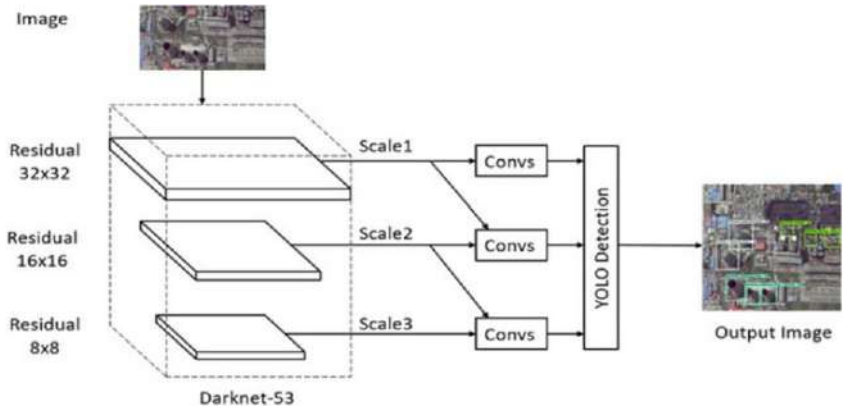

Fig. 4 Architecture of YOLO (v3) [11]

VI) YOLO-V4

YOLOv4 is the latest version of the YOLO series for fast object detection in a single image. YOLO V4 was developed by Alexey Bochkovsky, who also developed the Windows version of Darknet.YOLOv4 was a real-time object detection that achieved state-of-the-art performance on the COCO dataset. It works by breaking the object detection task into two pieces, regression to identify object positioning via bounding boxes and classification to determine the object's class. This implementation of YoloV4 uses the Darknet framework.

By using YOLOv4, you are implementing many of the past research contributions in the YOLO family along with a series of new contributions unique to YOLOv4 including new features: WRC, CSP, CmBN, SAT, Mish activation, Mosaic data augmentation, CmBN, DropBlock regularization, and CIoU loss. In short, with YOLOv4, you're using a better object detection network architecture and new data augmentation techniques.[22]

YOLO V4 Architecture:

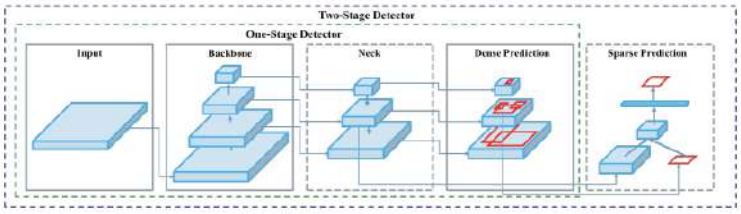

Fig. 5 Object Detector [25]

YOLOv4 has an incredibly high performance for a very high FPS; this was a major improvement from previous object detection models which only had either high performance or high inference speeds.

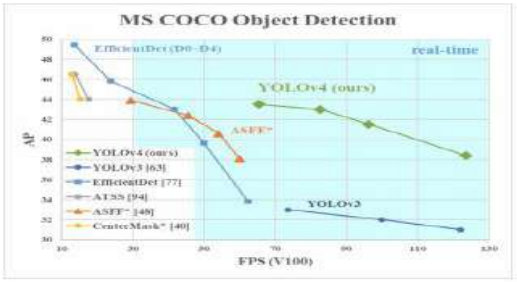

Fig 6: Comparison of the proposed YOLOv4 and other state-of-the-art object detectors. YOLOv4 runs twice faster

as Efficient Det with comparable performance. Improves YOLOv3's AP and FPS by 10% and 12%, respectively.[23]

YOLOv4 consists of:

1) Backbone: CSPDarknet53 [26] 2) Neck: SPP [27][17], PAN [28] 3) Head: YOLOv3 [29]

YOLO v4 uses:

_ Bag of Freebies (BoF) for backbone: CutMix and Mosaic data augmentation, DropBlock regularization,Class label smoothing

_ Bag of Specials (BoS) for backbone: Mish activation,Cross-stage partial connections (CSP), Multiinput weighted residual connections (MiWRC)

_ Bag of Freebies (BoF) for detector: CIoU-loss,CmBN, DropBlock regularization, Mosaic data augmentation,Self-adversarial training, Eliminate grid sensitivity, Using multiple anchors for a single ground truth, Cosine annealing scheduler [52], Optimal hyperparameters,Random training shapes

_ Bag of Specials (BoS) for detector: Mish activation,SPP-block, SAM-block, PAN path-aggregation block,DIoU-NMS.

Dataset:

At least 80 kinds of objects can be detected at once by the MS COCO Dataset (Dorathi, Joel, Sinha, & Malathi, 2020). Compared to motorcycle riders, LeNet architecture provides less accuracy because it catches every image that enters the screen. Accuracy in the YOLO Dense backbone approach is 98.78%.This module's flaw is that it Instead of filming motorcycle riders, record pictures of everyone entering the frame of the video. This has a direct impact on the classification's accuracy (Dorathi, Joel, Sinha, & Malathi, 2020). (Xu, Wang, Yuwan, & LinShi, 2019). The original model, which includes various strategies such increasing anchors, multi-

scale training, and OHEM, is optimized using an enhanced faster RCNN model. The user can learn two modules in the RCNN model:

A fast RCNN object identification module and a region-proposed network (RPN) module are used to produce candidate regions. The object detection module receives "attention" from the RPN, which also creates ROIs. RPN operated using a sliding window system.

Proposed Smart Region Method:

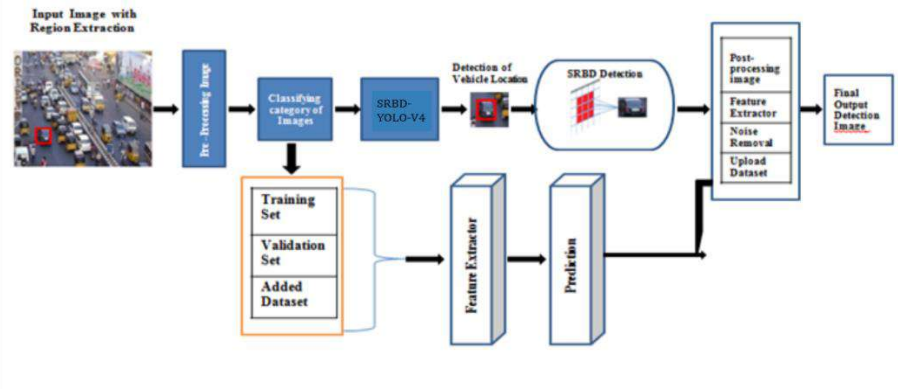

Fig: 7 Smart Region Detection Method [2]

The suggested technique preprocesses the image after capturing it from streaming videos. The architecture divides up the different image sizes into small, medium, and large objects. New images are added to the dataset as the existing images are trained and validated.

The overall pipeline proposed architecture for the smart region detection method: Step 1: First, take a picture from the videos that are streaming. Step 2: A preliminary data pre-processing model is developed, which identifies the annotation errors that occur during image scaling and updates the new images. Step 3: The new CNN network layer is used to begin the next stage of selecting and classifying image objects, which are then divided into small, medium, and large objects.

Step 4: After identifying each Region of Interest, the selection is made, the location is eliminated, and the photographs are inserted into grid cells of varied sizes. Step 5: Examine the extracted features from the identified image and assess the layer's condition.

Step 6: Using the picture data from the dataset, the image data is trained and validated. Step 7: The dataset's available photos are matched and forecasted. If not, go back and do steps 4 and 5again.

Step 8: New photos are uploaded to the dataset and given labels. Step 9: The classification and localization values of the image data are provided together with the final detection findings.

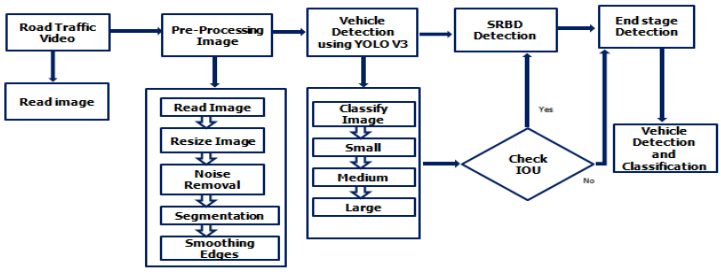

Fig 8: Overflow of the method

Experimental Platform:

The configuration parameters of the software and hardware platform implemented by the algorithm in this paper is shown in Table 2.

1	Operating system	Windows 10
2	Processor	Inter(R)i7-9700k
3	GPU accelerator	CUDA 10.1, Cudnn 7.6
4	GPU	RTX 2070Super, 8G
5	Frames	Pytorch, Keras, Tensorflow
6	Compilers	Pycharm, Anaconda
7	Scripting language	Python 3.7

Table 2: Device Configuration

Findings

YOLO V1: Speed is improved in real time detection at 45 frames per second.Use of Fast YOLO network to increase the speed at 155 fames per second. It has a limitation that YOLO can detect only 49 objects using in 7 X 7 grids. YOLO can predicts, only one class at each grid and limits the number of nearby objects Moderately High in localization errors occur in small object.(Pascal voc 2007+2012 dataset with 52.7 accuracy using 155 frames per second)[30]

YOLO V2 : Furthermore, it can be run at a variety of image sizes to provide a smooth tradeoff between speed and accuracy. It achieves classification loss, back propagate loss at the time of labeling the image. The localization error is reduced, but not accurate.Most weak in image segmentation.(COCO dataset and Image classification dataset with 68.7 mAP
Pascal Voc dataset with 78.6 mAP.)

YOLO V3: It has increased improvement in real-time object detection with speed, accuracy, and classifying the objects. The Prediction of the object at aspect ratios or different scales. Easily to detect small objects with a good accuracy rate. With the increase in MAP, there was a decrease in localization errors. It has most struggles with small objects that appear in groups of images. It gets Low mAP in different categories of objects. Minimum localization errors. (COCO dataset with 57.9 Map)[30]
YOLO V4: YOLOv4 runs twice faster than EfficientDet with comparable performance, and it improves YOLOv3's mAP and FPS by 10% and 12%. [23].

Conclusion

Object detection is a Computer Vision and Image Processing technique that deals with detecting instances of various classes of objects from the captured image or video. As compared to other object detection algorithms and approaches, YOLO is a fast and accurate detection algorithm. It follows a regression approach, that is, rather than selecting a field of interest for an image, they estimate groups and bounding boxes for the whole picture in one run of the algorithm [1][19]. In the future, we expect to extend our work further to make our benchmark dataset [1]. The time taken for training is much lower in YOLOv3 compared to v4. When taken into consideration v4 has some good performance characteristics and also training time is relatively lower than that of v5. So, we can choose v4 and make the hyper-parameters better and make the model more lucrative in nature. Improvements are still making on YOLO. To

obtain better results, the loss function of YOLO can be modified. A pooling layer can be added. The future and scope of YOLO object detection are vast.

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Artificial intelligence applications in human resource functions: an exploratory study

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Introduction

Technology plays very important role in digital era in which businesses operate We are living in a time where in Humans and learning machines are working together in every sphere of business functions and HR is one of that function.

Today, Artificial Intelligence (AI) is proving to be a valuable tool in reshaping the way that companies manage their workforce and make HR plans. Human Resources (HR) have been experiencing momentous changes, thanks to the advancement of information technologies in the last two decades. The HR department is not left behind the race. The HR professionals today are focusing to optimize the blend of human and automated work to grow simple, seamless, and intuitive work surroundings. It provides them time for creativity, intelligence, and empathy to deliver an enhanced candidate and employee experience. AI has been gradually applied to enterprise management decision making, taking on and helping managers to speed up their tedious and repetitive daily work. It provides powerful database and analytical support, allowing managers to get out of mechanical work and engage in more valuable work (Partridge & Hussain, 1992). This will provide more capacity, more time and budget, and more accurate information for decisive people management Artificial intelligence is increasing the efficiency of all the HR functions. AI is transforming all HR functions starting from recruitment, training, learning and development, compensation and payroll. AI into HR administration functions will advantage and get better the overall employee experience AI plays a big role today in transforming HR and the workforce; reducing human bias, increasing efficiency in candidate assessment, improving relationships with employees, improving compliance, increasing adoption of metrics, and improving workplace learning are some of the benefits organizations are experiencing today.

The current research paper on topic Artificial Intelligence Applications in Human Resource Function is written with an objective of

- To understand the conceptual framework of AI.
- To understand role of AI in HR Functions
- To analyze the implementation of AI by industry in current scenario

Conceptual framework

Artificial Intelligence (AI) is not new. The current concept of AI dates back at least as far as Alan Turing, the English mathematician who proposed the universal Turing machine in 1937. The term Artificial Intelligence was coined by John McCarthy in the year 1950. It became the basis for today's programmable computer.

AI is an umbrella term that encompasses areas such as machine learning and cognitive computing. It is a branch of computer science that deals with the simulation of intelligent behavior in computers. It has existed for decades: processing voice to text or language translation; real-time traffic navigation; dynamically serving targeted advertisements based on personal data and browsing history; predicting trends and guiding investment decisions in financial institutions.

It refers to technology used to do a task that requires some level of intelligence to accomplish — in other words, a tool trained to do what a human can do. Why is AI different than ordinary software? Three core components — high-speed computation, a huge amount of quality data and advanced algorithms differentiate AI from ordinary software. Core AI technologies provide better accuracy and stability to everyday processes using an algorithm that connects quality data with fast computation services.

TABLE 1: THREE LEVELS OF AI

LEVELS	**EXPLANATION**	**BENEFIT**	**EXAMPLE**
Assisted intelligence (automate,Short Term)	widely accessible these days,	-COST Saving -Improved UX	Prevalent in cars today, is the GPS navigation programme that offers directions to

	improves what people and organizations are already doing.	-Quality & Accuracy	drivers and adjusts to road conditions. Robotic Process Automation ***Google's 'Waymo'*** *and* ***Tesla's 'Autopilot'***
Augmented intelligence (augment, Medium Term)	emerging nowadays, helps people and organizations to do things they couldn't otherwise do.	-Self Learning activities -Better Predictions -Interaction with human	car ride-sharing businesses couldn't exist without the combination of programs that organize the service ML BOTS, Predictive Analytics
Autonomous intelligence (AMPLIFY, Long Term)	being developed for the future, establishes machines that act on their own.	-Decision Making, -Autonomous work -Boost Human Activities	An example of this will be self-driving vehicles, when they come into widespread use Cognitive analytics, Robotics

Review of literature

TABLE 2: PRESENT STATE OF RESEARCH

Title	**Author**	**Discussion**
A Study of Artificial Intelligence and its role in Human Resource Management	Yawalkar Vivek (2019) .	The paper describes the role of artificial intelligence in human resource department and also examined the challenges in HR department. The author concluded that AI plays vital role in numerous HR functions and artificial intelligence firms will handle hiring, analyzing the information, colleting the information, reducing work at work and enriching work potency.
Artificial Intelligence In Human Resources Management: Challenges And A Path Forward.	Tambe Prasanna, Cappelli Peter, And Yakubovich Valery (2019)	Considered the gap between the promise and reality of artificial intelligence in human resource management. They identified four challenges in using data science techniques in HR practices.

Artificial Intelligence & Human Resource Management In Indian It Sector	Verma and Bandi (2019)	Discussed the viewpoints that how employees take AI as a boon and a threat to their jobs. They focused on the advantages and limitations of artificial intelligence in the current industry scenario.
Artificial Intelligence in HRM: An Experimental Study of an Expert System	**Lawler and Elliot (2019)**	Investigated the impact of an expert system used as a decision aid in a job evaluation system, performance outcomes and psychological outcomes are analyzed.
Artificial Intelligence in Human Resource Management	Merlin Ruby,Jayam.R (2018)	Addresses the possibilities of how Artificial intelligence is transforming and supporting the Human Resource functions like recruitment, training, talent management & retention insights on inter-section of Artificial intelligence & Human resource management cases and finally it address the future impact on the HR workforce. The future of HR will most probably involve a human-machine collaboration and that can end up being a good thing
Artificial Intelligence in HR	Owais (2018)	Threw some light on artificial intelligence breakthroughs and implications with respect to HR

A Conceptual Artificial Intelligence Application Framework in Human Resource Management	Qiong Jia,Yue GuoRong LiYurong Li,uwei Chen (2018)	The study proposed a conceptional framework of artificial intelligence (AI) technology application for human resource management (HRM). The theory of the six basic dimensions of human resource management is combined with its potential corresponding AI technology application. This AIHRM conceptual model provided suggestions and directions for the development of AI in enterprise human resource management.
Can artificial intelligence change the way in which companies recruit, train, develop and manage human resources in workplace?	Faiyaz Md. (2018)	The study investigated the impact of Artificial Intelligence (AI) on the recruitment, training, development and retention of workers in organizations. The study found that AI is having positive impacts on the management of workers in companies and comes up with a recommendation to invest more in AI processes to take HR management to the next level.
Digital Transformation in HR	Manju, Malhotra (2017)	This paper investigated the concept of digital transformation in Human resources management and how new technologies are helping various HR functions and its employees. The study also contributed in the literature by exploring the various tools

		which are used by the companies for the advancement and development of HR department.
Human Resource Management through AI Approach: An Experimental Study of an Expert System	Tripathi, Jayanthi, Pandeya (2012)	The study investigated the impact of an expert system used as a decision aid in a job evaluation system. Performance outcomes and psychological outcomes are analyzed in an experiment. The study examined an expert system within an HRM context in the teaching and learning process, the results are useful as one test of expert system efficacy within the more general area of managerial decision making.
Marketing AI recruitment: The next phase in job application and selection	J. Black Ferolie	The novelty factor of using AI in the recruitment process, mediates and further positively influences job application likelihood. These positive relationships between attitudes towards the use of AI in the recruitment process and the likelihood of applying for a job have several important practical implications

AI usages in different HR functions

Recruitment: AI will streamline or automate, tedious and high-volume task in recruiting process. Companies receives large number of resumes and applications. Merlin Ruby,Jayam.R (2018) AI can help in weeding out the unnecessary and unqualified applications from a large

applicant pool thus saving time of an individual. AI software will scan, evaluate and reject 75% of resumes that are unqualified (Martin 2017).

Interview and hiring: AI can help in making hiring process faster. AI provides different tools for objective analysis of candidates which helps in selecting the candidate who has proper fit with job and organization. Digital interview AI software the evaluate candidate speech, word choice and body language through video and audio and examine the personality trait will fit the job. Through chabots AI helps to improve candidate experience by giving consistent update of requirement, feedback and suggestions.

Learning and development: Now a day's training has become essential part of any organization. Updation is required on continuous basis. AI can help in customizing the training and development program based on the need and background of the employees. It will also be easy to keep track of this entire program with the help of AI. AI platforms provide flexibility in learning, so training can be scheduled as per the availability of employees. AI software's will provide more of personalized /individualized learning based on learning style e.g. turning written document into visuals. It could accumulate data about employee engagement or failures inside the program, and consequently test new varieties to attempt and tackle the issue on its own.

Performance Management: AI offers the tool which differentiates between performers and non-performers. Assessing performance has been put down to challenges caused by work environment favoritisms .AI will eradicate biases with permanent feedback. The AI driven assessment may occur endlessly with checking objectives and a joint effort between the employees. The reward for good work will be given quicker or employers can provide challenges task if the group doesn't perform well., AI may predict performance indicators of excelling employees, people who tend to leave a job position, department that can show great results.

Compensation: There are many factors that impact compensation. They include both internal and external factors. Analyzing all those factors is a time consuming and tedious job. AI with the help of database makes it easier to arrive at compensation package. It also helps in pay transparency.

So AI has lot of advantages in HR. It will help to analyze and measure the expected outcome that are tied to objectives of the business. Different AI tools have minimized the HR efforts so

that they can utilize the time for more productive and strategic decisions.

AI application in HR processes in industry

TABLE 3: APPLICATION OF AI IN HR PROCESSES IN INDUSTRY

SNo	Company Name	AI Application	HR Process	HR Outcome
1.	Tech Mahindra	Facial recognition (FR)	Attendance	All the employee has to do is show up at the door; the facial scanning is almost instantaneous. It's an efficient way of marking your attendance
.		The 'mood-o-meter'	Employee satisfaction & Engagement	It captures eight emotions — happiness, anger, surprise, disgust, fear, contempt, sadness, and neutrality — every single day, for each employee. '**Happiness Quotient'**
		K2, the first Human Resource (HR) Humanoid		Take over the routine HR transactions to provide constant assistance to the HR team in creating an enhanced employee experience. K2 can respond to queries with text display along with speech. K2 can address general and specific HR-related employee queries as well as handle personal requests for actions like providing payslip, tax forms etc.
		Social network	Recruitment	Recruitment Process –Reduced dependency on consultant hiring and in past seven hiring is reduced from 55% to 3%

		Job Boards Talex, an AI-driven talent marketplace for its employees.	Recruitment Appraisal	Utilized for mapping the skills of their existing talent pool. They mapped each employee's profile, including their country, language skills, education and gender. "Once a job description comes in, the machine matches the profile and skills. If an employee's profile has a 70% plus match with a vacancy, that job doesn't go out (to a person outside the company. Appraisal process- Over a period of time, we have invested in the algorithm, which helps us screen and shortlist right candidate based on scores. We score people on various parameters. Especially when people move from one process to other internally, this scoring algorithm helps us. If you overrule algorithm to take a decision because you have a different judgment, algorithm updates itself. It is a constantly learning system,".
	Panasonic	Virtual Chabot's		Through virtual Chabot's culture of openness is fostered. It encourages people to raise issues such as cab or transportation issues, training issues, compliments, and complaints — over this platform
	Unilever's recruitment	**Future Leaders Programme** Unabot	artificial-intelligence	Assessments, artificial-intelligence was able to filter up to 80% of the candidate pool, using data points including facial expressions, body language and keywords, ultimately surfacing those candidates that are most likely to be successful at Unilever.
	Loreal's	ChatBot MYA	Recruitment Process	These first launches increased candidates' satisfaction and allowed L'Oréal, which receives over 1 million applications per year, to

				manage an even higher volume of applications. For Niilesh Bhoite, Chief Digital Officer for HR at L'Oréal:" The results of the first 10,000 recruiting conversations show that Mya engages with 92% of our candidates in an efficient way and achieves a near 100% satisfaction rate. We've received great feedback from our applicants. Many commented on how easy and personal the experience felt."

Conclusion

AI is unlikely to substitute HR, and a successful HR ecology will contain the right mix of people analytics, AI, and human intervention. Data-driven insights will make for multidimensional improved decisions, but it is imperative to store and manage such data suitably given its often sensitive nature. Successful adoption of AI permits HR teams to spend more time on the "human" part of human resources—hearing to employees' voices and supporting their welfare—a winning situation for everyone.

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Emotional intelligence and career-related outcomes:

A Literature Review

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Abstract

For decades, scholars have focused on emotional intelligence as a critical skill for overcoming professional challenges. This research discovered a high association between emotional intelligence and compensation, career commitment, decision-making challenges, professional satisfaction, entrepreneurial goals, and turnover intentions. Research indicates a strong link between emotional intelligence, job flexibility, entrepreneurial self-efficacy, and compensation.

Keywords: emotional intelligence; career outcomes, career adaptability, entrepreneurial self-efficacy, salary

Introduction

Organisational behaviour and human resource development have focused on emotional intelligence (EI) owing to its potential influence on career success. Unlike traditional intelligence quotients (IQ), which predict academic and technical job capabilities, EI offers a broader perspective on the interpersonal and intrapersonal skills essential for navigating the complexities of the workplace. This literature review begins with an overview of the foundational theories of EI, followed by an examination of its operationalization and measurement across different studies. Subsequently, it delves into the empirical evidence supporting the role of EI in enhancing job performance, leadership effectiveness, team dynamics, job satisfaction, and adaptability within professional settings. The paper also highlights the methodological challenges and variations in EI research, providing a critical analysis of the strengths and limitations of current studies.

Literature Review

This section will extensively review existing literature on emotional intelligence, career-related outcomes, and their interrelationship. The review will cover relevant theories, conceptual frameworks, and empirical studies to establish a theoretical foundation for the research. Key concepts to be explored include emotional intelligence, job satisfaction, career success, and their impact on individuals in the manufacturing industry.

The review of related literature shows that no authentic & systematic study has been conducted on this topic in major metro cities including Pune City.

There is a clear research gap.

Antonakis, J (2017) in his study he stated that the role of research in shaping policy and its societal impacts is the central argument of this position paper. It goes over five diseases—significosis, neophilia, theorrhea, arigorium, and disjunctivitis—that impede the generation of useful research. The report recommends that those in charge of publishing papers deal with these illnesses, promote research that is both theoretically and practically applicable, and incentivize researchers to put the greater good first. In order to raise the bar for research, it stresses the importance of self-reflection, transparency, honesty, and new technology. Among the improved scientific procedures proposed in the article are incentives for researchers and rules governing the publishing industry.

Boyd, N. G., & Vozikis, G. S. (1994). Their study found that, Many people are driven to become entrepreneurs after considering their job security, the resources available to them, and the possibility of losing their current position. By suggesting an updated version of Bird's model that includes self-efficacy with entrepreneurial intentions and action, this study broadens the application of social learning theory to new venture development. Ambient preference, skill acquisition, energy expenditure, and resilience are all impacted by one's sense of self-efficacy. Perseverance, effort, and drive are other factors that impact self-efficacy. The future of new venture development can be predicted by determining critical efficacy perceptions. Expanding career development theory to encompass shifting jobs and including entrepreneurship into career self-efficacy research could provide light on why many new businesses fail in the initial years of operation.

Brown, C., George-Curran, R., & Smith, M. L. (2003). In their research, the purpose of the research is to examine how emotional intelligence, career exploration, and self-efficacy in making decisions all relate to one another. The moderating influence of sex is examined in EQ and professional decision-making self-efficacy and EQ and vocation exploration and commitment. Career decision-making self-efficacy is positively linked with emotional intelligence, but vocational exploration and commitment are negatively correlated. There was a correlation between EQ and the career factors studied, although sex was not determined to moderate this link. Emotional intelligence is an acquired skill, and this study shows how important it is for career advice and evaluation. Research in the future should target both real and perceived emotional intelligence, and it should include participants from a variety of backgrounds, not just college students.

Carson, D., & Carson, P. P. (1994). Their study analysed that research in the academic community is moving away from career management and toward studying intra organisational mobility and its effects on overall performance. The changing nature of labour and vocations, together with the widespread belief in the impending doom of careers, has contributed to this change. As a result of environmental instability, intensified competition, and the flattening of organisational hierarchies, old covenants are being broken by organisations. Resilience and self-awareness will play crucial roles in future labour that is increasingly autonomous. Managers should push their employees that are committed to the firm and their work to be more involved in their communities.

Celik, P., & Storme, M. (2018). Their study explained that the goal of this research is to find out if undergraduates who score higher on measures of trait emotional intelligence (trait EI) also tend to have better grades. There should be a positive correlation between academic satisfaction and emotional intelligence (EI). This is because EI boosts career adaptabilities and job-specific coping tools. The ability to make adjustments to one's work schedule mediated this link, according to the study's authors. It is critical that career counsellors possess this knowledge so they can create interventions that work and assess how job flexibility affects the correlation between emotional intelligence and academic success.

Coetzee, M., & Harry, N. (2014). Their study found that, to thrive in today's volatile and unpredictable global work market, emotional intelligence is essential for handling stress and navigating difficult situations. Concerning emotional intelligence and its function in stress management, however, there is scant written material. To fill the gap in work growth and

happiness literature, emotional intelligence is connected to career flexibility. Improving emotional intelligence in call centre agents is the focus of this study, which analyses the African call centre environment using Savickas's idea of career adaptability.

Coetzee, M., & Beukes, C. J. (2010). Their study stated that The purpose of this research is to determine if there is a correlation between an individual's emotional intelligence and their happiness with career preparation assistance and if so, how. It implies that career counsellors should think about offering career services that assist teenagers build self-empowering career attitudes, abilities, and behaviours; this will boost their emotional intelligence and make them more marketable to potential employers. A new school of career counselling may spring up as a result of the results, which may prompt additional studies on emotional intelligence and employability in South African settings.

de Cuyper, N., & de Witte, H. (2011). Their studies found that, An intriguing subject is the management paradox, which is a dispute about the optimal human resource policy in relation to employability. Gaining an advantage in the job market is commonly believed to increase one's performance and adaptability. But it can also make employees act in their own self-interest, which in turn increases turnover and decreases loyalty to the company. The purpose of this research is to disprove this paradox by looking at how employability, emotional organisational commitment, and performance are related. Based on the findings, the management conundrum collapses when considering the internal and external variables influencing the labour market and the availability of jobs along a quadrant.

Lorraine Dacre pool & Pamela Qualter (2013) in his study stated that their research looks at the connection between ESE and graduate employability, specifically how employability relates to job happiness. Beliefs about emotional competence impact self-perceived employability, as worked-out graduates with higher ESE rate themselves positively in terms of employability, according to the study. For a person to be emotionally competent, they must possess the qualities and abilities that increase their likelihood of choosing, obtaining, and maintaining a job. Graduate employability mediated the association between ESE and job happiness, according to the study. A more fulfilling career is likely to be the outcome of improved communication and social interaction at work, boosted perceptions of one's employability, and a general sense of emotional competence, according to the results. Academic programs at the university level should incorporate meaningful emotional learning

experiences, and future studies should determine the role of emotional intelligence and emotional self-regulation in predicting actions that boost employability.

Dahl, D., Austin, K., Wagner, B., & Lukas, A. (2008). In their study states that, this study aimed to learn more about the connection between non-student individuals who were career-undecided and their overall emotional intelligence (EI) as well as any negative thoughts they might have about their chosen profession. Total EI and negative career thinking ratings were revealed to be significantly inversely related, according to the research. The majority of the variation in the link between career thoughts and EI was explained by two subscales: adaptability and intrapersonal variables. EI ratings were most inversely connected to decision-making perplexity. According to the findings, vocational decision-making counselling should prioritise assessing clients' EI levels. Over the last decade, there has been a proliferation of tools meant to gauge emotional intelligence, which has sparked heated debates and increased interest in the concept. The research centred on three main points: Is there a connection between emotional intelligence and dysfunctional career thinking in general? What, according to Bar-On's definition of emotional intelligence, are the most common components of pessimistic professional outlooks? The most common ways in which low emotional intelligence is linked to negative career thoughts. Further research with people who are not students is needed, as the study pointed out that the strong association between EI and negative career thinking does not establish causation.

Emmerling, R. J., & Cherniss, G. (2003). In their research, Emotional intelligence (EI) is a crucial skill in decision-making, involving perception, use, comprehension, and control of emotions. Emotional investment in professional decisions impacts self-exploration, information processing, and risk perception. Emotional state positively impacts cognitive system performance in decision-making. Traditional career counselling focuses on logical job choice models, but emotional self-awareness can be improved by understanding the connections between personal lives and professional trajectories. Techniques for increasing emotional self-awareness include keeping a "feeling journal," evaluating emotions, and considering other perspectives.

Guan, Y., Deng, H., Sun, J., Wang, Y., Cai, Z., Ye, L., Fu, R., Wang, Y., Zhang, S., & Li, Y.

(2013). In their studies observed that, career adaptability aspects were associated with higher levels of self-efficacy in the job search and employment status in a study of Chinese college grads. Perceptions of a good match between people and their environments were similarly

predicted by these factors. The biggest predictors of job search self-efficacy, which in turn had a favourable effect on employment status, were career concern and control. Job search self-efficacy mediated the indirect effect of career control on P-E fit. Job search self-efficacy mediated the relationships between career adaptability, employment status, and P-E fit. To help people be better prepared for job choices and transitions, the study recommends that future studies look at the factors that influence career flexibility as well as the antecedents of this trait.

Hodzic, S., Scharfen, J., Ripoll, P., Holling, H., & Zenasni, F. (2018). Their study found that, through the use of this meta-analysis, the effectiveness of emotional intelligence (EI) training in individuals who are in good health is investigated. The major effect of EI training was determined to have a mild change, while the effect remained stable from the pre-follow-up period. Significant modifiers were the type of EI model, the size of the four branch model, the dose, and the style of publishing. Because of its connection to health, well-being, academic performance, and work performance, emotional intelligence (EI) has emerged as an important psychological category. Identifying specific groups and tailoring training to meet the requirements of those groups should be the primary focus of future study.

Jiang, Z. (2014). In his study stated that, the purpose of this research is to examine the relationship between Emotional Intelligence (EI) and Career Decision-Making Self-Efficacy (CDMSE) among students from South Korea and China. According to the results, there is a positive relationship between EI and CDMSE, which means that people with higher EI tend to be more confident when making decisions about their careers. A student's self-efficacy expectations for their chosen profession are higher if they are able to effectively assess and control their emotions. A person's emotional and cognitive regions work together during emotional processing, which could impact the weight that emotions carry when making a professional choice. Researchers did not find that gender moderated the relationship between EI and CDMSE. While there are some caveats, the study does provide light on how East Asians make job decisions based on emotion and offers some promising directions for career and employment consulting programs.

Jiang, Z. (2016). In his study explained that the purpose of this research is to investigate the connection between emotional intelligence (EI) and career decision-making confidence (CDMSE) in college students. It was discovered that elevating emotional intelligence can raise confidence and self-efficacy expectations in relation to professional choices. Personality context (PC) acts as a mediator in this relationship, with persons with greater EI having a

stronger attachment to the professionals they are currently employed in. Within the context of the indirect interaction between EI and CDMSE, gender does not play a role. There are certain limits to the study; however, it does provide useful insights for researchers and practitioners working in the field of career development. These insights include the impact that emotions have in career confidence and self-efficacy expectations.

Koen, J., Klehe, U. C., & Van Vianen, A. E. M. (2012). Their research explained that, the success of graduates' careers in the future depends on how well they handle the transition from school to work. Nevertheless, when times are tough economically, it can be especially challenging for newcomers to secure acceptable employment. Avoiding poor-quality work and mismatches in your career requires thorough preparation. Four psychological resources—care, control, curiosity, and confidence—make up career adaptability, an important part of career preparation. Adolescents who score higher on measures of career flexibility are less likely to experience extended unemployment, make better decisions regarding their careers, and are more likely to successfully transfer between jobs. University grads now have better tools for career adaptation thanks to a new training program.

Parmentier, M., Pirsoul, T., & Nils, F. (2022). Their study found that an individual-centred approach was used to examine the career adaptability profiles of college students. Six unique profiles were detected, with different levels and shapes. Individuals with greater levels of emotional intelligence tended to have more flexible employment trajectories. Feelings of optimism about the future and confidence in one's ability to make important professional decisions diverged greatly. In order to better plan and execute interventions pertaining to careers, it is helpful to differentiate career adaptability profiles. Due to its cross-sectional methodology, small sample size, and concentration on low confidence profiles, the study does have certain drawbacks. Counsellors and practitioners can benefit much from the results.

Pekaar, K. A., van der Linden, D., Bakker, A. B., & Born, M. P. (2020). Their study found that every aspect of life is impacted by emotional experiences, which communicate mood states, set priorities for objectives, and impact behaviour. A person with high EI is perceptive, knowledgeable, and skilled in emotion management. Successful goal-attainment and positive social reactions are hallmarks of high emotional intelligence (EI) people. Having EI is linked to having a fulfilling social life, good health, and being successful at work. On the other hand, studies on EI tend to ignore contextual elements, interpersonal effects, and temporal considerations in favor of examining individual variances. This research presents a theoretical

framework that takes into account time, context, and individual and contextual moderators to examine self- and other-focused EI in a dynamical environment. Researchers may find this paradigm useful for gaining a better grasp of the everyday effects of EI and for informing future studies.

Pirsoul, T., Parmentier, M., Sovet, L., & Nils, F. (2023) in their study found that Despite the importance of emotional intelligence for people navigating professional obstacles, there has been little attempt to empirically combine studies on its relationship with career-related outcomes. An integrated theoretical model is proposed and tested in this study, which also performs a meta-analysis and systematic review of 150 separate samples involving 50,894 people. The results of the meta-analysis demonstrated a strong correlation between emotional intelligence and the following variables: salary, career commitment, career satisfaction, turnover intentions, career adaptability and self-efficacy. At the same time, self-perceived employability and job search self-efficacy did not show any significant connections. The study's substantial theoretical contributions and suggestions for further investigation stress the importance of developing a thorough emotion-focused career model to investigate the positive impacts of EQ on occupational and professional development.

Saka, N., Gati, I., & Kelly, K. R. (2008). In their research explained that, problems with making a profession choice could have their roots in a person's emotions and character traits, which this study seeks to explain using a theoretical framework. Negative outlooks, anxiety, and issues with one's sense of self make up the model's three main sections. Both Israeli online users and American university students participated in the development and pilot testing of the Emotional and Personality Career Difficulties Scale (EPCD). This research emphasizes the need of cross-cultural validation and the necessity for a generic theoretical framework to address emotional and psychological factors that contribute to challenges in making career decisions. Findings from the study highlight the importance of cross-cultural validation in learning about cultural contexts in which career decision-making is challenging, as well as the EPCD's reliability, structure of challenges, and possible gender disparities.

Schreuder, A., & Coetzee, M. (2011). Their research found that a total of 270 persons working in the service sector were surveyed to determine their levels of emotional intelligence, job satisfaction, and career anchors. There were statistically significant correlations between EQ, career anchoring, and job happiness. A high level of emotional intelligence was predicted by traits such as independence, creativity, and entrepreneurship. As far as career pillars go, job

satisfaction is a good predictor of genuine challenge and service commitment to a cause. Possessing strong emotional regulation skills was a strong predictor of happiness in the workplace. The research adds to the field of career psychology and could help HR professionals better understand how to help their employees feel fulfilled in their work and in their jobs.

Udayar, S., Fiori, M., Thalmayer, A. G., & Rossier, J. (2018). Their research found that, among 270 persons working in the service sector, the study looked at how career anchors, EQ, and job happiness were related. The correlations between emotional intelligence, career anchoring, and contentment with one's employability. There was a strong correlation between emotional intelligence and entrepreneurial spirit, self-reliance, and service dedication. Pure challenge and service, a commitment to a cause, and job pleasure are the moorings of a purposeful career. Job happiness was significantly predicted by the capacity to manage the emotions of others. The results add to the field of career psychology and could guide HR policies and procedures aimed at maximising job happiness and job fit for employees.

Vesely Maillefer, A., Udayar, S., & Fiori, M. (2018). Their study found that ability EI and trait EI are the most popular theoretical frameworks for understanding emotional intelligence (EI), a multi-faceted concept that has been the subject of substantial research. Emotional intelligence (EI) is reframed as an ability in the ability EI approach, which also implies that emotions are involved in cognitive processes. Individuals' emotional self-efficacy, as assessed by self-report measures, is the primary emphasis of the trait EI method. One such aspect of emotional intelligence that could explain the observed variation in EI behaviour is emotion information processing (EIP). People who have a greater emotional information processing (EIP) tend to be more attuned to positive emotional cues, suggesting a link between EI and EIP. Nevertheless, there is a lack of knowledge about the interplay between various EI viewpoints and how they contribute to enhanced performance. By utilising a moderated-mediation framework, Seal and Andrews-Brown (2010) present a thorough model that elucidates the potential interactions between various EI components in order to predict emotionally intelligent behaviour. In addition to trait and ability EI, this study adds a third technique called emotion information processing to the list of EI components. It also gives some early evidence on how well this new framework predicts adaptive performance.

Wen, Y., Chen, H., Pang, L., & Gu, X. (2020). Their study observed that 529 students from vocational colleges in China were surveyed on their levels of emotional intelligence and their confidence in their ability to start their own business. Although there were statistically

significant differences between the sexes on a number of measures, emotional intelligence was not one of them. Entrepreneurial self-efficacy is a key component to success in the workplace, and EQ training can help you achieve that. The impact of relevant characteristics on entrepreneurial intention, ways to better educate future business owners, and similar questions should guide future studies.

Zampetakis, L. A., Kafetsios, K., Bouranta, N., Dewett, T., & Moustakis, V. S. (2009) in their research stated that, the importance of entrepreneurship and an entrepreneurial culture in driving economic growth, revitalizing businesses, and creating jobs is being recognized more and more in both academic and professional circles. On the other hand, the efficacy of educational initiatives aiming to foster an entrepreneurial spirit and improve the environment for new businesses is a matter of some concern. This knowledge would be particularly useful for university students, who are more inclined to seek self-employment. University students' entrepreneurial attitudes and intentions were investigated in this study through the examination of correlations between emotion-related dispositions proactivity, and creativity. In their pursuit of a more entrepreneurial spirit among college students, educators and policymakers may find the data-supported approach useful.

Limitations

We couldn't evaluate the relationships among all career-related factors since there were only a few research that explored the aspects of emotional intelligence. We decided a study agenda for future research.

Conclusion

The examination of literature on emotional intelligence (EI) and career-related outcomes underscores the multifaceted role of EI in the workplace. The evidence presented in this review indicates that individuals with high levels of EI tend to achieve greater job satisfaction, exhibit superior leadership skills, contribute more effectively to team dynamics, perform better at their jobs, and adapt more readily to changes. These findings suggest that EI is a valuable asset for professional development and organisational success. However, the review also identifies gaps in the current literature, such as the need for longitudinal studies, more diverse sample populations, and the exploration of cultural influences on the EI-career outcome relationship. Emotional intelligence has importance in career development programs and organisational strategies. By fostering emotional intelligence, organisations can enhance employee well-being, promote effective leadership, and achieve a competitive advantage in the increasingly

complex and dynamic business environment. Future research should aim to address the identified gaps and continue to explore the potential of EI as a cornerstone of professional excellence and organisational success.

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Study of Influence of Artificial Intelligence on Human Life

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Abstract

Artificial Intelligence (AI) generally refers to the capacity of machines to carry out tasks like learning, problem solving, and decision making that ordinarily need human intelligence Artificial intelligence, however, has a profound effect on the way we go about our daily lives and connect with one another. The objective of this paper is to study the influence of the artificial intelligence on the life of human beings. Our lives are being profoundly impacted by artificial intelligence (AI), and privacy is one of the main areas of worry. Our lives are made easier and more productive by recommendation engines, smart devices, and AI personal assistants. AI touches every aspect of our personal and professional online lives today. Various technologies are developed in the recent past which have made inroad in all the aspects of human being. Interesting part of it is that at times we do not know what sort of information is being silently without one's knowledge is being transmitted and recorded at unknown ends. We do not have control over it as the data is being collected without one's knowledge and permission. This aspect has in fact disturb the whole human life. Despite several benefits of AI, there are also concerns about its impact on society. The possibility of AI being abused or misused is another issue. Concerns regarding privacy and civil liberties are brought up using AI in surveillance and law enforcement. The Government of India is seized with the problem of need for regulating the use of AI and has taken several initiatives to effectively deal with it. It has assigned this work to NITI Aayog and several regulations are in offing.

Keywords: Artificial Intelligence, Machine Learning, Safety and Privacy concerns, Regulatory initiatives. Positive impact.

Introduction

Artificial Intelligence (AI) generally refers to the capacity of machines to carry out tasks like learning, problem solving, and decision making that ordinarily need human

intelligence. But there are numerous varieties of AI, each with unique powers and uses. According to NITI Aayog, "Artificial intelligence (AI) refers to a collection of technologies that empowers robots to mimic human sense-perception-action at higher intelligence levels. The world is changing faster than ever because to the emergence of big data and artificial intelligence (AI and BD). Our everyday routines have been completely transformed by artificial intelligence (AI), which gives us the comfort and efficiency we need to complete jobs faster.

One of the 21st century's most revolutionary technologies, artificial intelligence (AI) is changing every facet of our life, including how we work, study, communicate, and engage with one other. AI-powered robots are replacing human workers in regular and low-skilled jobs at a rate never seen before in the history of labour. Although this could save expenses and increase efficiency, there are worries that employment may be lost as a result of it. Another important area of growth is the effect of AI on healthcare. With the ability to evaluate huge volumes of data rapidly and precisely, AI-powered systems can improve patient outcomes and cut healthcare expenditures. AI is also transforming the way we interact with technology

The objective of this paper is to study the influence of the artificial intelligence on the life of human beings. Various technologies are developed in the recent past which have made inroad in all the aspects of human being. Interesting part of it is that at times we do not know what sort of information is being silently without one’s knowledge is being transmitted and recorded at unknown ends. We do not have control over it as the data is being collected without one’s knowledge and permission. This aspect has in fact disturb the whole human life.

Review of literature: In his study work titled "A Case Study on Applications of Artificial Intelligence in Human Life," Uddipam Medhi (2020) concluded that artificial intelligence is the field that allows machines to understand analytically and conceptually. Artificial Intelligence approaches during the past two decades have made a tremendous contribution to several sectors. In the years to come, this technology and its uses will probably have a significant impact on human life. Pinky Gupta According to the findings of "AI in Our Life," artificial intelligence has more profound benefits and effects than our way of living. The younger generation is embracing artificial intelligence's involvement and enjoyment in their daily lives. Since it is utilised in all spheres and aids in the solution of simple issues. She has come to the additional conclusion that the older generation finds it risky to fully rely on artificial intelligence (AI) and struggles with a lack of understanding when using technology.

Discussion:

Our lives are being profoundly impacted by artificial intelligence (AI), and privacy is one of the main areas of worry. The impact of AI on human life is broken down here, considering both the advantages and the privacy concerns:

Positive Impacts:

Convenience: Software and hardware driven by Artificial Intelligence and Machine Learning is imitating human brain processes to help with the digital transformation of civilization. Our lives are made easier and more productive by recommendation engines, smart devices, and AI personal assistants. AI touches every aspect of our personal and professional online lives today. In the world of business, global communication and interconnectedness have always been crucial. Following are the most common uses (these are illustrative) availed by the human beings in their day- to-day life:

- AI algorithms are used by social media sites like Facebook, Instagram, and YouTube to enhance user engagement and personalisation.
- We can book a cab through Ola or Uber. Road closures, real-time traffic data, and other factors are used to recommend the quickest and most cost-effective routes for vehicles, cutting down on travel time and raising user satisfaction.
- With the use of artificial intelligence (AI), these apps can sift through the vast amounts of user data and generate playlists of songs, films, and TV shows just for each user.
- Artificial intelligence integration greatly benefits the financial sector, especially in terms of online banking security.
- On line banking, use of ATMs, Cash Depositing Machines etc.
- The various apps can effectively fix errors and assist in switching between languages thanks to artificial intelligence.
- Use of Close Circuit Tele Vision sets
- Seniors' quality of life may be enhanced by having a pet in a number of ways, including as reduced blood pressure, less loneliness and anxiety, and increased social engagement. The idea of providing elderly persons who live alone with

cybernetic companions that can assist with household chores has gained popularity recently.

- ❖ Transmission of messages, files, photographs at almost no costs using social networking platforms like WhatsApp, Instagram, "X' (Formerly Twitter) handle.

Problem-solving: AI can analyse enormous volumes of data to find difficult solutions in industries like finance, logistics, and healthcare.

Healthcare has made significant strides thanks to artificial intelligence, especially in the fields of disease diagnostics, drug discovery, and customised treatment plans. Machine learning algorithms have the potential to assess various medical images, such as X-rays and magnetic resonance imaging scans, to facilitate prompt identification and precise diagnosis.

Education: There is one school of thought which subscribe that AI will create more jobs than it destroys, however these new roles will require higher levels of technical expertise. Governments, academic institutions, and businesses should assess how best to design educational programmes that give people the skills they need to participate in the modern economy as new capabilities emerge. Consequently, educational establishments will have to prepare students for careers in the AI.

Economy: With AI's capacity to increase output and efficiency, India can achieve its lofty objectives and accelerate its economic growth. Increased funding for AI research, education, and upskilling is essential to realising this potential, guaranteeing inclusivity, and advancing India's future prosperity and equity. Given that a large amount of the added value is anticipated to come from the service sectors, India is in a strong position when it comes to Gen AI and has a large economic opportunity. **Safety:** AI can be utilised for facial recognition in security systems and fraud detection. AI analyses network behaviour and spots anomalies or security incidents by using machine learning and deep learning techniques. This prevents possible threats with similar characteristics and improves future security measures by enabling quick

reaction. It provides vital usage by the security personnel in detecting frauds.

Here it will be worthwhile to mention that after the adoption of advanced technology in day to day banking the number of cyber frauds has substantially increased. Majority of these frauds are due to use AI. More particularly the elder generation people are the victims of it because unknowingly their password or OTP is disclosed which increases the

vulnerability of these persons to cybercrime. Therefore, it is necessary that the elder generation people should take extra care while using internet banking.

Privacy Concerns:

Data Collection: AI is data-driven, and the more data that is gathered about us, the bigger the risk to our privacy. This information may include past purchases, browsing patterns, and even physical movements. Availability of data helps in achieving accuracy in decision making.

Data Misuse: Personal information can be used for targeted advertising, discrimination, or identity theft if it ends up in the wrong hands.

AI Processing Bias: AI procedures can be prejudiced based on the data they are trained on, leading to unjust conclusions in areas like loan approvals or job applications.

Lack of Transparency: It might be challenging to comprehend how our data is being used and the reasoning behind specific judgements made by AI decision- making algorithms since they are frequently opaque and sophisticated.

Ethical Development: There's a growing emphasis on developing AI ethically, with a focus on transparency, accountability, and avoiding bias.

Despite several benefits of AI, there are also concerns about its impact on society. The possibility of AI being abused or misused is another issue. Concerns regarding privacy and civil liberties are brought up using AI in surveillance and law enforcement.

It is also critical to recognise that not all sectors and occupations will experience the same effects from AI on the workforce. The use of AI-powered systems is expected to result in a large increase in job opportunities in several industries, including healthcare and finance. However, automation may result in employment losses in other sectors of the economy, such manufacturing and retail.

What needs to be done to save from the adverse impact of AI

Regulation: Governments everywhere are debating how best to control the advancement and application of AI, with a particular emphasis on algorithmic fairness and data protection. India's government has launched several measures to encourage the spread of artificial intelligence (AI) in the nation, realising the technology's strategic significance in propelling economic growth and development. The top public policy think tank in India, NITI Aayog, was given a mandate by the government to create rules and regulations for the creation and application of artificial intelligence. To allay some

of the privacy worries around AI platforms, the Indian government also recently passed the Digital Personal Data Protection Act in 2023. The Ministry of Electronics and Information Technology, one of the other Indian ministries working on AI policy, has established committees on the subject and received reports from them regarding its development, safety, and ethical implication. AI require the adoption of best practices.

User Control: People should have more control over their data, including the option to ask for data deletion and to opt out of data collecting. AI performs a variety of tasks across the cyber lifecycle, acting as a force multiplier for seasoned cyber professionals. These tasks include monitoring large volumes of data to identify subtle adversarial attacks, estimating the risks associated with known vulnerabilities, and using data to inform decision-making during threat hunts.

Conclusion:

AI is and will continue to change the way we live. India is not an exception when it comes to the significant prospects and possible hazards that artificial intelligence (AI) offers nations worldwide. India boasts a sizable and rapidly growing high-tech workforce. There are both exciting and difficult implications of AI for society. While artificial intelligence (AI) has the potential to revolutionise the way people work, communicate, and engage with technology, it also brings up issues related to job displacement, bias and discrimination, and potential misuse or abuse. It is critical that we address these issues and seek to guarantee that everyone in society benefits from AI as we develop and apply it.

Artificial intelligence (AI) has had a significant impact on people's lives and has greatly aided in the automation of practically all their daily tasks. Many of these techniques need a lot of time and labour-intensive work to finish.

While artificial intelligence (AI) has a bright future, there are several challenges it must overcome. As technology advances, artificial intelligence (AI) is expected to become more and more commonplace, revolutionising industries like finance, transportation, and healthcare. AI-driven automation will transform the labour market and require new roles and competencies. The field of AI policy is changing quickly on a worldwide scale. To guarantee that AI's benefits are fulfilled with inclusion while avoiding its risks, it is imperative that it be created and employed ethically, transparently, and under human control.

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Enhancing Image Authentication Through HOG-Based Inconsistency Analysis

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Abstract

Today, a plethora of image editing tools are available, offering transformative changes to images at no cost. While images play a significant role in human life, they are also susceptible to manipulation through image processing software. Detecting manipulated images poses a challenge, as altered images can be difficult to distinguish from originals. Consequently, image forgery detection has become a focal point of research. This paper proposes a method for detecting image inconsistencies using the Histogram of Oriented Gradient (HOG) technique. HOG helps identify manipulated blocks within images. The study comprises several stages, including acquisition, preprocessing, and feature extraction and Matching Process. The system's performance is evaluated based on the True positive Rate (TPR) and False Positive Rate (FPR), ACC 90.06

Introduction

In the digital era, images and videos have become the main carriers of information. Due to the simplicity of acquisition, distribution, and storage of images and videos, it is easy to convey information. Additionally, images and videos serve as evidence. Videos in TV news and images in newspapers and magazines are often accepted as truth and can be used as evidence in a court of law. In today's world, with the advancement of technology, people can easily access image and video editing software, which can alter or change the meaning of images. People manipulate images for malicious purposes. To detect image manipulation, there are two approaches: active [1-3] and passive [4-6] figure 1 shows below. Active image inconsistency detection has two types: Digital Signature and Digital Watermark [7]. Passive forgery detection also has two types: Forgery Type Dependent and Forgery Type Independent. Forgery Type Dependent comprises two subtypes: Copy-Move Forgery Detection and Image Splicing

Detection. Forgery Type Independent includes two subtypes: Retouching Detection and Lighting Condition.

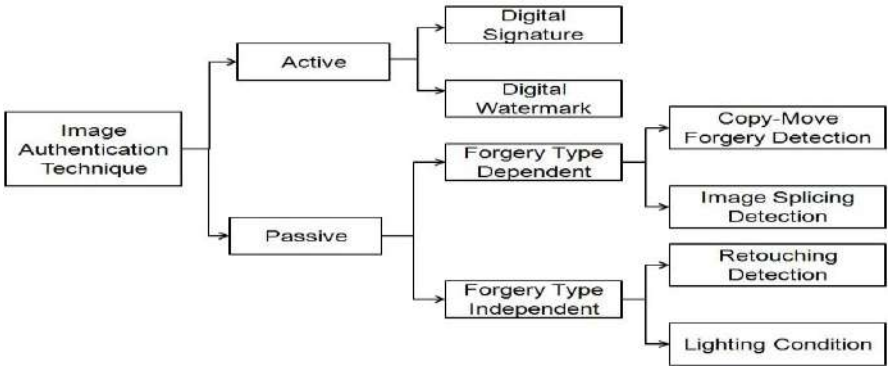

Fig.1 Image forgery detection methods

The most common image forgery methods are Copy-Move [8-10] and splicing. In Copy-Move forgery, a portion of the image is copied and pasted onto another area of the same image. Detecting this type of image forgery is challenging because the pasted part originates from the same image, resulting in properties that closely match the rest of the image. In splicing, objects from one image are merged with the source image

Digital image forgery detection has emerged as a crucial field in the realm of digital forensics and computer vision. With the widespread availability of sophisticated image editing tools, the manipulation and tampering of digital images have become increasingly prevalent. Image forgery encompasses various illicit activities, including but not limited to, copying and pasting image regions, adding or removing objects, altering image attributes, and generating entirely synthetic images. These manipulations can be perpetrated for malicious purposes such as spreading misinformation, fabricating evidence, or damaging someone's reputation.

The detection of digital image forgery is imperative for maintaining the integrity and trustworthiness of digital media. It involves the development and application of advanced algorithms and techniques aimed at identifying inconsistencies and anomalies within images that indicate tampering. Detection methods range from simple pixel-based analyses to complex statistical modeling and machine learning approaches.

Key challenges in digital image forgery detection include the ability to distinguish between authentic and manipulated images, dealing with increasingly sophisticated forgery techniques, handling large volumes of image data, and ensuring robustness against adversarial attacks aimed at circumventing detection methods.

Related Work

In the past, numerous studies have reported on image inconsistency detection. One notable work is the passive copy-move image detection method proposed by Ghulam et al.[9] . A.C. Popescu and H. [10] Farid proposed a copy-move forgery detection technique using Principal Component Analysis (PCA). They demonstrated the effectiveness of this method on credible forgeries and its sensitivity to additive noise and lossy JPEG compression. M.H. Alkawaz [11] et al. proposed a copy-move image forgery detection method based on Discrete Cosine Transform (DCT). They first converted RGB images to grayscale, then segmented the image into different m x m pixel blocks, where m=4.8. Next, they computed 2D DCT coefficients for each block using Euclidean Distance. Their study was conducted on the COMOFOD dataset, consisting of 200 images (100 original and 100 forged). Vivek H. et al. [12] proposed an image inconsistency detection method utilizing the Local Binary Pattern (LBP) technique. In their study, they employed simple preprocessing steps, converting color images to grayscale, followed by feature extraction using LBP as a texture method. Subsequently, they utilized a distance measure, likely the Euclidean distance, to ascertain the similarity of each pixel. The results indicated an achieved accuracy of 98.58% with a block size of 2 x 2. Vivek H. et al. [13] worked in the same field focusing on detecting forged images. They proposed a method based on Histogram of Oriented Gradient (HOG) to achieve this goal. Their dataset consisted of 100 images, with 50 being forged and 50 original images, used to test their algorithm.

The results indicated a False Acceptance Rate (FAR) of 0.82 and a False Rejection Rate (FRR) of 0.17, demonstrating the efficiency of the system in achieving its objectives. Mahale, Vivek et.al. [14] proposed method aims to detect inconsistencies in specific image areas due to the availability of image editing software. It involves preprocessing, feature extraction using Discrete Cosine Transform (DCT), and matching processes. Evaluation metrics include True Positive Rate (TPR), False Positive Rate (FPR), and Area under the Curve (AUC) with values of 0.3372, 0.5278, and 0.949, respectively, showcasing improved system efficiency.

Methodology

The methodology employed in this system aims to detect image inconsistencies through a series of mechanisms, including proposed techniques and feature extraction methods. In this study, preprocessing steps are conducted using the COMOFOD dataset.

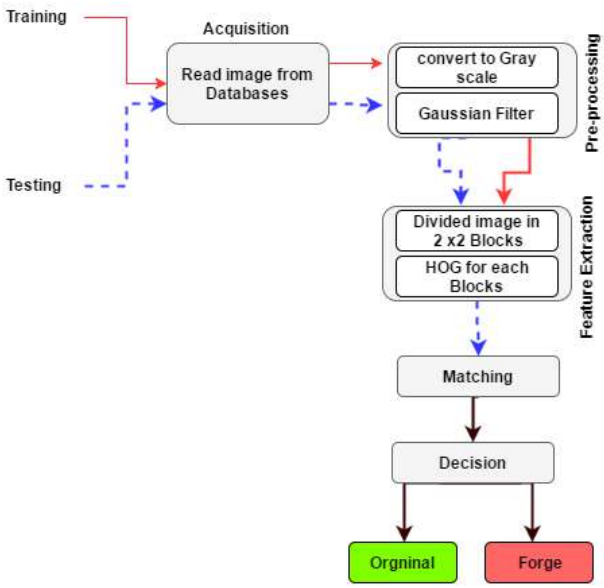

Figure 2: Methodology of studies

Input: Image for determination of inconsistencies check

Output: Either Original or Forge image

Begin:

Step 1: Read Image

Step 2: Convert Color Image in to Gray scale image

Step 3: Divide image into overlapping blocks

Step 4: Compute HOG Features from each block

Step 5: Apply Lexicographical sorting and match similar pairs of blocks.

Step 6: Matched blocks are mapped to indicate forgery detection.

Step 7: Detect image is Original or forge

End.

Algorithm 1: Forgery detection

The methodology begins with pre-processing steps, involving the retrieval of input images from the database and converting them into grayscale images. Detecting copy-move forgery in

images is a crucial and valuable method, aiding in distinguishing fake images from originals and identifying duplicated regions within images. Figure-2 illustrates our methodology, encompassing acquisition, pre-processing, feature extraction, and matching stages.

I) Acquisition

In this step, we discuss the source of the database utilized in our implementation task. We obtained the images from the COMOFOD dataset, which is available online as a standard resource.

II) Preprocessing:

In the preprocessing steps, the color image is converted to a grayscale image using the following formula:

$$I=0.299R+0.587G+0.114B$$

III) Feature Extraction Process

The feature extraction process involves dividing the input image 'I' into overlapping blocks of a fixed size. This division into overlapping blocks facilitates the detection of forged regions within the image. Once divided into blocks, each block is passed through the Histogram of Oriented Gradient (HOG) algorithm to extract descriptor features.

The HOG algorithm is applied to each block, generating a histogram for each individual block. These histograms are then combined into a descriptor vector for the entire image, which is stored as template data. This template data is utilized during the testing stage to determine the matching scheme for each block.

IV) Matching Process

The matching process operates in a block-wise manner to identify inconsistencies by lexicographically sorting feature vectors. Similar features found in different blocks are compared using the Euclidean distance measure.

$$d(block\,v1, block\,v2) = \sqrt{\sum_{n=1}^{N}(block\,n1 - block\,n2)}^{\,2}$$

Pairwise Euclidean distances between blocks from the training and test datasets are calculated using the Euclidean equation. A resulting distance equal to zero or near-zero signifies that the

image lacks inconsistencies, indicating its originality. Otherwise, if the distance is significant, the image is deemed inconsistent.

Result and discussion

The proposed method is evaluated on the COMOFOD database, which includes different types of image forgery. This database is sourced from the Video Communication Laboratory (VLC) at the University of Zagreb, Croatia, and the Department of Wireless Communication. The proposed method was assessed using a laptop equipped with an Intel Core i3 processor, 4GB of RAM, and hardware infrastructure running MATLAB 2013 with necessary toolboxes. Figure 4 displays sample images extracted from the COMOFOD database under two conditions: original and forged.

From the experimental work, the HOG feature extraction is applied using different block sizes, namely 2x2.

We are use formula ACC = 1−FPR

Table 1: shows evaluation result of our system extracting HOG features.

Dataset size	TPR	FPR	ACC
100	0.0517	0.0994	90.06

The figure 3 shows the ROC curve of the system by FPR, TPR and area under curve

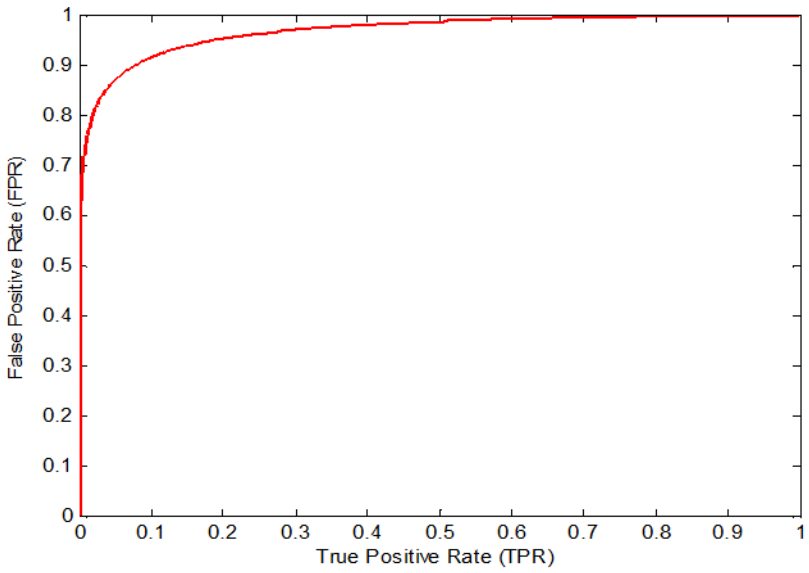

Figure 3: ROC curve

Conclusion

The paper presents a novel method for image authentication and detection based on the Histogram of Oriented Gradient (HOG) technique. The method was assessed using the COMOFOD dataset, where HOG was employed for feature extraction, and correlation calculations were utilized to identify forged regions within images. The system's efficiency was evaluated using metrics such as True Positive Rate (TPR), False Positive Rate (FPR), and Area under the Receiver Operating Characteristic (ROC) Curve, with a database comprising 100 images of originals and forgeries. The evaluation results demonstrated a TPR of 0.0517, FPR of 0.0994, and an ACC 90.06

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Impact of Artificial Intelligence in Marketing

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Dr. Sudhakar J Bokephode

Abstract

Implications, in particular ideas about marketing deployment of AI, developing products and ideas about how to leverage new skills into the marketing team mandated by the new technology. Artificial Intelligence **(AI)** has been an emerging phenomenon in a variety of fields in recent years: technology, business, medicine, automotive, and education. However, AI has made its way deeper into marketing in the last few years, helping brands develop every step of the consumer journey. In addition, instruments previously limited to companies at the enterprise level have become inexpensive and open to medium and small businesses. This study is to explore how widely AI is implemented in marketing and what consequences it has for marketing practitioners. This study concludes based on the gathered information, that AI helps in all aspects, especially in marketing the growth of the industry is found to be high compared with non-using AI industry. The study offers business.

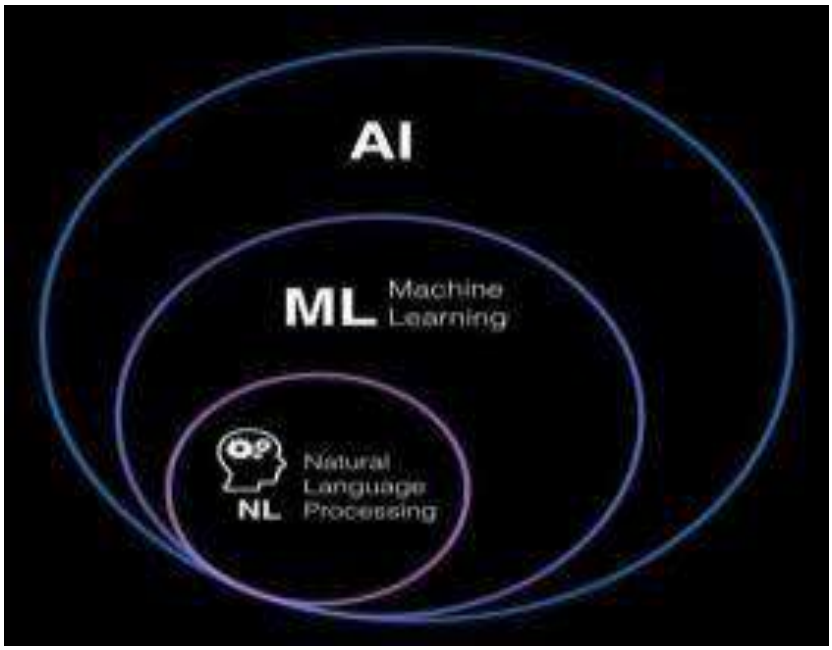
Introduction

Artificial Intelligence **(AI)** has proven useful in many ways, from driver less vehicles to providing responses to customer service like Chabot etc. While many businesses want to take advantage of AI to enhance marketing, they lack a mechanism for implementing a Marketing AI project. Artificial Intelligence (AI) is one of the most common buzzwords in business today but this is for a very good reason: for many marketing applications, AI has proved to be a very effective tool. AI has been around for decades, but its recent popularity stems from three major factors:

- Big Data growth
- Easy availability

- Easy intractable to customers and emergence of new AI technique

AI refers to the broad idea of computers being able to think and perform tasks like humans through the use of software and algorithms. AI automates many of the activities involved in gathering, storing, managing and retrieving information that can help in the creation and management of company offers. AI is able to train machines to recognize patterns in large amounts of data by using technologies such as deep learning, genetic algorithms and natural language processing. Popular personal- use AI tools include personal assistant Example: Siri, Alexa, Olivia, Nest, etc. AI has so far gained the attention of engineers, IT experts, and researchers, but is now heading beyond its typical circles of occurrence, rendering the management and marketing sector as a strong target. The ever-increasing number of customer data available online, in big data systems or mobile devices makes AI a major marketing collaborator, since the data analysis is rooted in almost every area of its operation.



To a great extent, marketing takes advantage of data-from consumer needs research, market investigates, customer feedback, and competitive intelligence through activities in different communication or distribution channels to assess the results.

Objectives

1. Will AI respond to "intelligent" machines and services? Most of what can be used for commercial use?

2. Why does AI development impact all sectors and businesses across the globe? Which countries lead this AI race?

3. Was that growth affecting the cycle of traditional business? How is this impact of AI changing the business and the potential employment in key sectors?

The solutions to the above questions would help human society get equipped for the challenges ahead and recognize the rapid changes that manifest with the influx of AI in human life and market.

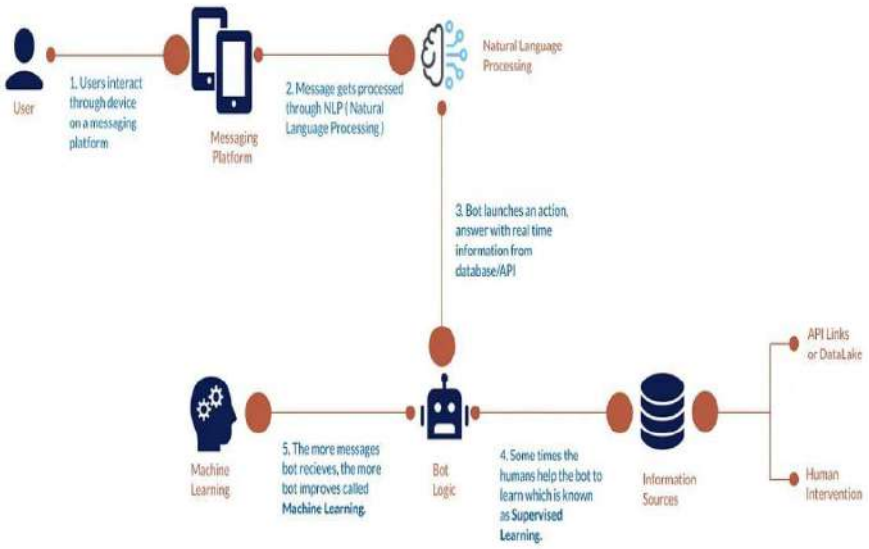
Research Methodogy

The inferences derived from the above through a descriptive study that provided a clearer understanding of the technologies, the actual degree of incorporation, implementation and effect of AI in enterprises.

Data collection

The data is collected through secondary data, which the overall view of the AI and its benefits are gathered from the previous data and reveals about the future growth of marketing through AI.

I. Existing AI Models Making Successful How AI (i.e Chatbot) Works with Humans?



Nowadays users have been increased to useonline purchasing or to clear any suspicions or to find a review about the product or place etc., the surfing mode helps a lot rather than approaching an individual and clearing the queries. If certain questions are unchecked and may remain to be technically apparent, the assistants are expected to fix the problems. So google launched the online assistants first to communicate with the customers to clear the queries the assistants are required to solve the issues. So the online assistants have been introduced by google first to interact with the customers to clear their needs (i.e. Chabot), which the computerized form of technology which interacts with the customer and give the feasible solution, instead of approaching the company or website to resolve. This invention makes time consumption less, easy like chatting, any queries to be resolved. The Chabot acts like a real human thinking and answer according to the inputs. Machine learning which helps in storing all possible of decisions to be exhibited to the customer and finally the NLP (natural language processing) helps in defining the statement as a human language at the end point.

A. The NLP Engine has two major components:

- **Intent Classifier** -It lets the algorithm understand its user's purpose to betterfit the user's feedback to strength provided by the bot.
- **Entity Extractor**- trained model that extracts key information from the input query of the user.

B. Neural network input data:

- **Manual Learning** includes the list of user's commonly asked

questions entered by the interaction expert manually and maps them to the chatbot's answers.

- **Automated Learning** includes sending client policy documents and all sorts of QA style documents to train the bot so that it can trustfully address all user queries.

C. Machine Learning:

•**Machine learning (ML)** has brought AI to a higher level, one above a set of predefined rules to obey. ML has thus altered the function of algorithms that have been used with AI since then. ML has trained computers to learn from the available data on their own by building links between individual pieces of data

II. Other AI in existing market

- Voice processing technologies
- Text processing technologies
- Image recognition and processing technology
- Decision-making
- Autonomous robots and vehicles

III. Data – fuel for artificial intelligent

The unparalleled data volume is the power on an AI-driven platform. According to Satya Nadella, CEO of Microsoft, "Every business core currency would be the ability to turn its data into AI that drives competitive advantage." Previously, the unavailability of data hampered AI's development, but the accessibility of low-cost and low-power sensors has resulted in a large amount of data being collected in the last few years. Sensor data such as camera, global positioning system (GPS) device, safety monitoring sensor, etc., can be continuously accessed and interpreted on - the-fly or stored to obtain valuable insights through different mechanisms. Moreover, data from several sensors can be integrated using the sensor fusion technique. Other sources exist too, viz. online archives, review pages, polls, real retail sales, country census

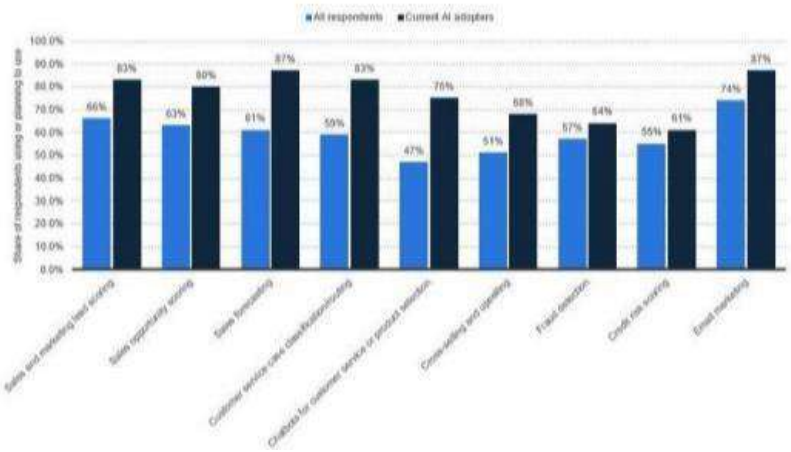
databases, manually generated / handmade data. It is feasible to process and use the raw data collected from all these sources to train an AI; the conversion from raw data to processed data is a costly and time consuming operation. There are a wide number of online data set sources, from which you we access multiple data forms.

IV. How artificial intelligent influenced in marketing

A few main elements make AI marketing as effective as it is today, including big data, machine learning and the right solutions.

A. Big Data: It is a relatively simple term. It refers to the capacity of a marketer to compile and classify broad datasets with minimal manual work. Marketing teams will then use this data to ensure that the correct message is sent to the correct person who asked about the query

B. Machine learning: When marketers try to make sense of this massive data collection, Machine learning systems will give an easy way to feed data. They can help recognize patterns or common events and forecast common observations, responses, and reactions effectivel



So, marketers can understand root cause and probability of repeating those responding behavior.

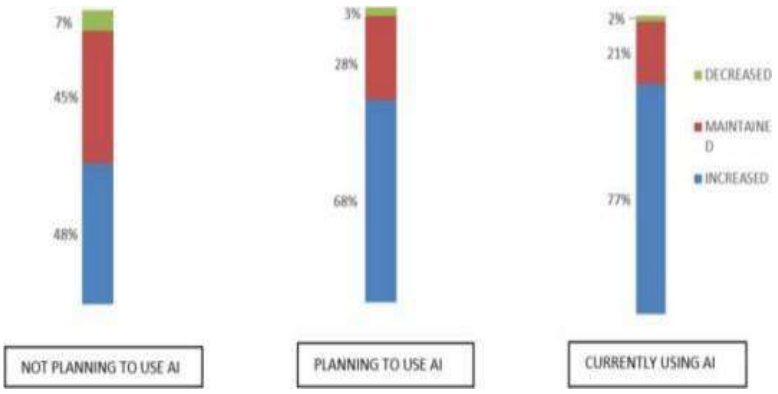
C. Making up right solution:

Marketing strategies for artificial intelligence actually acts in the same way a person do decisions. This means that, extremely quickly, the platforms can recognize informative concepts and trends through large data sets. AI solutions

also view emotion and communication as like a human being, thereby allowing such networks to understand open form content such as social media, natural language and email responses. Elimination of time-consuming and laborious routines. AI automates repetitiveness and repeatable tasks (**e.g., data collection and analysis, image search, and processing / adaptation**). Bigger value of both creative and strategic innovative and strategic business practices in creating new competitive advantage. Innovations in design.AI redefine how individual consumer value is delivered and increase the difficult task of seeking new solutions through design.

Developing new Marketing Team skills. AI needs the integration of data processing expertise as well as a comprehension of the marketing team's emerging technology ability. A new platform for Marketing. AI's complexity increases the function of the companies making AI solutions. Because of the current level of AI improvement (the Artificial Narrow Intelligence level), a new model of cooperation with AI entities offering data engineering or ML techniques needs to be developed.

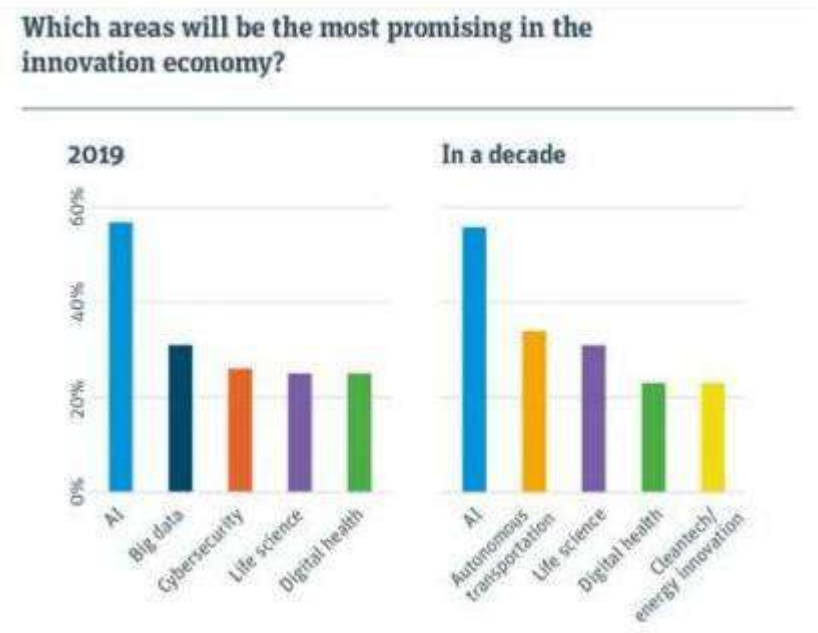
V. ARTIFICIAL INTELLIGENTLEVEL



AI's explosive growth has elicited concerns about job security in several roles and sales are no exception.Yet today's consumers claim they want knowledgeable,

trustworthy professionals based on satisfying their individual needs an innately human pursuit. The aim of AI for salespeople is not to replace them but to help them better understand the needs of their customers while alleviate the burden of manual tasks, they act as an advisor. The above data represents AI usage has be increased to 77% from 2019.

Entities believe AI and Big Data are the most exciting innovations today. Looking a decade ahead, they expect automotive transport to make a tremendous jump in growth, taking the second place after AI. From the past data we believe that AI takes the major role in bussiness part for reducing the human works and human error,



reduce the time consumption and even wages to increase the work speed, innovation and growth to make the products reach the consumer and attract them.

VI. Artificial intelligence for customers

Just like the Internet has introduced many benefits from the consumer's point of view, such as instant reviews and related product suggestions for quicker shopping time or customer service personalisation AI goes a step further and provides new opportunities in marketing practice. Analysis of the recorded examples of AI's use in marketing reveals a whole range of benefits that AI offers consumers are:

- Due to enhanced shopping (e.g. automatic billing, higher quality search engines, 24/7 customer support), more convenient and quicker shopping times.

- New customer experience by mass-scale hyper- personalization, after-sales service generating added value that goes beyond the basic product.

- A new aspect of the consumer-brand relationship generated by creating excitement and joy reduced post- purchase dissonance by digitally checking the product, removing the category learning process, and eventually taking advantage of optimising against other consumers.

Conclusion

The research verified the use of AI in many business sectors. In marketing sector it appears to be applied at the organizational level at present, typically as one-time programs or events. It may arise from the fact that we are dealing with the first instances of the realistic implementation of AI, and the businesses are careful to incorporate and experiment with this emerging technology.

AI in marketing appears to be applied at the organizational level at present, typically as oneprograms or events. It can be attributed to the fact that we are dealing with the first instances of the realistic implementation of AI, and businesses are careful to introduce and experiment with this new technology. Such developments have an unquestionable effect on marketing departments and organisations operations. Above all, it needs marketing departments to incorporate new roles and skills, i.e. people with the right knowledge about AI, data science and expertise in developing and implementing innovative solutions. This is also about developing a new paradigm of collaboration with the organizations providing advanced AI solutions and creating an impact of synergy with respect to AI and other functions.

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A Comprehensive Study on Object Detection Techniques in Unfettered Environments

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Abstract

In computer vision, object detection is an essential task to identify and classify objects in the image or video. The recent advancements in deep learning and convolutional Neural Networks (CNNs) have significantly improved the performance of object detection techniques. In an unconstrained environment, the study in this paper provides a detailed analysis of object detection techniques and various challenges, datasets, or state-of-the-art approaches. In addition, a comparative analysis of these methods is presented and its strengths and weaknesses are highlighted. Finally, we've provided some new research directions for improving the detection of objects in uncontrolled environments.

Keywords: Object detection, uncontrolled environments, deep learning, convolutional neural networks, and computer vision.

1. Introduction:

The main problem in computer vision is the detection of objects, which encompasses a range of applications such as surveillance, robotics, Autonomous Vehicles, Augmented Reality, and human-computer interaction. Recognition and localization of instances of objects that belong to a defined class in an image or video are the primary objectives of object detection. Significant advancements in object detection algorithms have been achieved recently, mostly as a result of the introduction of deep learning and convolutional neural networks (CNNs). Significant performance gains have resulted from these developments in several benchmark datasets, including PASCAL VOC, ImageNet, and MS COCO. Even with these advancements, object recognition in unrestricted contexts is still a difficult issue. Changes in illumination,

shifting perspectives, occlusions, deformed objects, shifting scales, and cluttered backdrops are characteristics of unconstrained settings. Achieving high detection accuracy and resilience can be challenging due to these issues, which can negatively impact object detection algorithm performance.

Recently, Significant advancements in object detection have been made, especially in the fields of deep learning and convolutional neural networks (CNNs) [1]. The effectiveness of object detection algorithms has been greatly enhanced by these methods, especially in unrestricted situations where items may appear at various sizes, angles, and orientations. The way region-based object detectors work, like region-based Convolutional Neural Networks (R-CNN) [2], is by first utilizing a selective search technique to generate region proposals, which produces about 2000 areas for every picture. To categorize each region and anticipate its bounding box coordinates, a CNN is used to create a fixed-length feature vector, which is then input into an SVM [3]. Non-maximum suppression is then used to get rid of duplicate detections. R-CNN, however, was a significant breakthrough in object detection, it has several limitations, such as slow training & interference times.

Researchers have developed several R-CNN variations to solve these problems, including Fast R-CNN [4], which shares convolutional characteristics between region proposals, and Faster R-CNN, which creates an end-to-end region proposal generation system by introducing a Region Proposal Network (RPN). With these modifications, R-CNN's speed and accuracy are much increased, which makes it a popular option for object detection in unrestricted situations. The main goal of this paper is to provide a comprehensive overview of object detection techniques in unfettered environments, addressing the challenges, datasets, and state-of-the-art approaches.

The paper is organized into a total of 6 sections as follows: Section 2 discusses the challenges encountered in object detection in unfettered environments, highlighting the factors that contribute to the complexity of the problem. Section 3 presents a review of the commonly used datasets for evaluating object detection techniques in unconstrained environments. Section 4 presents state-of-the-art Objection detection techniques. Section 5 presents a comparative analysis of the surveyed methods, emphasizing their strengths and weaknesses in terms of accuracy, computational complexity, and robustness to variations in the unconstrained environment. Section 6 concludes the paper by highlighting some of the open research questions and future directions in the field of object detection in unfettered environments.

2. Challenges in Object Detection in Unconstrained Environments

Different pre-processing techniques have been applied to improve image quality to improve object detection performance in challenging environments over the years.

Figure 3 illustrates the comparison between the flow of traditional approaches and deep learning-based methods. Traditional methods rely on improving image quality through image enhancement and manual feature selection methods [20,21,22,23,24]. Later, these techniques were replaced with Deep Neural Networks (DNNs) due to their robust and generalization capabilities.

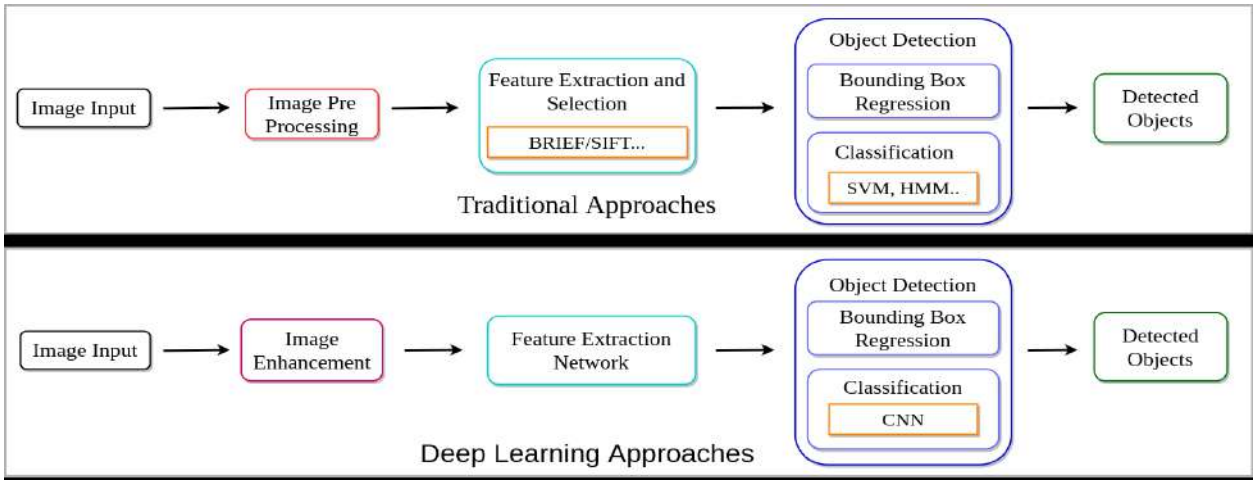


Figure 1. Pipeline comparison of traditional and deep learning approaches for object detection.

In traditional approaches, generally, image enhancement is generally applied before feature extraction to improve object detection performance. Unlike traditional approaches, deep learning methods can find the required features for detecting objects without relying on traditional rule-based methods.

2.1 Illumination Changes: Variations in lighting conditions, such as shadows and overexposure, can significantly impact the appearance of objects, making it difficult for detection algorithms to identify and localize them accurately. Variations in lighting conditions, such as shadows, overexposure, or underexposure, can significantly impact the appearance of objects in images [5]. These changes can make it difficult for detection algorithms to identify and localize objects accurately. To address this issue, several approaches have been proposed, including color constancy techniques [6] and deep learning-based methods that can learn illumination invariant features [7].

2.2 Viewpoint Variation: Changes in the viewpoint or camera angle can alter the object's appearance, causing the detection algorithm to fail to recognize the object or produce inaccurate bounding boxes [8]. Several methods have been proposed to tackle this issue, such as viewpoint invariant features and multi-view object detectors [8].

2.3 Occlusion:

Objects in the scene may be partially or entirely blocked by other objects, making it challenging for the detection algorithm to identify and localize them correctly [9]. To address occlusion, some methods employ part-based models [10] or leverage context information from surrounding regions.

3. Datasets: Object detection is a vital task in computer vision that involves identifying the presence and location of objects in an image or video. To evaluate the performance of object detection techniques in unconstrained environments, several benchmark datasets have been created. These datasets provide a standardized set of images with labeled objects, enabling researchers to compare the accuracy and speed of different algorithms. Some popular datasets include:

3.1 Pascal VOC: The PASCAL VOC (Visual Object Classes) dataset is one of the oldest and most popular datasets for object detection. It contains 17,125 images with 20 object classes, such as person, car, and dog. The dataset provides bounding box annotations for each object in the image. PASCAL VOC has been used as a benchmark dataset for several years, and many state-of-the-art object detection techniques have been evaluated on this dataset.

3.2 ImageNet: The ImageNet dataset is a massive dataset that contains 1.2 million images with 1,000 object classes. Unlike PASCAL VOC, ImageNet does not provide annotations for object detection. However, many researchers have used this dataset to pre-train their models on a large amount of data before fine-tuning them on smaller object detection datasets.

3.3 COCO: The COCO (Common Objects in Context) dataset is a newer dataset that contains 330,000 images with 80 object classes. COCO provides more detailed annotations than PASCAL VOC, including segmentation masks for each object in the image. This makes COCO a more challenging dataset for object detection algorithms to perform well on.

3.4 Open Images

The Open Images dataset is another large-scale dataset that contains 1.7 million images with 600 object classes. It provides both bounding box and segmentation mask annotations and has been used as a benchmark for object detection algorithms that require large amounts of training data.

These datasets vary in size, number of classes, and annotation types, allowing researchers to test their algorithms on a wide range of scenarios. The following table summarizes some key information about the four popular benchmark datasets used for evaluating object detection techniques:

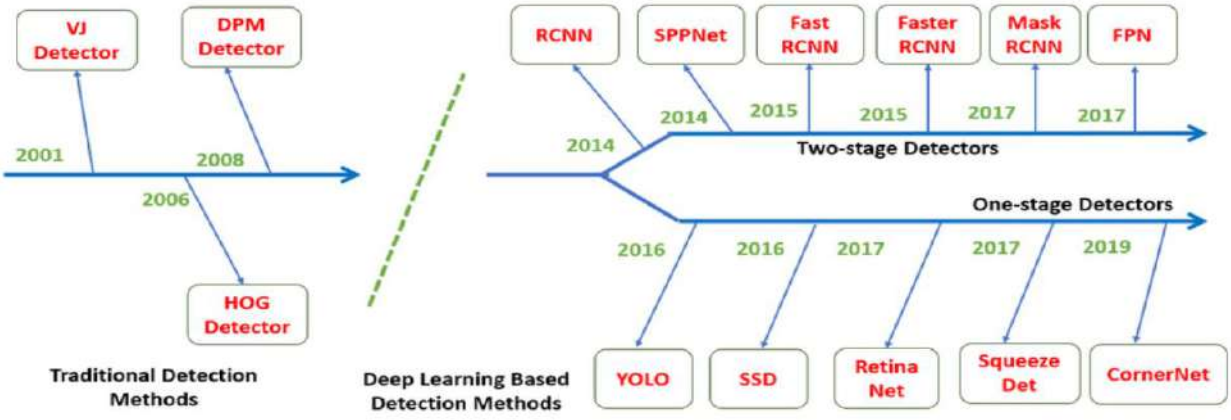
Table 1. Summary of key information about benchmark datasets for object detection

Dataset Name	Number of Images	Number of Classes	Annotation Type
PASCAL VOC[11]	17,125	20	Bounding Boxes
ImageNet [12]	1.2 million	1,000	Bounding Boxes
COCO [13]	330,000	80	Bounding Boxes
Open Images [14]	1.7 million	600	Mask RCNN

4. State-of-the-art Object Detection Techniques

We categorize the state-of-the-art object detection techniques into two main groups: two-stage detectors and single-stage detectors.

Figure 2. Milestones of object detection [15].



4.1 Two-stage detectors

Two-stage detectors consist of a region proposal stage followed by a classification stage. Some prominent two-stage detectors include:

4.1.1 R-CNN

R-CNN (Region-based Convolutional Neural Networks) is an object detection model that was proposed in 2014 by Ross Girshick et al. R-CNN is a two-stage object detection framework that uses a region proposal mechanism to generate potential object regions in an image and then applies a convolutional neural network (CNN) to classify and refine these regions.

The R-CNN framework consists of the following steps:

1. Region Proposal: The first stage of R-CNN generates potential object regions by using a selective search algorithm that combines low-level features, such as color and texture, with high-level cues, such as edges and corners. Selective search generates around 2,000 region proposals for each image.

2. Feature Extraction: In the second stage, each region proposal is warped to a fixed size and fed through a pre-trained CNN, such as Alex Net or VGG, to extract a feature vector for that region.

3. Object Classification and Refinement: The feature vector for each region proposal is then fed into a set of fully connected layers that perform object classification and bounding box regression. The classification layer outputs the probability of each region proposal containing a particular object class, while the regression layer outputs the refined bounding box coordinates for that object class.

4.1.2 Faster R-CNN:

Fast RCNN may be a neural organized arrangement for finding bounding boxes of objects in a picture.[30]

The Faster RCNN calculation, which was a headway over the Quick RCNN, gave rise to the Faster RCNN calculation. These calculations all work so also; A local proposer proposes potential rectangles that might have alluring pictures and decides what—if anything—can be seen there utilizing a picture classifier. Faster RCNN trains the local proposition in parallel on the same highlight outline on which the picture classification is done [28,30].

The object detection system called Faster R-CNN, is composed of two modules. The primary module could be a profound completely convolutional arrangement that proposes districts, and the second module is the Fast R-CNN locator that employments the proposed regions. [27,30] The whole framework could be single, bound together arranged for protest location. Utilizing the as-of-late prevalent wording of neural systems with 'attention' instruments, the RPN module tells the Fat R-CNN module where to see.

Faster R-CNN yields various component maps from a profound CNN in the wake of getting an info picture. All things considered; these convolutional highlight maps make local suggestions of the principal crude image. Furthermore, sliding windows and related strategies are supplanted by a District Proposition Network (RPN) for the improvement of district recommendations [29,30]. Another is RPN a profound fully convolutional network with object

jumping box expectation preparation. The objectness score (the probability that an item will be tracked down in a specific area) at each the while, the include map framework's situation. Fast RCNN is a calculation utilized for object discovery. It settles the disadvantage of RCNN [25,30].

Fast RCNN is quicker than its ancestor taking care of the CNN 2,000 suggestions isn't required as a contribution to every execution. Convolutional handling is utilized to make just a single component map for every image [25,30]. When contrasted with R-CNN, this calculation shows an essentially more limited preparation and testing time. Notwithstanding, it was noticed that adding the local proposition bottlenecks the calculation harshly, bringing down its exhibition [27]. For deciding the locale Proposition Fast CNN and its ancestors both utilize the specific search calculation which is a quicker scan calculation for picture discovery [26]. Faster R-CNN got rid of the necessity for its execution since this is a very tedious procedure and permitted the ideas to be advanced by the framework. Like how Fast R-CNN functions, a convolutional map is made from the image [26]. In any case, a different network replaces the Particular Inquiry calculation to anticipate the proposition. Utilizing return for capital invested (District of Interest) pooling these recommendations are then reshaped and classified [26].

4.2 Single-stage Detector

4. Single Stage Detector:

Single-stage locators straightforwardly forecast objection-bound boxes and course probabilities from a picture. A few well-known single-stage detectors incorporate:

4.2.1 YOLO

YOLO is another one-stage object detection model that predicts object class scores and bounding box offsets specifically from the complete picture. YOLO separates the picture into a lattice of cells and predicts the class and bounding box for each cell. YOLO uses a single neural network to make predictions and is known for its speed and real-time execution.

4.2.2 SSD

The Single Shot MultiBox Detector (SSD) expands the concept of YOLO by anticipating bounding boxes and lesson probabilities at numerous scales, which makes strides in the discovery of objects with shifting sizes. SSD employs an extractor to produce convolutional highlight maps and applies a set of convolutional channels to anticipate class scores and offsets

for each default box. SSD is known for its speed and effectiveness and has been utilized in real-time object detection applications.

RetinaNet: The RetinaNet [32] belongs to the family of one-stage detectors that are built on convolutional neural networks. Other prominent representatives are OverFeat [33], Single Shot Detector (SSD) [34]or You Look Only Once (YOLO) [35]. These one-shot detectors create a dense set of proposals along a grid and directly classify and refine those proposals. As opposed to the two-stage detectors, they have to handle a large number of background samples, which potentially can dominate the learning signal. The RetinaNet [32] is an adaptation of a Residual Network [33] with lateral connections to create features on multiple scales [34]. Small convolutional subnetworks perform classification and bounding box regression on each output layer. RetinaNet was proposed along with the focal loss function, which tries to overcome the hard object-background imbalance issue by dynamically shifting weight to increase the contribution of hard negative examples and decrease the contribution of easy positives.

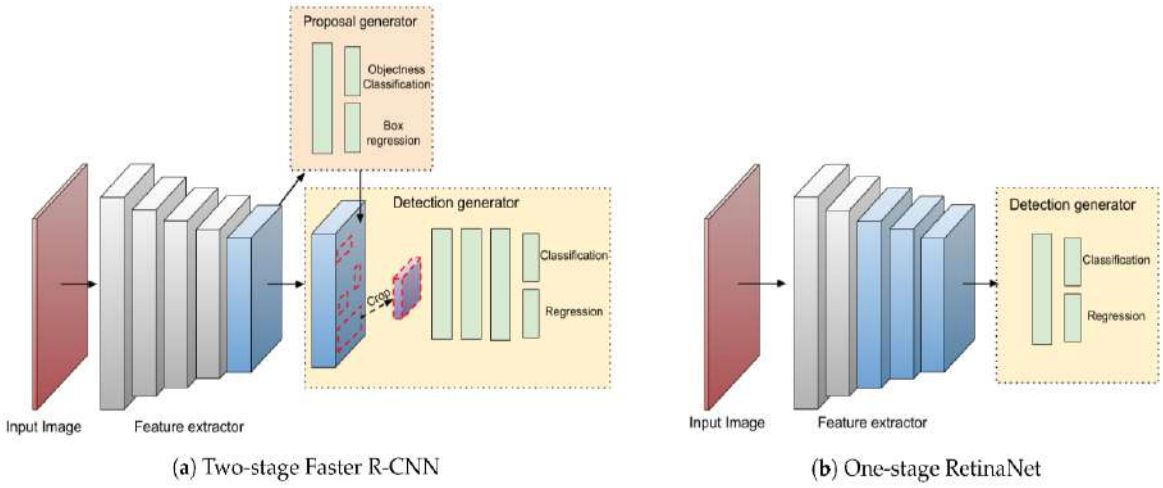


Figure 3. One stage vs two stage object detection.

The below table summarizes some key features of these state-of-the-art object detection techniques:

Technique	**Training Time**	**Inference Time**	**Number of Parameters**	**AP on COCO**
Faster R-CNN [16]	Long	Medium	High	39.3
SSD [17]	Medium	Fast	Low	31.2

YOLO [18]	Short	Very Fast	Low	28.2
Retina Net [19]	Long	Medium	High	39.1

Table 2: Key features of state-of-the-art object detection techniques

5. Comparative Analysis:

In this section, we compare the performance of various object detection techniques on the COCO dataset [31]. The results are summarized in Table 1.

Method	**Average Precision (AP)**	**Speed (fps)**
R-CNN	53.3	0.5
Fast R-CNN	70.0	5
Faster R-CNN	73.2	7
YOLOv3	57.9	45
SSD	72.1	19
RetinaNet	74.8	12

Table 3: Comparison of object detection techniques on the COCO dataset

The results in Table 3 show that two-stage detectors, such as Faster R-CNN, generally achieve higher average precision (AP) compared to single-stage detectors like YOLOv3 and SSD. However, single-stage detectors are faster in terms of frames per second (fps), making them more suitable for real-time applications.

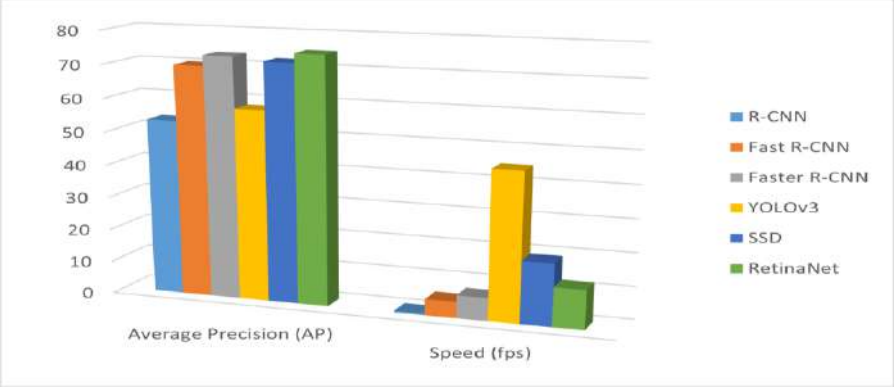


Figure 4. Comparison of object detection techniques on the COCO dataset

Conclusion:

In this paper, we have displayed a comprehensive study of object detection in unconstrained situations. We have examined the challenges related to object discovery in such situations, displayed prevalent datasets, and given an outline of the state-of-the-art methods. Furthermore,

we have compared the execution of different strategies and highlighted their qualities and shortcomings.

Despite the noteworthy advances made in later a long time, object detection in unconstrained situations remains a challenging issue. Future investigates bearings seem centered on the taking after viewpoints:

• Creating more strong calculations able to take care of occlusions, lighting varieties, and foundation clutter.

• Exploring strategies for effective and precise discovery of small-scale objects.

• Investigating the integration of other sensor modalities, such as LiDAR or profundity data, to upgrade protest discovery execution.

• Creating unsupervised or pitifully administered question location methods to decrease the dependence on large-scale clarified datasets.

By addressing these challenges and exploring new approaches, we believe that object detection in unconstrained environments can be further improved, concrete the way for more reliable and efficient applications in various domains, such as autonomous vehicles, robotics, and surveillance systems.

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The rise of the IT sector in pune, Maharashtra: catalyst for internal Migration

Najmul Huda

Dr. Sudhakar J Bokephode

Abstract

The Sociological review of migrants and migration is a widespread attraction in contemporary times. Internal migration within states has attracted economists, sociologist and political scientists in order to understand the effects of varied factors of migration. Certain factors have promoted the internal migration and a rapid increase in internal migration in India has affected the structure of the society, financial matters and patterns of lifestyle and social practices of migrants.

In Maharashtra one can find the varied new trends in migration in recent decades. One of them is the migration of IT persons from other states to Maharashtra especially to Pune. Pune is one of the developed cities in the state of Maharashtra. The city has witnessed the remarkable changes in recent years as a result of the emergence and development of IT centers and parks in the city. In present paper the researcher has tried to study the recent trends in interstate migration of IT persons especially to Pune, Maharashtra. The reasons behind it, the development of Pune as an IT hub and some other factors are being studied.

Keywords: Migrants, Interstate Migration, Urban Agglomeration, Million Plus Cities, Lifestyle and Social Practices.

Introduction

The trends of migration in India

The study of migration has developed rapidly as a research field over the past few decades. Researchers have studied different aspects of migration and its consequences on human society. Sociologists have studied migration as a phenomenon that affects various structures and institutions of the society. A sociological definition of migration defines migration as the

physical movements of individuals or groups which has effect on the individuals and the social structure of the group to which they belong.

Migration from one area to another in search of improved livelihoods is a key feature of human history (Srivastava, 2003). While certain regions and sectors fall behind in their capacity to support populations, few other sectors hold promising opportunities wherein people migrate to access these emerging opportunities. In India, the trends and pace of migration has boomed post liberalization, as the economy started opening up to different sectors. People have a wide range of choice and opportunities of different vocations and professions. This has triggered the pace of internal migration in India with increasing job opportunities in different sectors.

The Indian Census defines Internal Migration as any movement within the political boundaries of the nation which results in a change of usual place of residence from the past residence or place of birth. Based on this, internal movements within the political boundary of states or nation are classified as intra-district, inter-district and inter-state movement. These three categories of internal movements across and within states are together called as internal migration. Migration literature makes a clear- cut distinction between “pull” and “push” factors, which, however do not operate in isolation from one another. Mobility occurs when workers in the source areas lack suitable options for employment or livelihood, and there is some expectation of improvement in circumstances through migration (Srivastava, 2003). In India the level of development in different states and places is different, thus inter-state migration within the states varies differently between different states. The patterns of migration in India are such that less affluent states and districts show higher out- migration while rich metropolises attract large inflows of labor(Economic Survey of India, 2017). Census data reveals that internal migration has been rising in recent years, which has nearly doubled in the 2000s as compared to the 1990s.

The Economic Survey of India (2016-2017:265) in its chapter titled ‘India on the Move and Churning: New Evidence’ finds high levels of internal work-related migration in India. It analyses the Census data on migration, stating that interstate migration in India was about 5-6.5 million between 2001 and 2011. The survey analyses some of the largest interstate migration routes in India. According to it, ‘states like Delhi, Maharashtra, Tamil Nadu, and Gujarat attract migrants from the North Indian states of Uttar Pradesh, Bihar, and Madhya Pradesh. Kolkata in West Bengal attracts migrants from nearby states of Jharkhand, Uttar

Pradesh, and Odisha making clear one of the laws of migration put forward by Ravenstein (1885)': "There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas, and so on until the attractive force is spent.".

Migration to Maharashtra

The state of Maharashtra has thus emerged as one of the most selected destinations for migration. According to the UNESCO 'Internal Migration in India Initiative (2011)' there is an increase in urban migration as well as interstate migration in recent times, wherein noticeable migration corridors have emerged within the country – Bihar to Delhi, Bihar to Haryana and Punjab, Uttar Pradesh to Maharashtra, Odisha to Gujarat, Odisha to Andhra Pradesh and Rajasthan to Gujarat. In general, in-migration rates were higher in high-income states such as Haryana, Punjab, Maharashtra, Gujarat, Karnataka, and West Bengal, whereas low-income states such as Bihar, Uttar Pradesh, Jharkhand, Rajasthan, Orissa and Chhattisgarh reported relatively higher rates of out-migration. It is thus seen that state of Maharashtra being one of the most developed and 'high income' states in terms of its per capita income, has witnessed high migration rates in recent years. The Census data reveals that during the 1991-2011, the total migrants in the state of Maharashtra increased remarkably. The total migrants to the state increased by 16.37(lakhs) during the period 1991-2001 and 6.53 lakhs during the period 2001-2011. Total inmigrants comprised of migrants from other states and migrants from abroad. Source: Office of the Registrar General & Census Commissioner, India. (ORGI) The Census data also reveals that work or employment emerged as the most popular reason for migration amongst in- migrants from other states to the state of Maharashtra, followed by marriage during the period 1991-2001. For work or employment, the inmigrants from other states to the state of Maharashtra increased by 10 lakhs during the period 1991-2001.During the period of 2001- 2011 'moved with household' emerged as the most popular reason amongst in-migrants from other states.

Development of IT Sector in Maharashtra - Reasons of Migration

In order to promote balanced growth of Information Technology (IT) industry in the State, Government of Maharashtra came up with its IT & ITES Policy. As defined by Information Technology Association of America (ITAA), **IT** is the study, design,

development, implementation, support or management of computer- based information system particularly software's applications & computer hardware. **ITES** is Information Technology Enable Services. It is defined as outsourcing of processes that can be enabled with IT and covers diverse areas like Finance, HR, and Administration etc. The Government of Maharashtra announced its first IT Policy in the year 1998. It was followed by the Information Technology and Information Technology Enabled Services (IT/ITES) Policy-2003 and IT/ITES Policy-2009 to generate employment, increase efficiency and to improve the quality of life of the people. From the year 2001 the concept of private IT parks gained much importance. Maharashtra Industrial Development Corporation (MIDC), City and Industrial Development Corporation of Maharashtra Limited (CIDCO) and Software Technology Parks of India have developed 37 Public IT parks which are functioning in the State with an immense investment and availed a huge employabilty. Amongst the Private IT parks, the highest number are located in Pune and Mumbai suburban area. These IT parks accommodate a number of companies related to IT and ITES. The Pune city in the state of Maharashtra which was popularly known as the "Pensioner's Paradise" and the "Oxford of the East" has thus witnessed comprehensive changes in recent years as a result of the rapid increase in IT hubs and parks in the city. It has developed as a substitute to Mumbai, the administrative capital of the state of Maharashtra and business capital of India. According to the Report on Migration and its Impact On Cities by World Economic Forum, the city of Pune which was traditionally a manufacturing hub, soon transformed itself into a service sector with the IT sector being a predominant source of employment in recent years .It is estimated that India has 7,935 cities and towns according to the 2011 Census, however 70 per cent of the urban population lives in 468 Class I Urban Agglomerations (UAs) i.e., a continuous urban spread constituting a town and its adjoining outgrowths. The number of Class I UAs has sharply increased from 384 in 2001 to 468 in 2011. In addition, there are 53 million-plus UAs which comprise 43 per cent of India's urban population. The number of million-plus UAs increased from 35 in 2001 to 53 in 2011 – an addition of 18 UAs during the period 2001– 2011 –demonstrating that the nature and pattern of urban population is heavily concentrated in large cities. (Bhagat, 2014) The city of Pune has fast emerged as an Urban agglomorate. The rising importance of these million-plus cities, both in numbers as well as the huge concentration of urban population within them, indicates the significance of the presence of migrants in the city space. (Bhagat, 2014) The city of Pune is on the 5th highest position amongst the selected 16 urban agglomerate cities. (R.B.Bhagat, 2012). Looking at the proportion of migrants across the million-plus cities, it is quite evident that

this is closely related to the economic position and vitality of these cities. (Bhagat, 2014). The progress of Pune has exceeded from manufacturing hub to a prosperous IT hub, resulting in creation of employment, emerging as the most chosen destination for migration, ensuring higher out migration from those states who are relatively lesser developed in terms of IT infrastructure and services. The JLL1 City Momentum Index 2 in its research pointed out India – with seven cities in the top 20, the most of any country – leads the 2020 Index. The city of Pune was ranked in the top 20 rank with the 12th position. The JLL City Momentum Index identifies a number of key success drivers of the world's most dynamic cities, including talent attraction and strong innovative economy as well as the challenges these cities face in trying to accommodate rapid growth and maintain positive momentum in the longer term. This again supports to the fact that the city, amidst heavy migration against the background of 'IT boom' and remarkable demographical, economic and cultural changes, has maintained its position in various indices indicating that the city has constantly adapted to the changes and worked towards providing people with better opportunities and good quality life. All these factors point out that a high income state and a city is usually a preferred destination for the aspirant migrants. Especially when it comes to high skilled migrants who migrate out of choice for raising one's standard of living.

Also they try to employ themselves in the jobs which are most suited to their professional skills. The rise of the IT industry in Pune has not only developed it in terms of infrastructure developments across the city but has also accompanied in the pace of urbanization with a rise in the number of residential complexes, hospitals, hotel industries, multiplexes and malls. The rapid industrialization and migration to the city has led the process of cultural hybridization. This increasing migration which is the result of urbanization has affected the economic spheres along with the socio-cultural aspects. For example, development in culture like sunburn or EDM with the existence of traditional cultural events like Sawai Gandharva Sangeet Mohotsav, Development of multi cuisine restaurants with the growing popularity of the traditional food culture, development of old Pune with the emergence of planned townships in the areas of IT parks, existence of traditional education with emergence of half a dozen private universities with new vocational courses. Many more examples of such socio-cultural fusion or cultural hybridization can be given.

Effects of this Migration

The Indian society is a distinctive one with diverse cultures and traditions

together. The people of India practice diversity in cultures and perform across various regions making them distinct from one another. There are differences in practices with respect to family, marriage, religion, gender and practices related to cuisines and dressings. However, cultures are dynamic forces which constantly evolve as a result of different forces acting upon them; one such force being the process of globalization which has drastically altered the face of societies across time and space. Emergence of transnational corporations, changed notions of division of labour, increased human mobility, changing institutional structures, changes in lifestyles and practices are all result of globalizing tendencies which have affected our society. All such changes are clearly visible to any metropolitan city due to the economic and industrial development and due to migration. It tends to change the cultural identity of the city. The city of Pune has witnessed such transformation with the rise of IT industry and constant growth in migrants from other states.

Transformations in social institutions, lifestyles, social practices, patterns of entertainment, patterns of consumption and youth culture are clearly visible.

1Jones Lang LaSalle (JLL), together with its subsidiaries and affiliates, is a leading global provider of real estate and investment management services.

2The City Momentum Index 2020 covers 130 major established and emerging markets to identify the cities that have the strongest positive

A Study on challenges in implementation of Six Sigma in Farmer Producing companies.

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Abstract

This is a pilot study which tries to investigate the reliability of a subscale of the questionnaire. The other purpose of the study is to identify the factors affecting the perception of Famer Producing Companies (FPCs) regarding Six Sigma implementation in farming. Further the study also aims to investigate if there exists any significant relationship between such factors and perceived challenges in implementation of Six Sigma in farming. A structured questionnaire was developed and used for data collection. Total 20 FPCs were requested for the responses. All FPCs agreed and gave their responses. The study found that perception of challenges in implementation of Six Sigma vary among FPCs having different size of land. Further such perception also changes significantly among FPCs according to services availed from external agencies. Limitations and scope for future studies are discussed in the paper.
Keywords- Six Sigma, Famer Producing Organizations, Farm Operations, Farmer producing companies.

Introduction

In recent years, Six Sigma has gained significant popularity as a robust quality management methodology across various industries. Originally developed by Motorola in the 1980s, Six Sigma focuses on reducing process variation and improving efficiency and effectiveness. While it has been successfully implemented in manufacturing and service sectors, its adoption in the agricultural industry, specifically in farm operations, presents unique challenges. This article explores the perceived challenges that farmers encounter when implementing Six Sigma in their operations.

Understanding Six Sigma in Farm Operations

Six Sigma follows a systematic approach to identify and eliminate defects or inefficiencies in a process by using statistical analysis and data-driven decision-making. By aiming for a

maximum of 3.4 defects per million opportunities, Six Sigma provides a framework to enhance productivity, reduce waste, and increase overall quality. In the context of farm operations, this methodology can be applied to various processes such as planting, harvesting, irrigation, pest control, and supply chain management.

Perceived Challenges in Implementation

Limited Data Availability: Unlike manufacturing or service industries, farm operations may lack comprehensive and standardized data sets required for effective Six Sigma implementation. Farmers face challenges in collecting accurate and relevant data due to factors such as variability in weather, crop yield, Soil health card and pest infestations. The absence of data makes it difficult to conduct robust statistical analysis and identify process improvement opportunities.

Seasonal Nature of Agriculture: Farming operations are inherently seasonal, with different activities taking place throughout the year. This seasonality poses challenges when implementing Six Sigma, as it requires continuous monitoring and improvement efforts. Limited time frames for data collection and analysis, coupled with the urgency to complete tasks within specific windows, can hinder the implementation process.

Complex and Interconnected Processes: Farm operations encompass a multitude of interconnected processes. Implementing Six Sigma in such an environment requires a comprehensive understanding of the entire value chain, from field preparation to distribution. Farmers often face difficulties in defining process boundaries and identifying key variables that impact overall quality, leading to potential gaps in improvement initiatives.

Adoption of Statistical Tools: Six Sigma relies heavily on statistical tools and analysis to drive decision-making. However, many farmers may have limited familiarity with these tools and may lack the necessary expertise to apply them effectively. The need for training and resources to enhance statistical literacy becomes a barrier to successful implementation.

Cultural and Mindset Shift: Implementing Six Sigma necessitates a cultural shift within farm operations. It requires embracing a data-driven approach, breaking away from traditional practices, and encouraging collaboration and continuous improvement. Overcoming resistance to change, particularly in family-owned or traditional farming setups, can be a significant challenge.

Resource Constraints: Farm operations often face resource limitations in terms of capital, technology, and skilled labor. Investing in Six Sigma training, software, and infrastructure may seem financially burdensome to some farmers. The perceived costs and effort required for implementation can discourage adoption and hinder progress.

Addressing the Challenges

To overcome the challenges faced in implementing Six Sigma in farm operations, several steps can be taken:

Data Collection and Management: Farmers should focus on establishing reliable data collection systems that capture relevant metrics throughout the agricultural cycle. This may involve leveraging technology solutions, such as sensor networks, farm management software, and remote monitoring tools.

Education and Training: Training programs should be developed to enhance farmers' understanding of Six Sigma concepts and statistical tools. Collaborations between agricultural institutions, industry experts, and farmers' associations can facilitate knowledge transfer and build capacity.

Process Mapping and Improvement: Conducting thorough process mapping exercises can help identify critical process steps, potential bottlenecks, and areas for improvement. Farmers should collaborate with process improvement experts to define measurable goals and implement data-driven solutions.

Industry Collaboration: Sharing best practices and success stories among farmers, agricultural organizations, and industry associations can foster a supportive environment for Six Sigma implementation. Collaborative platforms and knowledge-sharing networks should be encouraged.

Tailored Approaches: Recognizing the unique challenges faced by the agricultural sector, Six Sigma methodologies should be adapted and customized to suit the specific needs of farm operations. Flexibility and practicality in implementation are key.

This study primarily is a pilot study of a dissertation. The study tries to investigate the reliability of a scale which is a part of the questionnaire.

The objectives of this pilot study (in addition of checking the reliability of the scale)-

1. To study the challenges in implementation of Six Sigma in farming
2. To investigate the relationship between farm land size possessed by FPC and their perception of challenges Six Sigma implementation
3. To investigate the relationship between services availed by FPC from external agencies and their perception of challenges Six Sigma implementation

Literature Review

According to Wipro, they have achieved benefits such as reducing software defects by 50% and reducing rework from 12 percent to 5 percent by using Six Sigma methodologies, increasing productivity by 20-30 percent, and 93 percent of projects being completed on time, as well as achieving 67 percent lower field defect rates than the industry average (Sharma et al., 2008)[1].

A study conducted on the fortune 100 companies in Saudi Arabia to assess the implementation of Six Sigma demonstrates that all the firms reported financial benefits (Alsmadi et al., 2012)[2].

The implementation of the Six Sigma methodology in the automobile piston ring manufacturing industry has the potential to decrease the rejection percentage rate of piston rings from 38.1 percent to 13.2 percent (Suresh et al., 2014)[3].

The study (Jankelová et al 2019)[4], examined innovative management approaches and their impact on the competitiveness of agribusiness companies in Slovakia. It evaluated the importance of these approaches, including the use of methods and tools, their frequency of application, and their impact on company efficiency. A research gap had been identified in the existing literature on primary agribusiness companies. A questionnaire research has been conducted in agribusiness companies in Slovakia, highlighting the significance of hard factors in management tool utilization and the positive effect of soft factors on economic results. The study concluded that hard tools include operational management, budgeting, control systems, and information systems. These businesses tend to focus more on the short-term, as strategic management tools such as vision, mission, and strategy have been rated as the least important hard factors. Soft factors that are often underestimated include informal communication, common values, employee behavior, and teamwork.

The article (Irtyshchevaa et al 2020)[5] highlights the business process management system in the food industry, focusing on theoretical and practical aspects. The authors explained the

concept of "business process" and methods for improvement. The analysis of business processes in the food industry of Ukraine at a macro level was carried out, including tax system imperfections, regulatory issues, financial support, employment, international migration, competitiveness of Ukrainian food products, and barriers to international food trade. The calculations of regional potential of food safety are carried out using the data of the Black Sea region in Ukraine as an example. The main prerequisites for the formation of a food safety system have been identified, with the priority direction being increasing production and constructing processing plants in the Black Sea region of Ukraine. The study found that the effective functioning and development of the food industry was important for ensuring the country's food safety and promoting Ukraine's export interests. Increasing competitiveness, strengthening positions in domestic and foreign markets, and introducing resource-saving technologies were necessary for process management.

The study (Antony 2006)[6] endeavored to showcase the efficacy of Six Sigma, a disciplined approach to enhancing the quality of products, processes, or services, within the service industry. The paper presents the fundamental attributes that characterize Six Sigma, followed by a straightforward methodology for its application in service operations. Additionally, the paper illustrates a range of tools and techniques employed within Six Sigma to improve service process performance. The key factors for successful implementation of Six Sigma in service organizations, as well as the criteria for selecting winning projects, are also addressed. The paper emphasizes the distinction between Six Sigma and other quality initiatives like TQM, highlighting the misconceptions among quality practitioners regarding these two philosophies. Furthermore, the paper outlines and discusses the limitations associated with Six Sigma. Some of these are- The availability of high-quality data poses a significant challenge, particularly in situations where there is a lack of initial data (this task can often consume the majority of project time). This can lead to frustration when the solutions driven by the data are costly, resulting in only a fraction of the solution being implemented. The prioritization of projects in service-oriented companies is primarily based on subjective judgment, with few tools available for effective project prioritization. However, selecting the appropriate projects is a crucial element for the successful implementation of Six Sigma.

Mahajan and Patil (2019) attempted SWOT analysis of Indian Agro industry. According to their analysis Indian Agro Industry has following strengths- Huge natural resources, Suitable geographical conditions for agricultural production, Availability of raw material, Ability to

exports, Strong traditional knowledge, and Additional employment generations. Lack of professional management and lack of modern technology are weaknesses of the Indian agro industry. Proper utilization of natural resources and value addition are some of the opportunities available and huge cost of technology are threats to the industry as per this study. The study concluded that with innovations, management know-how, and technological advancements, the agro-based industry can become a significant economic force and a vehicle for rural development.

Effective Flux; a Romanian consulting firm implemented Six Sigma in Farm ((*Six Sigma in Agricultural Farms: Effective Flux*, n.d.). DMAIC methodology was used. The objective of the project was to increase the yield of wheat from farm. In define phase processes such as Sowing, rising, twining, straw elongation and grain filling were studied. In measure phase, factors which were highly influencing, were identified and data pertaining to those factors were collected. These parameters were linked with Ishikawa diagram. During Analysis phase it was found that the root causes for the low yield were improper preceding plant, which was same plant-wheat, and very high seed density. After identifying the root cause in Improvement phase it was decided to have peas, beans or lentils as preceding plants, seeding density to be between 450 and 500 grains germinate. Sq. Agriculture engineer was not skilled so he was sent for a formal training. After these implementations the yield of wheat grain was 4.72 MT per hectare which was only 3 MT per hectare earlier.

A case of Sahyadri Farmer Producer company was studied by National Institute of Agricultural Extension Management (MANAGE) Hyderabad (MANAGE 2018). In less than ten years, The Sahyadri Farmer Producer Company developed itself and rose to prominence as one of India's top grape exporters. In the Indian agricultural setting, it has shown to be a viable model for management and operation of a Farmers Producer Company. Other business ethics that an FPC must adhere to include the capacity to seize opportunities in accordance with local and global market demands and strategies to supply the same to customers in a timely way at competitive pricing. An association of committed team of workers and loyal farmer members is sine qua non for evolving a common goal for the success of a Farmer Producer Company. Furthermore, the culture of a FPC should necessarily be farmer-friendly for its long term success. Besides, ability to tap the opportunity through a balanced produce mix and diversification as per requirements of domestic and international market and strategies to deliver the same to the consumer in time-bound manner at competitive prices are some of the other business principles

to be followed by a FPC. The democratic ideal of "for the farmers, by the farmers, and of the farmers" counts as a vital condition for maintaining a company's long-term success, even while diverse stakeholders functioning at different levels may have varied interests, including financial stakes.

Research Methods

The study is conducted in Pune District. Mainly Farmer producing companies were the sample unit of the study. To meet the objectives of the study a structured questionnaire was designed to collect data from company representatives/ members. The questionnaire was developed using past literature review and discussion with few farm producing companies. Total 20 farm producing companies were approached for data collection purpose. The list of farm producing companies was available and was containing 85 registered farm producing companies. From this list the samples were selected using simple random method. The collected data was coded and analysed in SPSS.

Data Analysis

Reliability of questionnaire

Cronbach's Alpha	N of Items
.759	9

Since the Cronbach's alpha is greater than .759, the questionnaire was considered reliable. (Nunnally 1978)[7]

Profile of the respondents

		Frequency	Per cent
size of land holding by FPC	0 to 2 Hectares (Small to Marginal)	**16**	80
	2 to 10 Hectares (Medium)	**4**	20
	Total	20	100

Services which are being availed by FPC	Center / State level implementing agencies	3	8.11
	Common collection centers	7	18.92
	Seminars	4	10.81
	Transportation	8	21.62
	Weaker section support societies providing farm equipment's	5	13.51
	Renting necessary farm equipment	13	35.14
	Total	37	100.00

Out of 20 FPC only 4 were having land between 2 and 10 hectares; rest others were having only small to marginal land. Renting necessary farm equipment was found to be most preferred service availed by FPCs.

Descriptive Statistics

Perceived Challenges in Six Sigma implementation

	N	Minimum	Maximum	Mean	Std. Deviation
Farm producer companies can face resistance to change from their members.	20	1.00	5.00	4.6324	.72345
Farm producer companies need to spread awareness regarding the implementation of Six-Sigma	20	2.00	5.00	4.6217	.72434

methodology through employee/ stakeholders training and development programs					
Farm producer companies because of their unique agriculture base will find difficulties in aligning Six-Sigma methodology with operational processes.	20	1.00	5.00	4.4675	1.2313
Farm producer companies will be required to promote a culture of continuous improvement.	20	1.00	5.00	4.4502	.9984
Farm producer companies require to develop an effective communication system for collaboration before implementing Six-Sigma methodology.	20	1.00	5.00	4.3977	.92421
Key performance indicators should be identified before the implementation of Six-Sigma methodology in farmer producer companies.	20	1.00	5.00	4.3343	.95301
Overall Mean				**4.4839**	

Overall mean of perceived challenges subscale indicated that farmer producing companies perceive it very challenging to implement six-sigma in farming. The highest mean was recorded for perceived resistance from the members and lowest mean was observed for identification of key performance indicators before implementation.

Hypothesis testing

H_1- Size of land holding by FPC and perceived challenges in implementation of Six Sigma in farming are significantly related.

To investigate the relationship between size of land held by FPC and perceived challenges, One-way ANOVA is used in SPSS.

Table- One- Way ANOVA- Land held by FPC and Perceived challenges

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	773.198	2	42.955	130.744	**.000**
Within Groups	144.889	14	.329		
Total	918.087	19			

From the table it is observed that the significance value is less than .05 ($p<.05$). Thus, we failed to accept null hypothesis that there is no significant relationship between size of land holding by FPC and perceived challenges by FPCs in implementation of Six Sigma. Therefore, we accept H_1.

H_2- There exists significant relationship between services availed by FPCs and perceived challenges in implementation of Six Sigma in Farming.

Table- One Way ANOVA- Services availed by FPCs and perceived challenges

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	20.594	2	4.119	4.839	**.000**
Within Groups	386.451	14	.851		
Total	407.046	19			

Significance value of F test is less than .05 ($p<.05$) indicating that null hypothesis –'there is no significant relationship between services availed by FPCs and perceived challenges in implementation of Six Sigma in farming' cannot be accepted. Therefore, we accept alternate hypothesis- H_2- There exists significant relationship between services availed by FPCs and perceived challenges in implementation of Six Sigma in Farming.

Discussion and Conclusion

Data analysis showed that perceived challenges are higher among FPCs. It is also found that size of farm land of FPC and their perception of challenges are significantly related. In other words, small and marginal FPCs have different perception of challenges in implementation of Six Sigma in Farming for process improvement than that of medium and large FPCs (size of land wise). Further it was also found that FPCs availing different types of services from outside agencies for farming also differ in their perception of challenges in implementation of Six Sigma in farming. Future research can investigate which FPCs perceive it to be less challenging to implement Six Sigma in farming. So that such FPCs can be further trained and equipped to implement Six Sigma. After implementation of Six Sigma result of output can be compared in order to assess if Six Sigma is really worth implementing in Farming. Secondly Future study can also be studied that in which operation in farming Six Sigma cane be implemented to start with. Once the results are acceptable then Six Sigma can be implemented in other operations. This is how Six Sigma- an effective process improvement tool- can be implemented in phase wise in FPCs farming operations in Pune district.

The main limitation of this study is the sample size. Sample size very small to generalize any findings. Secondly the study focuses on FPCs' perception of challenges in implementation of Six Sigma. However, the responses are collected from only one member of the FPC. Personal view may be different than that of entire FPC. Future studies can collect responses from FPC members collectively.

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Role of Warehouse in the Logistic Industry with reference to Pune Industrial Environment

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Abstract

In the post globalization several new concepts in management have been introduced in the Indian manufacturing sector e.g., use of advanced technology, personnel dept. was replaced by the Human Resources Dept. and the Stores, inventory management, became logistic industry which mainly encompasses purchases, procurement of raw material and its stocking, dispatches to the distributors/direct consumers etc. This paper restricts to the warehouse component in the logistic industry and its optimum usage of latest technology. Day in and day out new technologies are being introduced which is improving the labour efficiency and improving the production. The Indian industries in a bid to compete with the multinational manufacturing companies has also adopted these changes in a short period. This article takes review of the role played by the warehouses in the logistic industry with carving out the research universe as the Pune industrial belt which is quite large and comprised of both domestic and MNCs. Pune is becoming a logistic hub which is already known as automobile and information technology hub. This study reveals that the warehouse industry in the study area is fully matured and is managing the warehouse facilities to the satisfaction of the industrial sector. The Govt. of India is very well seized of the support the logistic industry needs to support the industrial sector which is contributing sizably to the GDP. It has in Sept. 2022 has announced a New Logistic Policy which provides sops to this sector. The author has offered a few recommendations based on the interaction with the warehouse owners in the study area.

Keywords: Warehouse, logistic industry, optimization of technology,

Introduction

Indian government has embraced a liberalization, privatization, and globalization strategy in the post-globalization age. Globalization is the opening of the economy to the rest of the world, privatization is the reorganization of some goods that the government has set aside for itself, and liberalization is the removal of unnecessary restrictions. The opening of the Indian

economy to the outside world resulted in a gradual increase in foreign direct investment. The opening of India's economy to the outside world brought with it a number of multinational industrial companies, which accelerated the country's industrial development. Along with cutting-edge technology, the multinational corporations also brought cutting-edge managerial techniques.

There have been positive effects of globalization in some industrial sectors. The manufacturing, business process outsourcing, pharmaceutical, and information technology sectors all saw growth, and there was a significant increase in FDI and technological input.

In terms of industrial manufacturing, godowns and in-house inventory management were historically commonplace. The concept of Supply Chain Management (SCM) was introduced following globalization. SCM, which refers to the process and activity of sourcing the raw materials or components an enterprise needs to create a product or service and deliver that product or service to customers, expanded the role of warehouses. The effective running of warehouses of all sizes depends on warehouse optimization. The flow of the warehouse, product placement, storage, and retrieval systems are additional factors to optimize. Agile supply chains and lean warehouses depend on optimized warehouse operations. Warehouses that have been optimized to outperform the competition on all fronts are the most efficient. Industries are aiming for zero inventory these days. More so in the post-globalization era, when market rivalry has been getting fiercer, every facet of production has been thoroughly examined, and expenses have been lowered without compromising product quality. This emphasizes how crucial warehouse management is.

Today the industries are setting a target of Zero inventory. More particularly in the post globalization when the market competition has been becoming stiffer and stiffer, every aspect of production has been carefully studied and without sacrificing the quality of the product costs are reduced. This underlines the importance of the warehouse management.

Objective

The objective of this article is to bring out the role of warehouse in the changed industrial scenario in the post globalization period.

Scope & limitation

The scope of this article is restricted to the warehousing scenario in Pune industrial belt.

Methodology

The methodology is based on the collection of the primary data through interview of 25 industrial warehouses located in the identified study area. These 25 warehouses covered large, medium, and small warehouses. Even care was taken to ensure that all the types of ownerships have been covered to have a comprehensive representation.

Discusssion

The management of warehouses is changing quickly. Every day, technical advancements occur, and as new warehouses embrace these developments, they gain an advantage over older ones. There is variation in the warehouse management. examine the most recent technological advancements and management strategies in use. After reviewing the numerous popular management tactics,

The data collected was consolidated and using the percentage tool it has been analysed and interpretated. Following are the findings of this study.

1. 90% of the warehouse management undertake regular maintenance of the godown.
2. 50% of the warehouse owners expressed their concern for green environment.
3. 90% of the warehouses have adequate provision for natural light and ventilation.
4. 50% of the warehouses have installed sprinkler system to ensure fire safety.
5. 85% warehouses have adequate space for easy movement of large sized containers.
6. 6% warehouses were built to suit the customer’s specific needs.
7. 80% of the warehouses have made provision for the driver’s rest rooms.
8. 100% warehouse owners have expressed their prime concern is the safety of the campus.
9. 90% of the warehouses confirm that they fulfil all the government obligations.
10. 100% warehouses have ensured their location near the state/national highway.
11. All the warehouses insured by a nationalized insurance companies covering natural calamities like earthquakes, flood, heavy rains, fire etc.,

12. 66% of the warehouses have ensured aesthetic part of the warehouse by providing gardens, tree plantation, proper display, office building elevation etc.
13. 45% of the warehouses have achieved technology optimization and make maximum use of information technology in their day-to-day operations. There is greater scope in updating the handling of materials using advanced technology
14. Only 30% of the identified warehouses have used solar system to save on electrical front. These were newly constructed warehouses.
15. There is cut throat competition in some area (Chakan industrial belt)
16. 60% of the warehouses under study have ISO certification.
17. 70% of the warehouse owners expressed that there is need to have a common platform for all the stakeholders of logistic providers.
18. 80% of the warehouse owners stated that they conduct management audit every year to focus on our deficiencies to enable us to take remedial actions.
19. 85% of the warehouse owners stated that they analyze supply chain performance regularly to adapt to changing market conditions.
20. 90% of the warehouse owners agreed that they have to be professional for retaining their existing clientele.
21. The 100% of the warehouse owners take abundant care to ensure that the stored items are not damaged during the storage as well as in transport.
22. All the warehouses have a system of tracking the material from pick up point till ware house using appropriate software.
23. 80% of the warehouse owners use barcoding for easy location of the stored material.
24. 45% of the warehouse owners stated that they avail of professional services of the software programmers, management experts to improve our functioning

Recommendations:

1. The central government is fully persuaded that building in warehouses to satisfy the demands of the expanding sector and using solar energy are both good. The government ought to provide warehouse owners with enticing incentives to install solar power systems in order to reduce electricity costs and improve cold storage services.
2. Government should provide incentive in the form of interest subsidy for using latest technology.
3. For updating the technology, the banks provide credit on soft term basis.

4. Multinational organizations and domestic organizations have made inroad and they need to locate their warehouses near to the metropolitan /urban areas. it is suggested that the warehouses near the residential locality should go in for vertical growth

The government of india's initivative

The Indian government is fully aware of the significant contribution the logistics sector makes to the country's GDP and the swift advancement of industrialization. As a result, it unveiled its Logistic Policy 2022, highlighting the following key features:

On September 17, 2022, the long-awaited National Logistic Policy (NLP) was unveiled. As far as GDP is concerned, India recently ranked fifth internationally. This NLP is a crucial step that will help to open more time for obtaining the top spot in the global economies. The policy places a strong emphasis on crucial areas like process re-engineering, digitization, and multi-modal transportation. It is an important move since high shipping costs affect how competitive domestic products are on the global market. Given that India's logistics costs are higher than those of other industrialized nations, there is a perceived need for a national logistics policy.

Goals:

By 2030, the cost of logistics must be lowered in half to 8 percent, the level recommended by international best practices, from the current 14 to 18 percent share of GDP.

Several European nations, the US, South Korea, Singapore, and other nations have extremely low logistics cost-to-GDP ratios.

- 16 percent of GDP is the current cost.
- India, which has the fifth-largest economy in the world, wants to rank in the top 10 countries in the Logistics Performance Index (LPI) by 2030. It must keep up with South Korea's speed.
- India placed 44th in the LPI in 2018.
- Building a data-driven logistics ecosystem through developing decision support systems (DSS).

The goal of the program is to ensure that logistical problems are kept to a minimum, exports increase greatly, and small businesses and the people who work in them significantly profit.

There are five common warehouse problems that pose challenges to warehouse optimization. These problem areas are as under:

1. **Inventory accuracy** – Companies often do not know what they have in stock and have too little visibility into their warehouses when they lack an automated system
2. **Inventory location** – Without accurate insight into inventory location, pickers cannot work efficiently, which results in slower loading processes and backups in dock scheduling
3. **Space utilization and warehouse layout** – If storage systems and warehouse racking is not optimized, space required to house inventory and labor needed inside the warehouse increase
4. **Redundant processes –** Redundant processes and multiple touches hurt a company's bottom line and are inefficient
5. **Picking optimization –** Too many warehouses lack common routes for picking items for shipment because their manual processes are inefficient

Conclusion

The globalisation of the economy and the influx of multiple international firms into the Indian industrial sector have resulted in fierce competition among the Indian businesses. These industries have provided money as well as a range of innovative management techniques and state-of-the-art technologies. This helped the domestic industries, which likewise embraced the newest technology and management strategies. Technology is developing at a rapid rate every day. The rate at which the industrial landscape is evolving is astounding. Upgrading to the newest technologies is essential for manufacturing organisations hoping to survive in the logistics sector. Using modern technologies, upstarts in the market have an advantage over more seasoned competitors.

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Revolutionizing Supply Chains: The Transformative Influence of Artificial Intelligence

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Abstract

Artificial Intelligence (AI) has emerged as a game-changer in supply chain management, revolutionizing traditional practices and reshaping the landscape of global trade. This paper explores the profound impact of AI technologies on supply chains and explores their transformative impact on efficiency, transparency and agility. Through advanced data analytics, machine learning algorithms, and automation, AI enables companies to optimize inventory management, streamline logistics operations, and improve the accuracy of demand forecasts. Additionally, AI-driven predictive analytics enables supply chain stakeholders to proactively identify risks, mitigate disruptions, and capitalize on opportunities in new markets. This article explores various applications of artificial intelligence in supply chain management, including demand forecasting, inventory management, logistics optimization, and supply chain visibility. It also discusses the challenges and opportunities associated with the adoption of AI in SCM and provides insights into future trends in this rapidly growing field.

Keywords: Artificial Intelligence, Supply Chain Management, Demand Forecasting, Inventory Management, Logistics Optimization, Supply Chain Visibility.

Introduction

Supply Chain Management (SCM) is a key function for businesses to ensure the efficient flow of goods and services from suppliers to consumers. With the increasing complexity of supply chains and the increasing volume of data generated, artificial intelligence has become a key factor for improving SCM processes. Artificial intelligence technologies such as machine learning, natural language processing and robotics are revolutionizing SCM by automating tasks, improving forecast accuracy and optimizing operations.

In today's fast-paced and interconnected world, supply chains serve as the lifeblood of global commerce, enabling the seamless flow of goods and services over vast distances. However,

traditional approaches to supply chain management often struggle to keep pace with the evolving demands of the modern business environment. Enter artificial intelligence (AI), a transformative technology poised to revolutionize supply chains in an unprecedented way.

Artificial intelligence, including machine learning, deep learning, natural language processing and other advanced techniques, offers a paradigm shift in the way supply chains are managed, optimized and executed. With its ability to process massive data sets, identify patterns and make data-driven predictions, AI presents a unique opportunity to increase efficiency, agility and responsiveness within supply chain operations. Artificial intelligence enables dynamic and adaptive supply chain planning and enables organizations to respond quickly to changing market conditions, disruptions and uncertainties. Through advanced algorithms, artificial intelligence can optimize sourcing, transportation and logistics networks, leading to cost savings and greater operational efficiency. Despite its transformative potential, the widespread adoption of AI in supply chains is not without challenges. In order to fully realize the benefits of AI-driven supply chain management, concerns related to privacy, cybersecurity, ethical implications and workforce displacement need to be addressed.

This research paper aims to explore the transformative impact of AI on supply chains and delve into its various applications, benefits, challenges and future implications. By examining real-world case studies, industry trends and academic research, we aim to uncover the profound impact of AI at various stages of the supply chain, from procurement and manufacturing to distribution and customer service.

Objective of the study

- To examine the current field of supply chain management and identify key challenges facing organizations.
- To explore the role of artificial intelligence (AI) technologies in optimizing various aspects of supply chain operations.
- To explore the impact of AI-driven analytics and predictive modeling on demand forecasting, inventory management and risk mitigation strategies.
- To explore the role of AI-powered automation in increasing supply chain resilience and adaptability to unforeseen disruptions or changes.
- To propose recommendations and guidelines for organizations seeking to use artificial intelligence for transformational improvements in their supply chain operations.

Research methodology

This research paper delves deep into the impact of artificial intelligence in revolutionizing supply chains and examines its impact on various aspects of supply chain operations such as demand forecasting, inventory optimization, logistics management and decision-making processes.

Conduct a comprehensive review of the existing literature on AI in supply chain management which includes academic journals, books, industry reports and white papers. This will identify key concepts, theories and trends related to the adoption of AI in supply chains and critically analyze previous research to understand gaps in knowledge and areas that require further investigation into the ways in which AI intelligence-driven solutions have reshaped traditional supply chain paradigms.

Literature review

Chen, L., et al. (2018) in their study conducted comparative analysis of logistics optimization algorithms based on artificial intelligence is conducted. The study examines various logistics AI technologies and examines their effectiveness and applicability in real-world scenarios. Gardener (2021) provide valuable insights into the evolving landscape of supply chain management. The report, published by Stamford, Conn.-based Gartner Research, provides a comprehensive assessment of how AI technology can transform supply chain visibility and improve decision-making. Johnson, R., et al. (2019) present a compelling case study of AI-driven inventory management in the consumer goods industry. The study provides practical insights into the implementation and outcomes of artificial intelligence technology in optimizing inventory levels and increasing supply chain efficiency. Lee, S. and Kim, Y. (2021) Focusing on artificial intelligence-driven inventory management in manufacturing. Through detailed case studies, the authors demonstrate the benefits and challenges of adopting artificial intelligence in inventory management in a manufacturing environment. Li, X. and Cheng, T. (2019) studied the application of machine learning technology in demand forecasting in the retail industry. The study highlights the effectiveness of machine learning models in improving the accuracy of demand forecasts and supporting the strategic decision-making process. Tang, J., et al. (2020) investigated the use of machine learning algorithms to improve the accuracy of retail demand forecasts. Through detailed case studies, the authors illustrate the potential of machine learning techniques to solve challenges related to demand forecasting. Wang, Q., et

al. (2020) provide a comprehensive overview of AI-driven warehouse optimization techniques. This study provides an overview of current progress, challenges, and future research directions in leveraging artificial intelligence to optimize warehouse operations. Zeng, Y., et al. (2019) studied the use of artificial intelligence to improve supply chain transparency in the retail industry. Through empirical analysis, the authors demonstrate the potential of AI technology to improve supply chain transparency and reduce operational risks.

Overall, the reviewed literature highlights the important role of AI in revolutionizing all aspects of supply chain management, from logistics optimization and inventory management to demand forecasting and supply chain visibility. These studies provide valuable insights into implementation challenges, benefits, and future research directions for leveraging AI technologies to improve supply chain performance and resilience.

Conceptual Framework

Analyze the impact of AI on demand forecasting, inventory optimization, logistics management, and decision-making processes through data-driven approaches. By leveraging historical data, real-time information, and advanced analytics techniques, organizations can harness the transformative potential of AI to enhance demand forecasting, inventory optimization, logistics management, and decision-making processes, ultimately driving efficiency, agility, and competitiveness in today's dynamic business environment.

1. Demand Forecasting:

AI has transformed demand forecasting by enabling more accurate predictions through the analysis of vast amounts of data. By leveraging machine learning algorithms, AI systems can detect patterns, trends, and anomalies in historical sales data, market trends, and external factors.

- Data Analysis Approach:
    - Historical Sales Data: Analyze historical sales data to identify patterns and seasonal trends.
    - Market Trends: Incorporate external data sources such as market reports, economic indicators, and social media sentiment analysis to capture market dynamics.

    - Machine Learning Models: Utilize machine learning algorithms such as ARIMA, LSTM, or Prophet to forecast demand based on historical and external data inputs.
- Performance Metrics:
    - Mean Absolute Error (MAE), Mean Squared Error (MSE), or Root Mean Squared Error (RMSE) to evaluate the accuracy of demand forecasts.
    - Forecast Bias: Measure the deviation of forecasts from actual demand to identify any systematic errors.

2. Inventory Optimization:

AI-driven inventory optimization enhances efficiency by dynamically adjusting inventory levels based on demand forecasts, lead times, and supply chain constraints. It minimizes stockouts, reduces excess inventory, and improves overall inventory turnover.

- Data Analysis Approach:
    - Demand Forecasts: Utilize AI-generated demand forecasts as input for inventory optimization algorithms.
    - Lead Time Variability: Analyze historical lead time data to estimate lead time variability and incorporate it into safety stock calculations.
    - Supply Chain Constraints: Consider constraints such as production capacity, supplier reliability, and transportation lead times in inventory optimization models.
- Performance Metrics:
    - Inventory Turnover Ratio: Measure how efficiently inventory is being utilized.
    - Fill Rate: Evaluate the percentage of demand that is met from on-hand inventory.
    - Stockout Rate: Assess the frequency of stockouts or instances where demand cannot be met from available inventory.

3. Logistics Management:

AI enhances logistics management by optimizing transportation routes, scheduling, and resource allocation, thereby reducing costs and improving delivery efficiency.

- Data Analysis Approach:
    - Transportation Data: Analyze historical transportation data including routes, transit times, and carrier performance.

    - Real-Time Data: Integrate real-time data sources such as GPS tracking, weather updates, and traffic conditions to optimize route planning dynamically.
    - Predictive Maintenance: Use AI algorithms to predict equipment failures and schedule maintenance proactively, minimizing disruptions in logistics operations.
- Performance Metrics:
    - On-Time Delivery Performance: Measure the percentage of shipments delivered on time.
    - Transportation Costs: Evaluate the cost per unit shipped or total transportation costs as a percentage of sales.
    - Route Optimization Efficiency: Assess the reduction in transit times or mileage achieved through AI-driven route optimization.

4. Decision-Making Processes:

AI empowers decision-making processes by providing real-time insights, scenario analysis, and predictive analytics to support strategic, tactical, and operational decisions.

- Data Analysis Approach:
    - Real-Time Data Integration: Aggregate and analyze real-time data from various sources including IoT sensors, RFID tags, and enterprise systems.
    - Predictive Analytics: Employ machine learning models to predict future outcomes and assess the potential impact of different decision alternatives.
    - Scenario Analysis: Conduct "what-if" analysis to evaluate the implications of different scenarios on key performance metrics such as costs, service levels, and inventory levels.
- Performance Metrics:
    - Decision Quality: Assess the effectiveness of decisions based on predefined objectives and outcomes.
    - Decision Time: Measure the time taken to make decisions and implement changes in response to insights generated by AI systems.
    - Business Impact: Evaluate the overall impact of AI-driven decisions on supply chain performance metrics such as cost savings, revenue growth, and customer satisfaction.

AI implementation in revolutionizing supply chain operations

Leveraging AI for transformative improvements in supply chain operations can provide numerous benefits including increased efficiency, reduced costs, improved decision-making, and enhanced customer satisfaction.

- **Finance: JPMorgan Chase**
  - Case Study: JPMorgan Chase utilizes AI for fraud detection and risk management. Machine learning algorithms analyze large datasets of transactions, customer behaviors, and historical fraud patterns to identify anomalies and potential fraudulent activities in real time. This has significantly improved the bank's ability to detect and prevent fraudulent transactions.
- **E-commerce: Amazon**
  - Case Study: Amazon employs AI in its fulfillment centers for efficient inventory management and order processing. The company uses robotic systems equipped with computer vision and machine learning to optimize the movement of goods, reducing the time it takes to pick, pack, and ship orders. This enhances overall operational efficiency and customer satisfaction.
- **Healthcare: IBM Watson Health**
  - Case Study: IBM Watson Health applies AI for personalized medicine and cancer treatment. Watson analyzes vast amounts of medical literature, patient records, and clinical trial data to assist healthcare professionals in making informed decisions about treatment options. This helps tailor treatment plans based on individual patient characteristics.
- **Energy: Royal Dutch Shell**
  - Case Study: Shell employs AI for predictive maintenance in its oil and gas operations. By utilizing sensors and machine learning algorithms, Shell can predict equipment failures before they occur, enabling proactive maintenance. This approach reduces downtime, extends the lifespan of equipment, and improves overall operational efficiency.
- **Telecommunications: AT&T**
  - Case Study: AT&T uses AI for network optimization and predictive maintenance. Machine learning algorithms analyze network performance data, predict potential issues, and optimize network configurations in real time. This

proactive approach helps enhance the quality of service and reduces network downtime.

- **Transportation: Uber**
  - Case Study: Uber integrates AI into its ride-sharing platform for dynamic pricing and route optimization. AI algorithms analyze real-time data on traffic conditions, rider demand, and driver availability to adjust prices dynamically and optimize routes for more efficient transportation services.
- **Agriculture: John Deere**
  - Case Study: John Deere employs AI in precision agriculture for crop management. AI-powered tools analyze data from sensors, satellites, and other sources to provide farmers with insights into crop health, optimal planting times, and irrigation management. This helps farmers make data-driven decisions to improve yields and reduce resource usage.

Impact of AI on SCM

AI-powered demand forecasting algorithms leverage historical data, market trends, and external factors to predict future demand more accurately. By analyzing large datasets, AI can identify patterns and trends that human analysts may overlook, leading to more accurate forecasts. Research by Tang et al. (2020) found that AI-based demand forecasting can reduce forecasting errors by up to 50%, leading to improved inventory management and customer satisfaction.

AI enhances inventory management by optimizing stocking levels, reducing carrying costs, and minimizing stock outs. AI algorithms can analyze real-time data to predict demand fluctuations and recommend optimal inventory replenishment strategies. According to a study by Johnson et al. (2019), AI-driven inventory management systems can lead to a 20% reduction in inventory costs while improving inventory turnover rates.

AI-driven logistics optimization tools improve the efficiency of transportation routes, warehouse operations, and delivery schedules. By optimizing logistics processes, organizations can reduce transportation costs, minimize delivery times, and enhance customer service. Research by Chen et al. (2018) demonstrated that AI can reduce transportation costs by up to 30% and improve delivery times by 50% through route optimization and real-time tracking.

AI enhances supply chain visibility by providing real-time insights into the entire supply chain network. AI-powered supply chain visibility tools track inventory movements, identify potential disruptions, and enable proactive decision-making to mitigate risks. According to a report by Gartner (2021), organizations that leverage AI for supply chain visibility can reduce inventory levels by 20% while improving order fulfillment rates by 30%.

Challenges and opportunities

Supply chain management is a critical aspect of modern businesses, ensuring the efficient flow of goods and services from production to consumption. However, in today's dynamic and complex global market, organizations face numerous challenges in managing their supply chains effectively. The integration of artificial intelligence (AI) holds significant promise in revolutionizing supply chains, offering solutions to address these challenges and unlock new opportunities for optimization and innovation. One key challenge faced by organizations in supply chain management is the demand for real-time visibility and responsiveness. Traditional supply chain systems often lack the agility to adapt to rapidly changing market conditions and customer demands. AI technologies, such as machine learning and predictive analytics, enable organizations to analyze vast amounts of data in real-time, identify patterns, and forecast demand more accurately. This allows for proactive decision-making and better inventory management, reducing stockouts and excess inventory costs.

Another challenge is the complexity of global supply chains, which involve multiple stakeholders, varying regulations, and diverse transportation networks. AI-powered solutions can enhance supply chain visibility and transparency by providing end-to-end traceability of products and shipments. For example, blockchain technology combined with AI algorithms can track the movement of goods across the supply chain, ensuring compliance with regulations and reducing the risk of counterfeit products. Furthermore, supply chain disruptions, such as natural disasters, geopolitical events, or supplier issues, can have a significant impact on business operations and profitability. AI-based risk management systems can analyze historical data, assess potential risks, and recommend mitigation strategies to minimize disruptions. By identifying vulnerabilities in the supply chain and implementing proactive measures, organizations can enhance resilience and ensure business continuity. Additionally, optimizing logistics and transportation processes is essential for reducing costs and improving efficiency in supply chain management. AI-driven optimization algorithms can optimize route planning,

vehicle scheduling, and warehouse operations, leading to reduced transportation times, lower fuel consumption, and increased asset utilization. Autonomous vehicles and drones equipped with AI technology have the potential to further streamline last-mile delivery operations, particularly in urban areas.

Despite the transformative potential of AI in supply chain management, organizations may face challenges in implementation, such as data integration issues, skill gaps, and concerns about data privacy and security. Despite the numerous benefits of AI in SCM, its adoption presents challenges such as data security concerns, implementation costs, and workforce displacement. However, organizations can overcome these challenges by investing in AI talent, developing robust data privacy policies, and integrating AI technologies gradually into their existing SCM systems.

One of the primary concerns with AI adoption in SCM is data security. As AI relies heavily on data, organizations must ensure that sensitive information is protected from unauthorized access and cyber threats. Implementing robust data encryption, access controls, and regular security audits can help mitigate these risks. Another challenge of AI adoption in SCM is the initial investment required for implementing AI technologies. Organizations must carefully evaluate the costs and benefits of AI implementation and develop a comprehensive implementation plan to ensure a successful integration into their existing SCM systems. The integration of AI in SCM may also lead to workforce displacement, as AI technologies automate certain tasks that were previously performed by humans. To address this challenge, organizations can provide training and upskilling opportunities to employees to prepare them for new roles that complement AI technologies.

Recommendations for organizations

- **Data Quality and Integration**: Ensure data quality by consolidating and integrating data from various sources such as ERP systems, IoT devices, and external partners. Amazon utilizes AI algorithms to analyze vast amounts of data from its supply chain partners to optimize inventory levels, predict demand, and enhance logistics operations.
- **Predictive Analytics**: Implement predictive analytics models to forecast demand, identify potential disruptions, and optimize inventory levels. Walmart uses AI-powered demand forecasting algorithms to predict product demand based on various factors including historical sales data, weather patterns, and social media trends.

- **Optimization Algorithms**: Utilize optimization algorithms to streamline routing, scheduling, and allocation of resources to improve efficiency and reduce costs. DHL employs AI algorithms to optimize delivery routes in real-time, considering factors such as traffic conditions, weather, and delivery constraints.
- **Supply Chain Visibility**: Enhance visibility across the supply chain by deploying AI-powered tracking and monitoring systems to identify bottlenecks and optimize processes. Maersk, a global shipping company, utilizes AI and IoT technologies to provide real-time visibility into container shipments, enabling customers to track their cargo and anticipate potential delays.
- **Risk Management**: Implement AI-based risk management systems to identify and mitigate potential disruptions such as supplier issues, natural disasters, and geopolitical events. IBM's Watson Supply Chain uses AI to analyze news articles, social media feeds, and other external data sources to identify potential supply chain risks and provide early warnings to businesses.
- **Automation and Robotics**: Deploy AI-powered robotics and automation solutions to optimize warehouse operations, increase throughput, and reduce labor costs. Alibaba's logistics arm, Cainiao, utilizes AI-driven robots in its warehouses to automate tasks such as sorting, picking, and packing, improving operational efficiency and reducing errors.
- **Collaboration and Ecosystem Integration**: Foster collaboration and integration with supply chain partners through AI-enabled platforms and tools to facilitate information sharing and decision-making. IBM's Sterling Supply Chain Suite leverages AI and blockchain technology to enable seamless collaboration and data exchange among supply chain partners, enhancing visibility and trust across the ecosystem.
- **Continuous Learning and Improvement**: Establish mechanisms for continuous learning and improvement by leveraging AI to analyze performance data, identify opportunities for optimization, and adapt to changing market conditions. Nestlé utilizes AI-powered analytics to continuously monitor and analyze its supply chain performance, identifying areas for improvement and implementing targeted interventions to drive efficiency and innovation.

Future trends in ai adoption in scm:

Autonomous vehicles, including drones and self-driving trucks, are increasingly being used in SCM to improve the efficiency of transportation and delivery processes. These vehicles can reduce delivery times, lower transportation costs, and enhance overall supply chain performance. In the future, we can expect to see further advancements in autonomous vehicle technology, including increased autonomy and integration with AI-powered systems for route optimization and real-time tracking.

Blockchain technology is gaining traction in SCM for its ability to provide secure and transparent transactions across the supply chain network. By utilizing blockchain, organizations can improve traceability, reduce fraud, and streamline supply chain operations. In the future, we can expect to see broader adoption of blockchain technology in SCM, with more organizations implementing blockchain-based solutions for enhanced transparency and security.

The Internet of Things (IoT) is enabling organizations to connect and communicate with various devices and sensors throughout the supply chain. IoT technologies can provide real-time data on inventory levels, equipment performance, and environmental conditions, allowing for more informed decision-making and improved operational efficiency. In the future, we can expect to see increased integration of IoT devices in SCM, with organizations leveraging IoT data to optimize supply chain processes and improve overall performance.

Conclusion

The evolution of artificial intelligence (AI) in the supply chain cannot be overstated. As discussed, AI technology has many benefits, from improving efficiency and reducing costs to improving speed, decision-making, and satisfaction. Using artificial intelligence, companies can optimize their delivery processes, making them more responsive to market trends and more responsive to customer needs. AI's ability to instantly analyze large amounts of information enables product managers to make quick decisions, increasing efficiency and reducing risk. In addition, artificial intelligence-supported products continue to support sustainable development by reducing waste, energy consumption and environmental impact. This aligns with the importance of community engagement and leadership in today's business world. Looking to the future, continued advances in artificial intelligence technology bring many opportunities for business management. AI will continue to revolutionize the way the maritime industry works by integrating blockchain to accelerate transportation adoption.

Artificial intelligence is changing the materials management process by increasing efficiency, reducing costs and improving decision-making. Organizations that promote SCM expertise will be highly valued in today's business environment. Although the adoption of AI in supply chain management poses challenges, the benefits outweigh the risks, and organizations that successfully integrate AI technology into their supply chain management processes will be better off succeeding in the future. As these companies acquire AI and use it for transformation, they will succeed in the global market. For organizations that want to thrive in an increasingly connected world, transforming the supply chain with the power of intelligence is not just a trend, but an imperative of ideas.

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Augmented Reality in Education: Enhancing Learning Experiences and Student Engagement

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Abstract:

Augmented Reality (AR) technology has emerged as a promising tool for transforming traditional educational practices by overlaying digital content onto the physical world, thereby enhancing learning experiences and student engagement. This research paper provides a comprehensive overview of the application of AR in education, exploring its benefits, challenges, and future potentials. Through an extensive review of existing literature and case studies, this paper examines the impact of AR on various aspects of education, including classroom instruction, remote learning, skill development, and immersive learning experiences. Additionally, the paper discusses the pedagogical theories and instructional strategies that underpin effective integration of AR technology in educational settings. By analysing the current state of AR in education and identifying key areas for further research and development, this paper aims to contribute to the advancement of educational practices through innovative technology adoption.

Keywords: Augmented Reality, Education, Learning Experiences, Student Engagement, Pedagogy

Introduction

In recent years, technological advancements have revolutionized the field of education, offering new opportunities to enhance teaching and learning processes. One such technology that has gained significant attention is Augmented Reality (AR), which overlays digital content onto the physical world, providing users with an immersive and interactive experience. AR technology holds immense potential for transforming traditional educational practices by creating engaging and interactive learning environments that cater to diverse learning styles and preferences.

This research paper aims to explore the application of Augmented Reality in education, with a focus on enhancing learning experiences and student engagement. By reviewing existing literature, case studies, and empirical research, this paper seeks to provide insights into the benefits, challenges, and future potentials of integrating AR technology in educational settings. Furthermore, this paper discusses the pedagogical theories and instructional strategies that support the effective implementation of AR-based learning activities.

Background

Augmented Reality Technology

Augmented Reality (AR) technology blends digital content with the physical environment, allowing users to interact with virtual objects in real-time. Unlike Virtual Reality (VR), which immerses users in entirely virtual environments, AR overlays digital elements onto the real world, enhancing the user's perception of reality. AR applications can be accessed through various devices, including smartphones, tablets, and wearable devices, making it accessible and versatile for educational purposes.

Educational Pedagogy and AR

The integration of AR technology in education aligns with constructivist and experiential learning theories, which emphasize active engagement, exploration, and hands-on experiences. AR enhances student-centered learning by providing opportunities for inquiry-based learning, problem-solving, and collaborative activities. By immersing students in interactive environments, AR facilitates deeper understanding and retention of complex concepts across various subjects and disciplines.

Purpose of the Paper

The purpose of this research paper is to explore the application of Augmented Reality in education, with a specific focus on enhancing learning experiences and student engagement. Through an extensive review of literature, case studies, and empirical evidence, this paper aims to:

- Examine the benefits of integrating AR technology in educational settings.
- Identify challenges and considerations associated with AR implementation.
- Explore various applications of AR in education, including classroom instruction, remote learning, skill development, and immersive experiences.

- Discuss pedagogical theories and instructional strategies that support effective AR integration.
- Provide recommendations for educators, policymakers, and researchers to maximize the potential of AR in education.

Benefits of AR in Education

Enhanced Learning Experiences

AR technology enhances learning experiences by providing interactive and immersive environments where students can explore, manipulate, and interact with virtual objects. By integrating digital content with real-world contexts, AR bridges the gap between abstract concepts and tangible experiences, making learning more engaging and meaningful.

Research has shown that AR can improve knowledge retention, comprehension, and problem-solving skills by facilitating experiential learning opportunities. For example, a study conducted by Dunleavy, Dede, and Mitchell (2009) found that students who engaged in AR-enhanced learning activities demonstrated higher levels of understanding and retention compared to those using traditional instructional methods. This is attributed to the multisensory nature of AR experiences, which stimulate multiple cognitive pathways and reinforce learning through visual, auditory, and kinesthetics modalities.

Furthermore, AR enables students to explore complex concepts in a self-paced and interactive manner, promoting active engagement and inquiry-based learning. For instance, AR simulations allow students to visualize abstract phenomena, such as molecular structures or geological formations, in three-dimensional space, facilitating deeper understanding and conceptualization. By manipulating virtual objects and observing real-time feedback, students can experiment with different variables and hypotheses, fostering critical thinking and problem-solving skills.

Figure 1: Diagram illustrating the components of an AR system (Feuchtner Tiare, June 2018).

Increased Student Engagement

One of the key benefits of AR in education is its ability to captivate students' attention and foster active participation in learning activities. Unlike traditional instructional methods, which often rely on passive consumption of information, AR encourages students to take an active role in their learning process.

By offering hands-on experiences and opportunities for exploration, AR motivates students to engage with course materials in a meaningful and interactive way. For example, instead of simply reading about historical events in a textbook, students can use AR applications to virtually explore historical sites, artifacts, and primary sources, gaining a deeper appreciation for the subject matter and its relevance to their lives.

Furthermore, AR facilitates collaborative learning experiences, where students can work together to solve problems, conduct experiments, and create projects in virtual environments. For instance, educators can design AR-based scavenger hunts or team-based challenges that require students to collaborate and communicate effectively to achieve common goals. By promoting social interaction and teamwork, AR enhances student engagement and fosters a sense of community and belonging in the classroom.

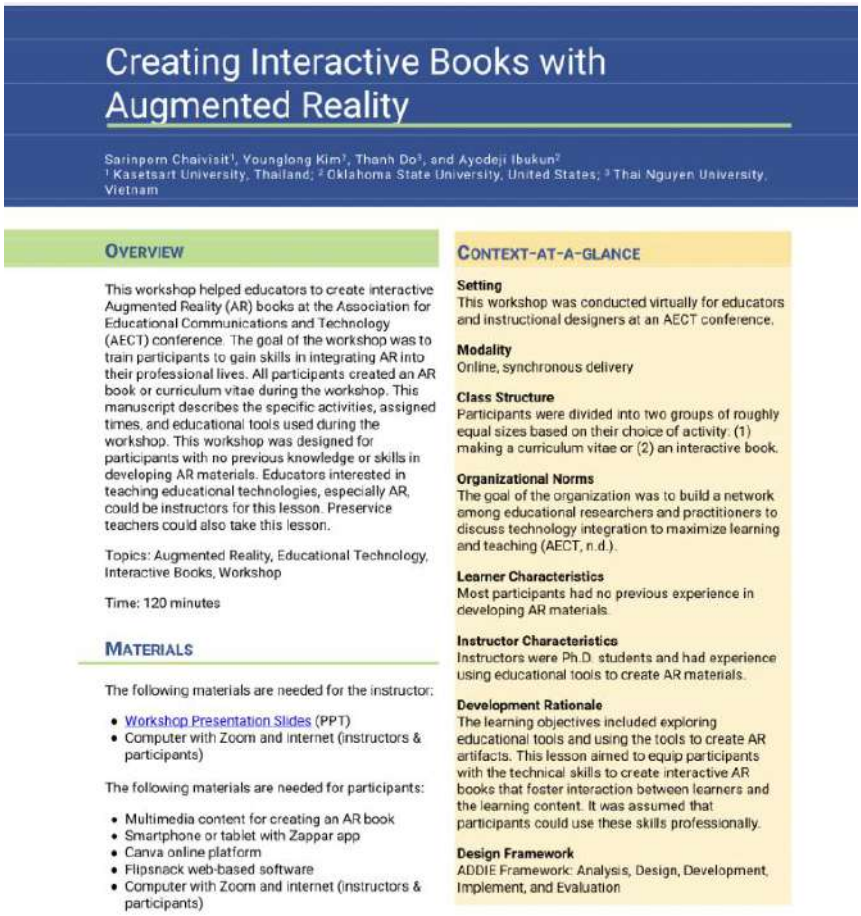

Figure 2: Example of an AR-enabled textbook page with interactive content (Sarinporn Chaivisit, Younglong Kim, Thanh Do, Ayodeji Ibukun, January 2024).

1. Challenges and Considerations

Despite its potential benefits, the integration of AR technology in education presents several challenges and considerations that need to be addressed:

Technical Infrastructure:

While AR holds immense potential for education, its implementation may be hindered by technical limitations and infrastructure requirements. For instance, AR applications require robust hardware and software capabilities to deliver immersive and seamless experiences. Some of the technical challenges associated with AR implementation in education include:

Hardware Compatibility: AR applications rely on compatible devices, such as smartphones, tablets, or AR glasses, with sufficient processing power, memory, and graphical capabilities to run AR content smoothly. However, ensuring widespread access to compatible devices among students and educators can be challenging, especially in resource-constrained settings.

Software Development: Developing high-quality AR content and applications requires expertise in software development, 3D modeling, and graphic design. Educators and content developers need access to user-friendly authoring tools and development platforms that facilitate the creation, customization, and deployment of AR experiences. However, the complexity of AR development tools and programming languages may pose barriers to entry for educators with limited technical skills and resources.

Connectivity and Bandwidth: AR applications often rely on high-speed internet connectivity and low-latency networks to deliver real-time interactions and streaming of multimedia content. However, ensuring reliable internet access and sufficient bandwidth in educational environments, particularly in rural or remote areas, can be challenging. Poor network infrastructure and bandwidth limitations may result in latency issues, buffering, or disruptions in AR experiences, affecting the overall quality of learning.

Cost and Accessibility: AR hardware, such as smartphones, tablets, or AR glasses, can be costly and may not be affordable or accessible to all students and schools. Additionally, AR development and licensing fees, as well as ongoing maintenance and support costs, can further strain limited educational budgets. Ensuring equitable access to AR technology and resources for all students, regardless of socioeconomic status or geographical location, remains a significant challenge for educators and policymakers.

Despite these technical limitations, ongoing advancements in AR technology, including improvements in hardware capabilities, software development tools, and network infrastructure, are gradually addressing these challenges and expanding the possibilities for AR integration in education.

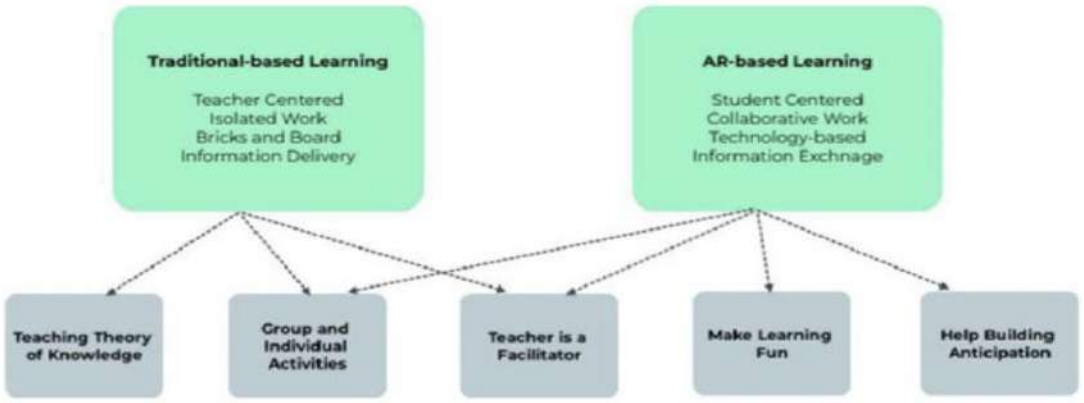

Figure 3: Comparison of traditional learning vs. AR-enhanced learning outcomes (Soraia Oueida, Pauly Awad, Claudia Mattar, July 2023).

Pedagogical Integration:

Effective integration of AR in educational practices requires careful consideration of pedagogical principles, learning objectives, and instructional design strategies. Educators need adequate training and support to design and implement AR-based learning activities that align with curriculum standards and educational goals.

Content Creation:

Developing high-quality AR content and learning experiences requires expertise in content creation, digital storytelling, and multimedia production. Educators and content developers need access to user-friendly authoring tools and platforms that facilitate the creation and customization of AR content.

Ethical and Privacy Concerns:

AR technology raises concerns related to data privacy, security, and ethical use, particularly when it involves collecting and analysing sensitive information about students. Educators and policymakers must establish clear guidelines and protocols for the ethical use of AR in educational settings, ensuring the protection of students' rights and confidentiality.

Applications of AR in Education

Classroom Instruction

AR technology can enrich traditional classroom instruction by supplementing textbooks and lectures with interactive digital content. For example, AR-enabled textbooks can transform static images and diagrams into dynamic 3D models, allowing students to explore complex concepts from multiple perspectives. Instead of passively consuming information, students can actively engage with the content by manipulating virtual objects, conducting virtual experiments, and visualizing abstract concepts in real-time.

AR-enhanced presentations and lectures can captivate students' attention and enhance information retention through interactive storytelling and immersive experiences. For instance, educators can use AR applications to overlay historical artifacts onto physical objects, enabling students to interact with artifacts and explore historical events in a tangible and engaging manner.

Furthermore, AR technology facilitates personalized and differentiated instruction by adapting content and learning activities to individual learning styles and preferences. Educators can customize AR experiences to accommodate diverse student needs, providing additional support and scaffolding for struggling learners while challenging advanced students with enriched content and extended learning opportunities.

AR-based assessment tools enable educators to gauge student understanding and progress in real-time, providing immediate feedback and actionable insights for instructional planning and intervention. By integrating formative assessment strategies into AR learning experiences, educators can create dynamic feedback loops that promote continuous improvement and mastery learning.

Overall, the integration of AR technology in classroom instruction enhances student engagement, fosters active learning, and cultivates a deeper understanding of subject matter across various disciplines. By leveraging the interactive and immersive capabilities of AR, educators can create dynamic and enriching learning environments that inspire curiosity, creativity, and collaboration among students.

Remote Learning

Amidst the rise of remote learning, especially due to global events such as the COVID-19 pandemic, AR technology offers innovative solutions to bridge the gap between physical and virtual classrooms. AR-based remote learning platforms enable students to access immersive learning experiences from anywhere, facilitating collaboration and interaction in virtual environments. Additionally, AR simulations and virtual field trips provide students with opportunities to explore real-world scenarios and environments, enhancing their understanding of abstract concepts and phenomena.

Skill Development

AR technology facilitates hands-on learning experiences that promote skill development across various domains, including STEM (Science, Technology, Engineering, and Mathematics), healthcare, and vocational training. For instance, AR-enabled simulations allow students to practice surgical procedures, engineering designs, and scientific experiments in a safe and controlled environment. By providing immediate feedback and guidance, AR enhances skill acquisition and mastery, preparing students for real-world challenges and professions.

Immersive Learning

Experiences One of the key advantages of AR technology is its ability to create immersive and interactive learning experiences that captivate students' attention and foster curiosity. AR-based educational apps and games engage learners in dynamic activities, such as scavenger hunts, interactive quizzes, and virtual tours, which promote active participation and exploration. Moreover, AR storytelling and narrative experiences transport students to different time periods, cultures, and environments, enabling them to develop empathy, cultural awareness, and critical thinking skills.

Case Studies

Case Study 1: AR in Science Education

A study conducted by Klopfer and Squire (2008) investigated the use of AR technology in a middle school science classroom. The researchers developed an AR simulation called

"Environmental Detectives," which allowed students to investigate environmental issues and solutions in their local community.

Methodology:

The study involved a group of middle school students who were divided into experimental and control groups. The experimental group used the AR simulation, while the control group followed traditional instructional methods. The researchers collected data through pre- and post-assessments, observations, and student feedback surveys to evaluate the impact of AR on student learning outcomes and engagement.

Implementation:

In the "Environmental Detectives" AR simulation, students assumed the role of environmental scientists tasked with investigating pollution sources, monitoring environmental indicators, and proposing solutions to mitigate environmental problems in their community. Using AR-enabled mobile devices, students explored real-world locations, such as parks, rivers, and industrial areas, where they encountered virtual objects, data overlays, and interactive simulations related to environmental science concepts.

Results:

The study findings revealed significant differences in learning outcomes and engagement between the experimental and control groups. Students who participated in the AR simulation demonstrated higher levels of knowledge acquisition, problem-solving skills, and environmental awareness compared to those in the control group. Additionally, students expressed greater interest and enthusiasm for learning science through the AR-based activities, citing the immersive and interactive nature of the experience as motivating factors.

Discussion:

The success of the "Environmental Detectives" AR simulation highlights the potential of AR technology to enhance science education by providing students with authentic and experiential

learning opportunities. By immersing students in real-world contexts and empowering them to investigate environmental issues firsthand, AR promotes inquiry-based learning, critical thinking, and environmental stewardship.

Conclusion:

The case study illustrates the effectiveness of AR technology in engaging students and improving learning outcomes in science education. By integrating AR simulations into the curriculum, educators can create dynamic and interactive learning experiences that stimulate curiosity, foster exploration, and deepen understanding of complex scientific concepts.

This case study underscores the transformative potential of AR in education and provides valuable insights for educators seeking to leverage technology to enhance student engagement and learning outcomes in STEM disciplines. Further research and exploration of AR applications in science education are warranted to continue advancing innovative teaching practices and preparing students for success in the 21st century.

Case Study 2: AR in History Education

A study conducted by Smith et al. (2019) explored the use of Augmented Reality in history education to enhance students' understanding of historical events and artifacts. The researchers developed an AR application called "Time Traveler" that allowed students to virtually explore significant historical sites, monuments, and artifacts from different time periods.

Methodology:

The study involved high school students enrolled in a history course, who were divided into experimental and control groups. The experimental group used the "Time Traveler" AR application, while the control group followed traditional instructional methods. The researchers collected data through pre- and post-assessments, student surveys, and classroom observations to evaluate the impact of AR on student learning outcomes and engagement.

Implementation:

In the "Time Traveler" AR application, students could use their smartphones or tablets to scan QR codes placed at various historical locations, such as museums, landmarks, and archaeological sites. Upon scanning a QR code, students were transported back in time through immersive AR experiences that recreated historical scenes, characters, and events. For example, students could witness the signing of the Declaration of Independence, explore ancient civilizations, or interact with virtual representations of historical figures.

Results:

The study findings revealed significant improvements in learning outcomes and engagement among students who used the "Time Traveler" AR application. Students demonstrated deeper understanding of historical events, contexts, and perspectives, as evidenced by higher scores on post-assessment quizzes and essays. Moreover, students expressed enthusiasm and excitement for learning history through AR, citing the immersive and interactive nature of the experience as transformative.

Discussion:

The success of the "Time Traveler" AR application highlights the potential of AR technology to bring history to life and engage students in meaningful learning experiences. By providing students with opportunities to explore historical sites and artifacts in virtual environments, AR promotes experiential learning, empathy, and cultural understanding. Furthermore, AR enables students to engage with primary sources, archival materials, and multimedia content in context, fostering critical thinking and historical inquiry skills.

Conclusion:

The case study demonstrates the effectiveness of AR technology in enhancing history education by providing students with immersive and interactive learning experiences. By leveraging AR applications like "Time Traveler," educators can transform history lessons into dynamic journeys through time and space, where students become active participants in the unfolding narrative of human civilization. As technology continues to evolve, the potential for AR to revolutionize history education and inspire a new generation of historians is boundless.

Future Directions

Despite the challenges, the future of AR in education appears promising, with ongoing advancements in technology, pedagogy, and research. Future directions for AR in education include:

Integration with Emerging Technologies:

AR technology is expected to converge with other emerging technologies, such as artificial intelligence, machine learning, and natural language processing, to create more intelligent and adaptive learning environments. By personalizing learning experiences based on individual preferences, abilities, and interests, AR can cater to diverse learners and promote inclusive education.

Augmented Reality Learning Ecosystems:

The development of AR learning ecosystems and platforms will enable seamless integration of AR content across different devices, environments, and educational contexts. These ecosystems will support collaborative learning, knowledge sharing, and interdisciplinary exploration, empowering students to become active creators and contributors in their learning journeys.

Research and Evaluation:

Continued research and evaluation of AR in education are essential to understand its impact on learning outcomes, student engagement, and academic achievement. Longitudinal studies, experimental research designs, and qualitative assessments will provide valuable insights into the effectiveness and scalability of AR-based interventions in diverse educational settings.

Conclusion

In conclusion, Augmented Reality has the potential to revolutionize education by enhancing learning experiences and student engagement. By leveraging the immersive and interactive capabilities of AR technology, educators can create dynamic and personalized learning

environments that cater to the diverse needs and learning styles of students. The integration of AR in education fosters active participation, critical thinking, and collaboration, empowering students to explore, experiment, and create in ways that were previously unimaginable. Furthermore, AR enhances the accessibility and inclusivity of education by breaking down geographical barriers, accommodating diverse learning abilities, and providing equitable access to interactive learning resources.

As educators, policymakers, and researchers continue to explore the possibilities of AR in education, it is essential to prioritize pedagogical innovation, professional development, and research-driven practices. By embracing technology as a tool for transformation rather than a mere supplement to traditional instructional methods, educators can unlock the full potential of AR to inspire curiosity, spark creativity, and cultivate lifelong learners. Through collaborative efforts and strategic investments in AR infrastructure, content development, and teacher training, we can pave the way for a future where every learner has the opportunity to thrive in an immersive and interactive learning environment powered by Augmented Reality.

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Level of Satisfaction with the Hospital Services among the Hospitalized Patients in the Selected Tertiary Level Hospitals in Bangladesh: A Management Perspective

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ABSTRACT

The role of patients' satisfaction with hospital services demands further exploration. Hence, this study explored the status of hospitalized patients and investigated the role of satisfaction with hospital services and their mental health. A cross-sectional study was conducted from October 2020 to April 2021 in Dhaka, Bangladesh. Using a multistage sampling process, face-to-face interviews were conducted to collect data from 401 patients from six tertiary-level hospitals. Bivariate and multivariate logistic regressions were performed to determine the relationship among study variables. The prevalence of depression and anxiety was 25.2% and 27.7%, respectively. Multivariate logistic regression indicated that participants from middle-class backgrounds exhibited a 2.7-fold (95% CI: 1.493 – 4.890) higher likelihood of satisfaction with healthcare and individuals without symptoms of depression exhibited approximately 10 times (95% CI: 1.294 – 84.365) higher satisfaction with healthcare services, while those without anxiety showed 2.4 times (95% CI: 0.401 – 14.485) increase in satisfaction levels. This study highlighted some significant markers regarding the patient's satisfaction with healthcare services that contributed to their mental health suffering. Establishing standard hospital facilities and a hygienic environment is highly suggested to maintain the psychological well-being of hospitalized patients.

Keywords: Hospital Management; Patient Satisfaction; Mental health; Hospital Services; Bangladesh

INTRODUCTION

In accordance to the World Health Organization (World Health Organization, 2017), common mental disorders can be specifically categorized into depressive and anxiety disorders. Globally, around 332 million and 264 million people have been reportedly suffering from depressive and anxiety disorders, respectively (World Health Organization, 2017). In terms of the global economy, these mental health issues account for USD 1 trillion every year (WHO, 2021b). Recent evidence from meta-analysis indicates that South Asian counties have a pooled prevalence of 26.4% and 25.8% for depressive and anxiety disorders, respectively, which is much higher than global estimations (Naveed et al., 2020). The first national survey (2003-2005) to evaluate the Bangladeshi population's mental health found that 16.1% of the adults have been suffering from mental illnesses (NIMH, 2007). In fact, as per the findings of a systematic review, 6.5% to 31.0% of Bangladeshi adults suffer from mental health problems (Hossain et al., 2014). A recent study by Hosen et al. (Hosen et al., 2021) conducted in Bangladesh, found that the pooled prevalence of depression was 47% (95% CI 39–55%) and anxiety was 47% (95% CI 39–54%) based on the cumulative results of 24 studies comprising of 49,806 individuals.

Patient satisfaction assesses the quality of care served by healthcare providers involving different facets such as the effectiveness of care, level of empathy, and the extent to which patients are happily satisfied with the healthcare services, both inside and outside of the physician's chamber (Prakash 2010; Xesfingi and Vozikis, 2016). Patient happiness is a strategic variable and a critical factor in the hospitals' long-term profitability and performance (Manzoor et al., 2019). Healthcare satisfaction is multi-dimensional since health is a human right; thus, emphasis on client-centered services should be advocated by health institutions so that they could be more responsive to the patient needs and deliver them improved quality of care (Coyle, 2008). Worldwide, the satisfaction of patients in all types of illnesses ranged from 72% in the developed nations to 60% in developing nations (Kassaw et al., 2020). It has been previously reported that patient's satisfaction with services plays a key process variable and quality indicator in the mental health treatment (Priebe & Miglietta, 2019). Patients experiencing satisfactory health services were more likely to adhere to treatment and also benefit from it, whereas unsatisfactory patients have experienced worse treatment outcomes (Smith et al., 2014). User attributes, as well as treatment and service features, might also influence the service satisfaction (Woodward et al., 2017).

Mental health problems are associated with social stigma and self-stigma, which act as barriers to the mental help-seeking behavior of individuals suffering from mental health issues, leading to a significantly greater public health concern (Stangl et al., 2019). Furthermore, anxiety and depression are specifically reported in individuals with multimorbidity (Gunn et al., 2012). Depression and anxiety, may occur collectively, meeting the criteria for both these conditions. It can be challenging to distinguish both these illnesses, but the necessity to identify and treat them is vital as they are significantly associated with high morbidity and mortality (Tiller, 2013). General practitioners plays an important role in identifying and treating these illnesses, and facilitating better mental health outcomes (Haque et al., 2021a).

Patients' or consumers' satisfaction is integral for the betterment of patients, the healthcare providers, and other third-party stakeholders in the healthcare settings. Ensuring consumers' satisfaction is a continuous goal for the healthcare providers. Hence, it is crucial that the actual state of consumer's satisfaction is known by them. Mental health issues linked to hospitalization distress, adverse events, and unsatisfactory treatment outcome. In addition, the role of patients' satisfaction with hospital services on mental health demands further exploration. However, to the best of our knowledge, no previous study has yet been conducted in Bangladesh to explore the mental health status of the hospitalized patients and investigate the role of satisfaction with hospital services from the management perspective.

METHODS

Study Design and Setting

A cross-sectional study was undertaken to gather data from hospitalized patients across six tertiary-level hospitals located in the capital city of Bangladesh, Dhaka. The study spanned from October 2020 to April 2021 and encompassed the following healthcare facilities: Dhaka Medical College and Hospital, National Institute of Cardiovascular Diseases, Shaheed Suhrawardy Medical College and Hospital, Asgar Ali Hospital, Ispahani Islamia Eye Institute and Hospital, and Square Hospital Ltd.

Sample Size Estimation

The sample size was calculated using the following formula shown below: Considering the wide range of diversity, variability, and characteristics of study population even if the population is unknown, in this context, Guilford and Fruchter (1973) recommended the use of this formula: $n=z^2pq/d^2$, Here, n=size of the sample; z=1.96, if level of significance=0.05;

p=target population, the value of p=0.5, q=1-p; (1-0.5) = 0.5; d=desired level of precision, level considered here 0.05. Therefore, the estimated sample size was 384. The target representative sample size (n) in this study was 401with a non-response rate of 4%.

Study Population

The study employed a rigorous selection process to recruit hospitalized patients as participants, while also implementing specific exclusion criteria to ensure the appropriateness and integrity of the study sample. Patients who met the following criteria were excluded from participation: those who were severely ill, hospitalized for more than four weeks, and individuals under the age of 18 years. This careful selection aimed to focus the study on a population of hospitalized patients whose experiences could provide valuable insights into satisfaction with hospital services and management.

To achieve a representative sample, the study utilized a multistage sampling approach, beginning with the identification of all public and private hospitals in Dhaka city. From this comprehensive list, three public hospitals and three private hospitals were randomly selected for inclusion in the study. Subsequently, three wards were randomly chosen from each selected hospital, ensuring a diverse representation of hospital settings.

In the final stage of sampling, the study assessed the list of hospitalized patients within the selected wards, establishing the sampling frame for participant recruitment. Employing a systematic sampling procedure, the study then selected participants from this frame, ensuring a fair and unbiased representation of patients across the selected hospitals and wards. The study successfully recruited a total of 201 patients from public hospitals and 200 patients from private hospitals, allowing for a comparative analysis of satisfaction levels between these two healthcare settings

Data Collection Tools and Techniques

Before commencing the study, verbal consent was obtained from the authorities of each hospital, demonstrating a commitment to ethical standards and respecting institutional guidelines. Building upon this foundation of ethical practice, efforts were made to establish rapport and trust with potential participants through personal visits to each hospital. During these interactions, the purpose and objectives of the study were transparently communicated, ensuring clarity and understanding among prospective participants.

Data collection was conducted using a structured questionnaire administered by skilled enumerators within the premises of the respective hospitals. Prior to administering the questionnaire, participants were briefed on the study's objectives and procedures, and a supportive and conducive environment for data collection. Clear instructions were provided to participants, and ample opportunity was given for any queries or concerns to be addressed, thus facilitating a comprehensive understanding of the questionnaire. To ensure linguistic and cultural appropriateness, the questionnaire was translated into Bangla and subjected to rigorous pre-testing. This iterative process allowed for refinement and modification of the questionnaire based on pre-test feedback, enhancing its clarity and relevance for the target population. Following data collection, meticulous attention was given to verifying the completeness, accuracy, reliability, and internal consistency of the collected data.

1.1.1 Socio-demographic Measures

Participants' socio-demographic information included gender, education level (no education, primary, secondary, tertiary), residence (urban or rural), healthcare source (public or private hospital), family type (nuclear or joint), occupation (unemployment, housewife, government job, private job, business, farmer, student, others), marital status (unmarried, married, others such as widow/separated/divorced), monthly family income (< 15,000 BDT = lower class, 15,000-30,000 BDT = middle class, > 30,000 BDT = higher class), and duration of hospital stay categorized as ≤10 days or >10 days.

1.1.2 Satisfaction with the Hospital Services

Satisfaction with hospital services was evaluated across various domains, each comprising multiple questions. These domains included basic healthcare facilities, the behavior of medical staff, quality of care, and healthcare service providers' practices.

Basic healthcare facilities encompassed aspects such as handwashing and toilet facilities, availability of drinking water, cleanliness, quality of food, medication supply, and lighting arrangements within the hospital premises.

The behavior of medical staff was assessed based on the conduct of doctors, nurses, medical technologists, and individuals responsible for registration records activities.

Quality of care focused on indicators such as the attention given by doctors during medical history-taking, duration of physical examinations, clarity in explaining medication and dosage to patients by doctors, and proficiency of nurses in utilizing medical equipment.

Healthcare service provider practices included observations such as adherence to hand hygiene protocols before touching patients, after handling patient fluids, before injections or blood sample collection, and before and after managing patient files.

Responses to these domains were collected using a five-point Likert scale ranging from 1 (strongly dissatisfied) to 5 (strongly satisfied). For analytical purposes, responses were further categorized into strongly dissatisfied and dissatisfied as one category, and strongly satisfied and satisfied as another category, facilitating a comprehensive analysis of satisfaction levels across different aspects of hospital services.

1.1.3 Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) was used to assess the depression and anxiety of the participants. The HADS is a widely used 14-item self-report instrument composed of two subscales: Anxiety (7 Items) and Depression (7 Items). Items are scored on a 4-point Likert scale ranging from 0 (no symptoms) to 3 (severe symptoms). Both subscales' scores can range from 0–21, with higher scores indicating greater levels of anxiety and depression. Subscales scores 0 to 7 indicated normal, 8 to 10 indicated borderline abnormal, and 11 to 21 indicated abnormal cases of anxiety and depression. A cut-offscore of ≥8 in the subscales indicated the presence of anxiety and depressive symptoms (Zigmond & Snaith, 1983).

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) version 25 was used to manage and analyze the data. A descriptive statistical analysis was used to assess the basic socio-demographic information and the level of healthcare satisfaction for hospitalized patients. Overall hospital satisfaction were considered as the dependent variables in this study. Logistic regression analysis was also conducted in this study. For bivariate regression, an unadjusted model was generated. All of the significant variables in bivariate analysis were considered in the adjusted model using multivariate regression analysis. The statistical tests were considered significant at $p<0.05$ with a 95% confidence interval (CI) for the crude and adjusted odds ratio.

Ethical Consideration

The Research Ethics Committee of the Faculty of Health and Life Sciences in Daffodil International University, Bangladesh, reviewed and approved this study. They delivered ethical clearance based on rigorous assessment. Before starting the data collection, administrative approval was also received from the appropriate authority of the respective hospitals. While meeting the participants, the data collectors clearly explained the background and objectives of the study and received the written informed consent from each of them afterward. Both anonymity and confidentiality were strictly maintained.

Results

Characteristics of the participants

The participant's age ranged from 18 to 94 years (Mean = 48.3, SD= 16.5 years). Out of the total 401 participants, 53.1% were female, 39.9% had secondary education, 55.9% resided in urban areas, and 55.9% belonged to nuclear families. Half of the respondents were admitted to public hospitals. About 31.9% were homemakers, 86.8% were married, and 68.6% had a monthly family income of more than 30,000 BDT. Most of the participants (96.3%) stayed in the hospital less than or equal to 10 days, whereas the mean days of hospital staying were (Mean ± SD= 4.79 ± 2.98days) (**Table 1**).

Table 1. Socio-demographic information of the participants

Variable		**N**	**%**
Socio-demographic information			
Age (Mean ± SD =48.3 ± 16.5 years)			
Gender			
	Male	188	46.9
	Female	213	53.1
Education			

	No education	24	6
	Primary	121	30.2
	Secondary	160	39.9
	Tertiary	96	23.9
Residence			
	Urban	224	55.9
	Rural	177	44.1
Healthcare seeking services			
	Public Hospital	202	50.4
	Private Hospital	199	49.6
Family type			
	Nuclear Family	224	55.9
	Joint Family	177	44.1
Occupation			
	Unemployment	50	12.5
	Housewife	128	31.9
	Government job	42	10.5
	Private job	79	19.7
	Business	59	14.7
	Farmer	20	5.0
	Student	16	4.0

	Others	7	1.7
Marital status			
	Unmarried	40	10.0
	Married	348	86.8
	Others	13	3.2
Monthly family income			
	Less than 15000	47	11.7
	15000 to 30000	79	19.7
	More than 30000	275	68.6
Hospital stays duration (Mean ± SD= 4.79 ± 2.98) days			
	≤10 days	386	96.3
	>10 days	15	3.7

Level of satisfactions among the participants

About 64.8% were satisfied with the basic healthcare facilities of the hospital, 73.3% were satisfied by the behavior of the medical staff, 66.6% were satisfied with the quality of care, and 62.8% were satisfied with the healthcare service provider's practice **(Table 2)**.

Table 2: Level of satisfactions among the participants

Level of healthcare satisfaction		**N**	**%**
Basic healthcare facilities			
	Dissatisfied	7	1.7
	Neutral	134	33.4

	Satisfied	260	64.8
Behavior of medical staff			
	Dissatisfied	8	2.0
	Neutral	99	24.7
	Satisfied	294	73.3
Quality of care			
	Dissatisfied	13	3.2
	Neutral	121	30.2
	Satisfied	267	66.6
Healthcare service provider's practice			
	Dissatisfied	7	1.7
	Neutral	142	35.4
	Satisfied	252	62.8

Prevalence of depression and anxiety

Figure 1 shows the level of depression and anxiety among hospitalized patients. Out of total 401 patients, the prevalence of depression was 25.2% (n=101), where 15.7% (n=63) were in borderline abnormal depression and 9.5% (n=38) in abnormal depression. About 27.7% (n=111) of the participants were anxious, where 18.7% (n=75) had borderline abnormal anxiety and 9.0% (n=36) abnormal anxiety.

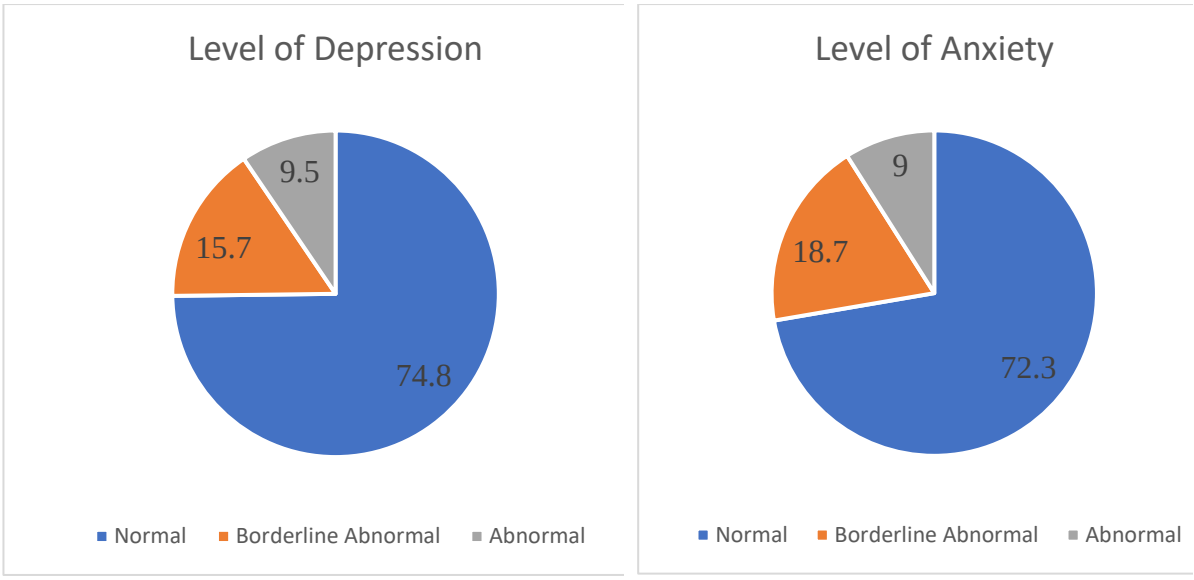

Figure 1. Prevalence of depression and anxiety among hospitalized patients

Overall level of patients satisfaction

Figure 2 shows that among the participants, a substantial majority, comprising 66.9%, expressed satisfaction with healthcare services. A smaller proportion, representing 31%, reported feeling neutral about their satisfaction level, while a minority of 2.1% indicated dissatisfaction with healthcare services.

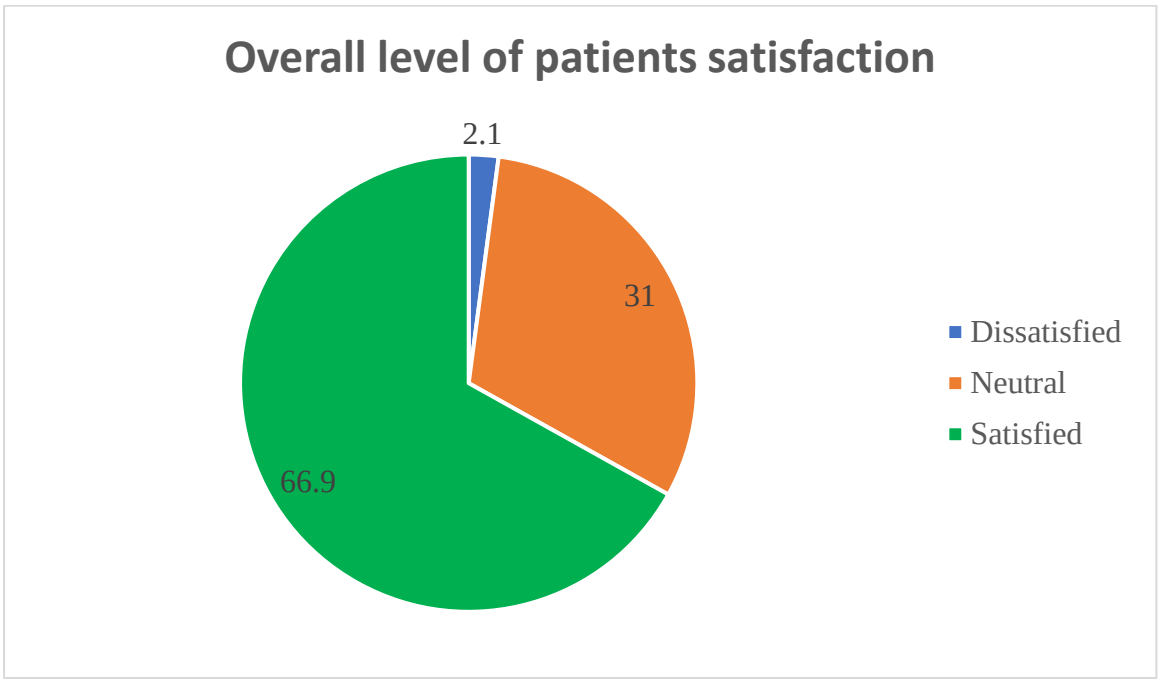

Figure 2. Overall level of patients satisfaction Factors associated with patient's satisfactions

Association between the studied variables and patient's satisfactions

Table 3 showed the factors associated with patient satisfactions against the studied variables. Considering the unadjusted model, we observed that gender, education level, place of residence, and healthcare-seeking behavior did not demonstrate any significant correlation with patient satisfaction. However, an intriguing finding emerged regarding family structure, as individuals from nuclear families exhibited a lower likelihood of satisfaction with healthcare compared to those from joint family setups. Furthermore, our logistic regression analysis revealed noteworthy insights. Participants from middle-class backgrounds exhibited a 2.7-fold (95% CI: 1.493 – 4.890) higher likelihood of satisfaction with healthcare, while those from high-class families demonstrated 1.9 times (95% CI: 0.900 – 3.999) higher likelihood. Additionally, patients who stayed in healthcare facilities for more than ten days expressed lower levels of satisfaction compared to those with shorter stays. Moreover, our investigation into mental health factors indicated substantial associations with patient satisfaction. Specifically, individuals without symptoms of depression exhibited approximately 10 times (95% CI: 1.294 – 84.365) higher satisfaction with healthcare services, while those without anxiety showed 2.4 times (95% CI: 0.401 – 14.485) increase in satisfaction levels.

Table 3: Logistic regression between the studied variables and patient's satisfactions

Variables	**Unadjusted model**			**Adjusted model**		
	Crude Odds ratio (COR)	**95% Confidence Interval (CI)**	***p*-value**	**Adjusted odds ratio (AOR)**	**95% Confidence Interval (CI)**	***p*-value**
Gender						
Male	0.981	0.625 – 1.542	0.935	-	-	
Female	Ref.					
Education						
No education	1.386	0.545 – 3.528	0.201	-	-	
Primary	0.602	0.324 – 1.118		-	-	
Secondary	0.720	0.408 – 1.270		-	-	
Tertiary	Ref.			-	-	
Residence						
Urban	1.149	0.728 – 1.814	0.550	-	-	
Rural	Ref.			-	-	
Healthcare seeking services						

Public hospital	0.772	0.491 – 1.214	0.262	-	-	
Private hospital	Ref.					
Family type						
Nuclear	0.605	0.389 – 0.939	0.025	0.537	0.330 – 0.874	0.012
Joint	Ref.					
Marital status						
Unmarried	2.086	0.397 – 10.959	0.685	-	-	
Married	1.862	0.405 – 8.562		-	-	
Others	Ref.					
Monthly family income						
More than 30000	1.495	0.740 – 3.021	0.002	1.897	0.900 – 3.999	0.003
Between 15000 to 30000	2.663	1.557 – 4.553		2.702	1.493 – 4.890	
Less than 15000	Ref.			Ref.		
Hospital stays duration						
>10 days	0.075	0.021 – 0.271	<0.001	0.057	0.015 – 0.218	<0.001
≤10 days	Ref.			Ref.		
Depression						
No	8.760	1.731 – 44.338	0.025	10.449	1.294 – 84.365	0.035
Yes	Ref.			Ref.		
Anxiety						
No	4.503	1.426 – 14.223	0.037	2.409	0.401 – 14.485	0.046
Yes	Ref.			Ref.		

2 Discussion

This is the first study to investigate the status of mental health problems and level of satisfaction with the hospital services, among the hospitalized patients at tertiary level hospitals in Bangladesh. Results showed that the prevalence of depression and anxiety was 25.2% and 27.7%, respectively. Furthermore, regarding satisfaction with the hospital healthcare services, it was found that about 64.8% were satisfied with the basic healthcare facilities of the hospital,

73.3% were satisfied with the behavior of the medical staff, 66.6% were satisfied with the quality of care, and 62.8% were satisfied with the healthcare service providers' practice.

It has been reported that about 28.47% were suffering from depression, and 34.72% had anxiety symptoms (Kong et al., 2020). Evidence from China suggested that about 41.5% were having anxiety symptoms (26.3% of patients were borderline cases, and 15.2% patients were abnormal), and 50.5% were suffering from depressive symptoms (21.2% patients were borderline cases, and 29.3% patients were abnormal) (Li et al., 2021). Therefore, it is urgent to take mental health initiatives by the relevant authorities to support the hospitalized patients.

The present findings revealed that most of the patients were satisfied with the services provided by the hospital, which is similar to other studies (Woldeyohanes et al., 2015; Assefa et al., 2011; Ambelie et al., 2014). About 64.8% were satisfied with the basic healthcare facilities, whereas in Ethiopia, a recent study has found that approximately 37.7% of the participants were satisfied with the hospital services (Asamrew et al., 2020). But a higher percentage of satisfaction was reported from a specialized university hospital, whereof, 77% were satisfied with the services provided (Assefa et al., 2011). A slightly lower rate of satisfaction level was reported in another study, where 61.9% were satisfied with hospital outpatient services (Woldeyohanes et al., 2015). Additionally, 76.7% level of satisfaction was reported with the ward's cleanliness, and 78.3% anticipated the same services they got (Woldeyohanes et al., 2015). Likewise, more than half of the respondents reported satisfaction with the hospital environment and power supply maintenance, 51.8% and 62.4%, respectively (Obi et al., 2018). Medical staff such as doctors, nurses, physician behavior was also considered in the healthcare satisfaction level. Consistent with other studies, the present study has also received professional and courteous behavior from the medical staff (Obi et al., 2018; Asamrew et al., 2020).

The findings of this study provide valuable insights into the level of satisfaction among hospitalized patients in tertiary level hospitals in Bangladesh, with a particular focus on the management perspective. Our analysis revealed several significant associations between various socio-demographic factors, mental health status, and patient satisfaction with healthcare services. Consistent with previous research, socio-economic status emerged as a significant determinant of patient satisfaction. Our results indicated that individuals from middle-class backgrounds exhibited a notably higher likelihood of satisfaction compared to those from lower-income backgrounds. This finding resonates with studies conducted in other settings, such as a study by Kruk et al. (2017), which found that patients from wealthier

households reported higher satisfaction levels with healthcare services. Interestingly, while patients from high-class families also demonstrated a higher likelihood of satisfaction, the effect was slightly less pronounced compared to those from middle-class backgrounds. This nuanced difference suggests that socio-economic factors play a complex role in shaping patient perceptions of healthcare quality. Similar observations were made in a study by Zarei et al. (2015), which highlighted the influence of socio-economic status on patient satisfaction in Iranian hospitals. Moreover, our analysis identified the duration of hospital stay as a significant factor influencing patient satisfaction. Specifically, patients who stayed in healthcare facilities for more extended periods expressed lower levels of satisfaction compared to those with shorter stays. This finding underscores the importance of efficient and timely delivery of healthcare services, as prolonged hospitalization can negatively impact patient experiences, as noted in research by Suhonen et al. (2012). Additionally, our investigation into mental health factors revealed substantial associations with patient satisfaction. Specifically, individuals without symptoms of depression exhibited significantly higher satisfaction with healthcare services compared to those with depressive symptoms. This aligns with prior research demonstrating the detrimental effect of depression on patient perceptions of care quality (Sharpe et al., 2010). Similarly, patients without anxiety symptoms also demonstrated higher satisfaction levels, although the effect was somewhat attenuated. This underscores the interconnectedness of mental health and patient experiences within the healthcare setting, as highlighted by studies such as that by Aydemir et al. (2018).

The limitations of the present study have been addressed. Firstly, due to the cross-sectional study design, the causal relationship between the studied variables and patients' satisfactions was not attained. Secondly, the data collection method may have given rise to undesirable bias. Finally, lack of generalization is another drawback as the study participants were solely from Dhaka city only.

3 Conclusions

This research highlighted some significant markers in regard to the patients' satisfaction with healthcare services and their mental health status. The study revealed that about two-thirds of the participants were satisfied with the basic hospital facilities, quality of care, and HCP practices, and three-fourths of them were pleased with the behavior of the medical staff. Based on the current findings of this study, the following recommendations are made for dealing with causal hospitalized patients during the pandemic situation: (i) mass-awareness programs

addressing depression and anxiety during the pandemic time should be adopted; (ii) a standard level of hospital facilities and hygienic environment need to be maintained for the hospitalized patients; thereby, the study findings may help to formulate adequate policy interventions to improve the situation; (iii) and lastly, future studies with a larger sample size may be conducive in understanding the depth of the problem in a broader context.

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Conflict of Interest

The authors of the research work do not have any conflict of interest.

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A Study of outsourcing of Transportation & Warehousing Services to 3PL's by Automobile Industry in Pune Region

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Abstract

Outsourcing transportation and warehousing services to third-party logistics (3PL) providers is a common practice in various industries, including the automobile sector in the Pune region. This research aims to investigate the perceived benefits and challenges associated with outsourcing logistics services to 3PLs in the automobile industry within the Pune region. The study employs a quantitative research methodology, collecting data through surveys administered to employees working in automobile companies that utilize 3PL services. The findings reveal that outsourcing transportation and warehousing services to 3PLs is perceived to bring significant benefits in terms of improving supply chain efficiency, reducing logistics costs, enhancing focus on core business activities, and improving delivery timeliness and reliability. However, challenges such as communication issues, difficulties in maintaining control over logistics operations, concerns about data security, and alignment issues with company-specific requirements are also evident. These findings provide valuable insights for automobile companies in the Pune region to make informed decisions regarding outsourcing logistics services to 3PL providers.

Keywords: Outsourcing, Third-party logistics (3PL), Transportation, Warehousing, Automobile industry, Pune region.

Introduction

Industries are increasingly turning to third-party logistics providers (3PLs) to outsource their transportation and warehousing services. This is seen as a crucial strategy to improve the efficiency of their supply chain operations. Within the intricate web of suppliers, manufacturers, distributors, and retailers that make up the car business, the effectiveness of

transportation and storage is crucial for achieving operational efficiency, cost-effectiveness, and customer happiness. The Pune region, recognised as a significant automotive centre in India, represents a small-scale version of this ever-changing industry landscape. Pune, a city with a large presence of automotive manufacturers, suppliers, and service providers, has experienced notable advancements in logistics methods throughout time. This transition is marked by an increasing dependence on third-party logistics providers (3PLs) to handle shipping and warehousing operations. This allows automotive firms to concentrate on their main strengths while taking use of the knowledge and infrastructure of specialised logistics partners. The decision to outsource transportation and warehousing services to third-party logistics providers (3PLs) is based on many factors. Firstly, it enables automotive businesses to take use of the specialised talents and resources of logistics providers, who offer industry-specific experience, sophisticated technology, and cost efficiencies. Automotive companies may expand their range of services, such as route optimisation, inventory management, packaging, and distribution, by outsourcing logistics operations to external partners. This allows them to avoid the need for investing in specific equipment or staff. Furthermore, the use of third-party logistics (3PLs) for outsourcing provides the automotive sector with the important advantages of flexibility and scalability, which are essential factors to consider due to the ever-changing nature of the business. Changes in demand, seasonal patterns, and market conditions frequently need quick adaptations to logistics strategies and capacity. Third-party logistics providers (3PLs), equipped with flexible and easily adjustable procedures and solutions, allow automotive firms to quickly adjust to changing market conditions without incurring the fixed expenses associated with managing logistics in-house. Additionally, the act of outsourcing transportation and storage services is in line with the prevailing trend of strategic alliances and collaborative supply chain models that are common in the automobile industry. By establishing mutually beneficial partnerships with third-party logistics providers (3PLs), automotive businesses may cultivate harmonious cooperation, optimise processes, and strengthen the overall resilience of their supply chain. This cooperative method allows for the joint effort in reducing risks, promoting innovation, and implementing ongoing improvement projects, which in turn leads to the production of long-lasting value throughout the supply chain network. Although the advantages of outsourcing to third-party logistics providers (3PLs) are convincing, the process of making decisions is not without difficulties and intricacies. When assessing outsourcing possibilities, automotive businesses must carefully analyse many factors such as cost implications, service quality, regulatory compliance, and risk management. Furthermore, the process of choosing and overseeing 3PL partners necessitates thorough

examination and meticulousness to guarantee that they are in line with strategic goals and performance standards. In light of this context, the objective of this study is to investigate the practice of delegating transportation and warehousing services to third-party logistics providers (3PLs) by the automotive sector in the Pune region. The research aims to offer significant insights into the changing dynamics of automobile logistics management.

Review of Literature

Power, Sharafali, and Bhakoo (2007) enhance comprehension of the outsourcing environment by examining how clients view the contributions of third-party logistics (3PL) providers in attaining the purported advantages of outsourcing. Their research, which centres on the condition of the third-party logistics (3PL) market in Australia, defines the usual business results anticipated from outsourcing logistics and analyses the evaluations given by clients about the impact of their main 3PL providers on these performance measures. The authors employ regression analysis to examine how the competitive priorities, services, and technology of 3PLs might be used to predict consumer happiness. The results indicate that clients place considerable importance on the services and technology provided by third-party logistics providers (3PLs), highlighting aims that go beyond just reducing costs. Although the study focuses solely on Australia, its results have broader relevance to the discussion on outsourcing in the transportation and warehousing services sector. The findings align with the aims of the planned research on outsourcing in the car sector in the Pune region by emphasising the significance of service-oriented solutions and the ability of 3PLs to help organisations compete on other aspects beyond just cost. This literature emphasises the importance of analysing customer perceptions and the additional value provided by 3PL services in the context of outsourcing transportation and warehousing. It establishes a theoretical basis for understanding the dynamics and consequences of such arrangements in the specific research setting.

Ansari and Modarress (2010) examine the difficulties associated with outsourcing logistics to third-party providers, with a specific emphasis on the viewpoint of shippers. The study analyses the main challenges that shippers have while using Third-Party Logistics (3PL) services. This is done by conducting postal surveys and personal interviews with shippers and executives from 3PL providers. The challenges encompass the task of locating a third-party logistics provider (3PL) that possesses capabilities that are in line with the shipper's precise logistics requirements, the potential mismatch of information systems between shippers and 3PLs, apprehensions regarding the 3PLs' capacity to accommodate the shipper's future growth

demands, and concerns related to security. The report offers significant insights to shippers and gives practical strategies to reduce these difficulties. This study emphasises the intricate and diverse characteristics of outsourcing logistical tasks to third-party providers. It highlights the significance of dealing with concerns like interoperability, scalability, and security when choosing and overseeing 3PL relationships. This literature provides a critical perspective on the potential challenges and factors that automotive companies may face when they outsource transportation and warehousing services to third-party logistics providers (3PLs) in the Pune region. Comprehending and tackling these difficulties are crucial for formulating ways to enhance the outsourcing process and maximise the advantages of working with third-party logistics providers in the specific research environment.

Vasiliauskas and Jakubauskas (2007) emphasise the importance and advantages of the third-party logistics (3PL) method in overseeing logistics supply chains, highlighting its central position in modern logistics operations. The notion of 3PL, which emerged from the outsourcing trends in the transport industry, has become a crucial aspect of effective logistics management. It improves the performance of hauliers and forwarders by expanding logistical services to external providers. 3PL providers have mostly emerged in response to the need from major transportation businesses to expand their service offerings throughout the full transportation process. Originally focusing on forwarding services, which involved the physical transportation of goods, the industry has now expanded to include a wider range of logistical services. This evolution has resulted in a more comprehensive responsibility for the entire transportation process, from the production of goods to their final consumption. This significant change represents a move from conventional transportation services to comprehensive logistics solutions, where firms provide integrated logistical services. This allows clients to concentrate on their main business operations while relying on specialised logistics partners to handle material flows. This shift in perspective emphasises the transformation of the transportation sector towards a focus on logistics, emphasising the importance of third-party logistics (3PL) services in making supply chain operations more efficient and enabling strategic outsourcing efforts. This literature offers a fundamental understanding of the principles that drive the adoption of 3PL services and highlights the value proposition of comprehensive logistics solutions in improving operational efficiency and business performance. It is relevant to the proposed study on outsourcing transportation and warehousing services to 3PLs in the automobile industry in the Pune region. It is crucial for automotive firms in Pune to comprehend the fundamental concepts and advantages of the 3PL

method. This will enable them to enhance their logistics strategies and utilise external knowledge to get a competitive edge in the ever-changing marketplace.

Mitra (2006) offers valuable insights on the growing importance of third-party logistics (3PL) or logistics outsourcing, especially for businesses globally who are dealing with the challenges of managing complicated supply chains. Organisations are relying more on 3PL providers for logistical services in order to improve their core business operations, reduce costs, and improve delivery performance and customer satisfaction. In 2003, the worldwide revenue for third-party logistics (3PL) reached $141 billion. It was expected to increase to $300 billion by 2006, with the United States being the dominant player, holding around 60% of the global market share. Nevertheless, the 3PL business in India is now in its early stages and is marked by a significant level of fragmentation. Notwithstanding these difficulties, the 3PL business in India has significant opportunities for expansion, with an expected annual growth rate of over 20%. The survey undertaken in this report sought to assess the Indian 3PL market, including its potential for development, possibilities, and risks. The results indicated that the market is divided into smaller segments, with a few of participants generating the majority of the overall income in third-party logistics (3PL). Despite the dispersion in the industry, the revenue and cargo volume handled by respondents showed significant growth rates, highlighting the growing need for outsourced logistics services in India. Nevertheless, the sector's expansion is hindered by major obstacles such as inadequate transport and communications infrastructure. On the other hand, there is a substantial possibility for growth due to the rising knowledge among Indian enterprises about the advantages of logistics outsourcing. This paper provides a comprehensive analysis of the changing 3PL market in India, presenting vital information on the industry's difficulties and possibilities. This literature emphasises the importance of comprehending the distinct dynamics of the Indian 3PL market and its potential consequences for automotive logistics outsourcing strategies in the Pune region. It is in the context of a proposed study on outsourcing transportation and warehousing services to 3PLs by the automobile industry. It is crucial for automotive businesses in Pune to understand the development and difficulties of the Indian 3PL sector in order to properly utilise outsourcing relationships and adapt to the changing logistics environment.

Aktas, Agaran, Ulengin, and Onsel (2011) provide a thorough examination of logistics outsourcing methods in Turkey. They investigate the viewpoints of organisations who outsource their logistics services and those that handle these responsibilities internally. The study employs a descriptive research technique and focuses on the top 500 enterprises that are

registered with industrial organisations and chambers of commerce in Turkey. By conducting a systematic survey among logistics managers of these companies, valuable information is obtained from 287 participants, resulting in a response rate of 58%. Out of them, 204 organisations opt to outsource logistics services, while 83 companies choose to keep these tasks in-house. The findings provide light on several facets of logistics outsourcing, such as the types of services that are outsourced and intended for future outsourcing, the obstacles faced, the costs associated with logistics, the individuals responsible for making outsourcing decisions, and the sources of information that influence the decision-making process. The paper suggests a decision support system based on Bayesian Causal Map technique specifically designed for third-party logistics providers (3PLs). This system provides recommendations for service offerings in various industries. This groundbreaking study contributes to the comprehension of the reasons and considerations that influence logistics outsourcing decisions in Turkey. It emphasises the importance of issues such as logistical costs, order fulfilment, and service development. Additionally, the survey indicates that organisations who outsource logistics activities view third-party logistics providers (3PLs) as providing inadequate value in relation to the cost. The study's uniqueness stems from its examination of outsourcing perceptions in many industries and its creative application of Bayesian Causal Map technique to guide 3PL plans and operational objectives, with the goal of enhancing competitive advantage. This literature provides valuable insights into the dynamics of logistics outsourcing practices in the context of the proposed study on outsourcing transportation and warehousing services to 3PLs by the automobile industry in the Pune region. It sheds light on the challenges, motivations, and decision-making processes that are common among companies in Turkey. Comprehending these subtle distinctions is essential for automotive businesses in Pune that want to effectively manage outsourcing relationships and enhance supply chain performance in a competitive market.

Parashkevova (2007) highlights the importance of logistics outsourcing as a strategic method for organisations to achieve and maintain competitive advantages in the marketplace. The logistics paradigm promotes the integration of different units in the delivery supply chain into a unified system, enabling efficient management of material and information flows to achieve desired results with the best use of time and resources. Adopting modern logistics management strategies improves how well an organisation functions, and outsourcing plays a crucial role in making this possible. Outsourcing logistics offers several advantages, such as inventory reduction, shorter order-to-delivery times, higher quality, more production flexibility, and

lower production costs. These benefits contribute to faster capital turnover and better delivery quality. These results combined provide organisations a clear advantage over their competitors. By delegating logistical responsibilities to external parties, organisations may effectively devote resources to areas where they have unique strengths and can successfully compete, thereby improving their total competitiveness. This discussion emphasises the strategic significance of logistics outsourcing in promoting competitive advantages for organisations, emphasising its role in optimising resource allocation, improving operational efficiency, and strengthening market positioning. This literature highlights the significant impact that outsourcing transportation and warehousing services to third-party logistics providers may have on the car sector in the Pune region. It emphasises how logistics outsourcing has the ability to drive competitive excellence. It is crucial for automotive firms in Pune to comprehend the consequences of logistics outsourcing as a strategic need. This understanding will enable them to utilise external knowledge and optimise supply chain operations in order to achieve a long-lasting competitive advantage in the ever-changing automotive industry.

In their 2015 study, Garg, Agarwal, and Jha discuss the growing worries about e-waste and the recently implemented rules. These requirements now require the manufacturing industry to use product recovery techniques inside closed-loop supply chains (CLSCs). Integrating recovery activities into supply chains can reduce efficiency, thus it may be necessary to outsource non-value-added services to third-party logistics providers (3PLs) in order to improve overall performance. The study suggests a universal Closed-Loop Supply Chain (CLSC) network that incorporates the subcontracting of transportation services from Third-Party Logistics (3PLs) providers into the early phases of the forward channel. The process of selecting 3PL providers is made easier by using the analytical hierarchy process (AHP) to evaluate weights based on established criteria. Afterwards, a problem is developed using fuzzy biobjective mixed-integer linear programming. This problem aims to find the best balance between minimising costs and maximising the performance of outsourced services, while also optimising flow within the network. The authors have created a mathematical model in a fuzzy environment to successfully deal with the uncertainties that are inherent in the globalised world. The validity of the proposed model is confirmed by conducting a practical case study using fuzzy multi-objective methodologies. This study demonstrates that the model is suitable and efficient in dealing with the intricate decision-making difficulties related to logistics outsourcing and the selection of third-party logistics providers (3PLs) in integrated closed-loop supply chains (CLSCs). This research enhances the comprehension and use of effective and durable supply

chain strategies in response to changing legal and environmental demands. It emphasises the significance of outsourcing and the careful selection of third-party logistics providers in optimising closed-loop supply chain operations. This literature provides valuable insights into the use of analytical methods and fuzzy techniques for decision-making in logistics outsourcing within closed-loop supply chains. It emphasises the importance of optimising performance and reducing uncertainties to achieve sustainable supply chain management practices. The study focuses on the automobile industry in the Pune region and its proposed outsourcing of transportation and warehousing services to third-party logistics providers (3PLs).

Khan et al. (2017) enhance the existing information on outsourcing and the choice of third-party logistics (3PL) service providers by specifically examining the situation in Pakistan. This research focuses on examining the factors that motivate companies to outsource and the precise criteria they use to choose third-party logistics (3PL) providers in Pakistan, across diverse industries. Unlike prior studies performed in other countries, this study is specially tailored to the context of Pakistan. The researchers collect data from manufacturers in several industries in Pakistan and use mean testing to evaluate the characteristics based on their value. The examination of data collected from 125 participants indicates that the main driving force behind the outsourcing of 3PL services is the need to lower logistical expenses. Additionally, the most crucial factor in choosing 3PL providers in Pakistan is the level of service quality. The study provides insights into the factors that influence outsourcing choices and the selection of third-party logistics (3PL) providers. However, the authors recommend that future research should investigate the effects of outsourcing logistics operations on organisational performance using both qualitative and quantitative methods. This study provides valuable insights for Pakistani organisations facing challenges in making decisions about outsourcing and selecting third-party logistics (3PL) providers. It fills a gap in the current body of literature by specifically focusing on the distinct organisational views within the setting of Pakistan. This report offers helpful guidance for Pakistani organisations as they navigate complicated logistics choices in a fast changing business environment by explaining the causes and factors that influence outsourcing and 3PL selection.

Zacharia, Sanders, and Nix (2011) explore the changing role of third-party logistics providers (3PLs) as coordinators in modern supply chains. The text emphasises the growing need for connection and communication in supply chains, which has caused 3PLs to expand their position from just providing logistical skills to becoming orchestrators responsible for developing and maintaining competitive advantages. The authors utilise theoretical views from

resource-based theory, network theory, and transaction cost economics, together with a thorough literature assessment, to construct a model consisting of seven assertions. In addition, the study provides empirical evidence for the model and propositions by conducting structured interviews with industry leaders from a well-known third-party logistics (3PL) company. The report outlines the key aspects of the orchestrator function that is taken on by 3PLs. This research enhances our knowledge of the changing dynamics within supply chains, by highlighting the influential role of third-party logistics providers (3PLs) in promoting competitive advantages for organisations. This literature highlights the strategic significance of 3PLs in managing supply chain operations and achieving competitive advantage in the car sector in the Pune region, specifically in relation to outsourcing transportation and storage services. It is crucial for automotive firms in Pune to comprehend the changing role of 3PLs as coordinators. This understanding will help them utilise external logistics knowledge and enhance supply chain efficiency, therefore gaining a long-lasting competitive advantage in the ever-changing industry.

Kmiecik (2022) highlights the continued focus in both research and the industry on the significance of third-party logistics (3PL) organisations and the progression towards synchronised logistics networks. This study examines the ability of third-party logistics (3PL) companies to provide accurate predictions of demand in order to improve cooperation in logistics, namely in the areas of inventory management and transportation planning. The study analyses the outcomes of demand forecasting techniques used in 29 chosen distribution networks. These tools include classic forecasting approaches such time series exponential smoothing, ARIMA, machine learning, and neural-network-based methods, all implemented in the R programming environment. Afterwards, the predicted results are contrasted in the specific fields of transportation planning and inventory management, specifically under the conditions of dynamic ABC analysis. The study demonstrates that demand forecasting is crucial in facilitating the inventory management and transportation planning tasks of third-party logistics providers (3PLs), hence improving the coordination of logistics across distribution networks. In order to convert forecasting results into practical insights for ABC analysis and transportation planning, the study proposes the creation of cloud-based systems that incorporate data from warehouse management systems (WMS). These systems should also include visualisation tools such as business intelligence (BI) solutions or managerial information dashboards. The study highlights the centralised network model with 3PLs as an effective way to logistics coordination. This model involves 3PLs planning and executing

logistics operations, allowing them to create customised predictions for different distribution network types and aggregations. This feature not only improves coordination in distribution networks but also raises the value of the logistics process. To summarise, the research highlights the crucial importance of third-party logistics providers (3PLs) in promoting coordination in logistics operations. This is achieved through activities such as demand forecasting, inventory management, and transportation planning. As a result, 3PLs play a significant role in enhancing the sustainability and efficiency of distribution networks.

Overall, the literature review provides valuable information on different aspects of outsourcing transportation and warehousing services to third-party logistics (3PL) providers. This includes the reasons why companies choose to outsource, the factors they consider when selecting a 3PL, the changing role of 3PLs as coordinators in supply chains, and the potential for 3PLs to improve logistics coordination through activities like demand forecasting, inventory management, and transportation planni However, despite the extensive research conducted in this field, there is a significant research vacuum when it comes to thoroughly studying the operational and strategic consequences of outsourcing logistics tasks to third-party logistics providers (3PLs), especially within certain geographic regions or sectors. Future research should prioritise empirical investigation into the effects of logistics outsourcing on organisational performance. This includes examining the effectiveness of various outsourcing strategies and identifying the most effective practices for collaborating with third-party logistics providers. By doing so, we can fill the existing research gap and gain a better understanding of the complexities and dynamics of logistics outsourcing in different situations.

Objectives of the study

1. To evaluate the perceived benefits associated with outsourcing transportation and warehousing services to 3PLs in the automobile industry within the Pune region.
2. To understand the challenges associated with outsourcing transportation and warehousing services to 3PLs in the automobile industry within the Pune region.

Hypotheses

H1: Outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region results in perceived benefits for companies.

H2: Outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region poses significant challenges for companies.

Research Methodology

In this study, a quantitative research methodology was employed to assess the perceived benefits and challenges associated with outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region. The study utilized a structured questionnaire as the primary data collection instrument, which was distributed to a sample of 233 employees in various automobile companies operating in Pune. The questionnaire consisted of items designed to measure respondents' perceptions of the benefits and challenges of outsourcing to 3PLs. The data collected were analysed using statistical techniques, including descriptive statistics to summarize the perceived benefits and challenges, and inferential statistics. The research methodology ensured a systematic and rigorous approach to investigating the research objectives, allowing for the comprehensive evaluation of the perceived benefits and challenges of outsourcing transportation and warehousing services to 3PLs in the Pune region's automobile industry.

Data Analysis

Table 1. Age

		Frequency	Percent
Valid	18 to 25 years	9	3.9
	26 to 35 years	38	16.3
	36 to 45 years	97	41.6
	46 to 55 years	76	32.6

	Above 55 years	13	5.6
	Total	233	100.0

Table 1 presents the distribution of respondents' age groups in the study sample. The majority of respondents fall within the age range of 36 to 45 years, constituting 41.6% of the total sample. Following this, respondents aged 46 to 55 years represent the second-largest group, comprising 32.6% of the sample. Those aged 26 to 35 years account for 16.3% of the respondents, while individuals aged 18 to 25 years and above 55 years make up smaller proportions at 3.9% and 5.6%, respectively. Overall, the data indicate a relatively balanced distribution across age groups, with a notable concentration in the middle-age categories, suggesting a diverse representation of age demographics within the study population.

Table 2. Gender

		Frequency	Percent
Valid	Male	194	83.3
	Female	39	16.7
	Total	233	100.0

Table 2 displays the gender distribution among the respondents in the study sample. The majority of respondents identify as male, comprising 83.3% of the total sample, while the remaining 16.7% identify as female. This indicates a significant gender imbalance within the study population, with a much larger representation of males compared to females.

Table 3. Outsourcing transportation and warehousing services to 3PLs has improved the efficiency of our supply chain operations.

	Frequency	Percent

Valid	Firmly Disagree	18	7.7
	Disagree	15	6.4
	Neutral	14	6.0
	Agree	85	36.5
	Firmly Agree	101	43.3
	Total	233	100.0

Table 3 presents the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has improved the efficiency of our supply chain operations." The majority of respondents either agree (36.5%) or firmly agree (43.3%) with the statement, indicating that a significant proportion perceives outsourcing to 3PLs as beneficial for enhancing supply chain efficiency. Conversely, a smaller proportion of respondents either disagree (6.4%) or firmly disagree (7.7%), while a minor percentage remains neutral (6.0%) on the matter. Overall, the data suggest a favorable perception among respondents regarding the positive impact of outsourcing transportation and warehousing services to 3PLs on supply chain efficiency.

Table 4. Outsourcing transportation and warehousing services to 3PLs has reduced our overall logistics costs.

		Frequency	Percent
Valid	Firmly Disagree	34	14.6
	Disagree	25	10.7
	Neutral	18	7.7
	Agree	92	39.5
	Firmly Agree	64	27.5

	Total	233	100.0

Table 4 illustrates the responses regarding the statement "Outsourcing transportation and warehousing services to 3PLs has reduced our overall logistics costs." The data indicate that a considerable portion of respondents either agree (39.5%) or firmly agree (27.5%) with the statement, suggesting a prevalent perception among respondents that outsourcing to 3PLs has led to cost reductions in logistics operations. Conversely, a smaller proportion of respondents either disagree (10.7%) or firmly disagree (14.6%) with the statement. Additionally, a minor percentage of respondents remain neutral (7.7%) on the matter. Overall, the data imply a generally positive sentiment regarding the cost-saving benefits associated with outsourcing transportation and warehousing services to 3PLs.

Table 5. Outsourcing transportation and warehousing services to 3PLs has enhanced our ability to focus on core business activities.

		Frequency	Percent
Valid	Firmly Disagree	17	7.3
	Disagree	30	12.9
	Neutral	17	7.3
	Agree	94	40.3
	Firmly Agree	75	32.2
	Total	233	100.0

Table 5 displays the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has enhanced our ability to focus on core business activities." The data reveal that a significant proportion of respondents either agree (40.3%) or firmly agree (32.2%) with the statement, indicating a prevailing perception that outsourcing to 3PLs enables companies

to concentrate more effectively on their core business operations. Conversely, a smaller percentage of respondents either disagree (12.9%) or firmly disagree (7.3%) with the statement. Additionally, a minor portion of respondents remain neutral (7.3%) on the issue. Overall, the findings suggest a positive perception among respondents regarding the role of outsourcing transportation and warehousing services to 3PLs in facilitating a greater focus on core business activities.

Table 6. Outsourcing transportation and warehousing services to 3PLs has improved the timeliness and reliability of deliveries.

		Frequency	Percent
Valid	Firmly Disagree	31	13.3
	Disagree	24	10.3
	Neutral	9	3.9
	Agree	91	39.1
	Firmly Agree	78	33.5
	Total	233	100.0

Table 6 presents the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has improved the timeliness and reliability of deliveries." The data indicate that a substantial proportion of respondents either agree (39.1%) or firmly agree (33.5%) with the statement, suggesting a prevailing perception that outsourcing to 3PLs has positively impacted the timeliness and reliability of deliveries. Conversely, a smaller percentage of respondents either disagree (10.3%) or firmly disagree (13.3%) with the statement. Additionally, a minor portion of respondents remain neutral (3.9%) on the matter. Overall, the findings imply a generally positive sentiment regarding the role of 3PLs in enhancing the timeliness and reliability of deliveries through outsourcing transportation and warehousing services.

Table 7. Outsourcing transportation and warehousing services to 3PLs has increased customer satisfaction levels.

		Frequency	Percent
Valid	Firmly Disagree	28	12.0
	Disagree	15	6.4
	Neutral	15	6.4
	Agree	83	35.6
	Firmly Agree	92	39.5
	Total	233	100.0

Table 7 depicts the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has increased customer satisfaction levels." The data illustrate that a significant proportion of respondents either agree (35.6%) or firmly agree (39.5%) with the statement, suggesting a predominant perception that outsourcing to 3PLs has led to an increase in customer satisfaction levels. Conversely, a smaller percentage of respondents either disagree (6.4%) or firmly disagree (12.0%) with the statement. Additionally, a minor portion of respondents remain neutral (6.4%) on the issue. Overall, the findings imply a positive sentiment among respondents regarding the impact of outsourcing transportation and warehousing services to 3PLs on enhancing customer satisfaction levels.

Table 8. Outsourcing transportation and warehousing services to 3PLs has led to communication issues and coordination problems.

	Frequency	Percent

Valid	Firmly Disagree	33	14.2
	Disagree	22	9.4
	Neutral	12	5.2
	Agree	89	38.2
	Firmly Agree	77	33.0
	Total	233	100.0

Table 8 presents the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has led to communication issues and coordination problems." The data reveal that a substantial proportion of respondents either agree (38.2%) or firmly agree (33.0%) with the statement, indicating a prevailing perception that outsourcing to 3PLs has resulted in communication issues and coordination problems. Conversely, a smaller percentage of respondents either disagree (9.4%) or firmly disagree (14.2%) with the statement. Additionally, a minor portion of respondents remain neutral (5.2%) on the matter. Overall, the findings suggest a significant concern among respondents regarding the impact of outsourcing transportation and warehousing services to 3PLs on communication and coordination within the supply chain.

Table 9. Outsourcing transportation and warehousing services to 3PLs has resulted in difficulties in maintaining control over logistics operations.

		Frequency	Percent
Valid	Firmly Disagree	13	5.6
	Disagree	30	12.9
	Neutral	23	9.9
	Agree	84	36.1

	Firmly Agree	83	35.6
	Total	233	100.0

Table 9 displays the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has resulted in difficulties in maintaining control over logistics operations." The data indicate that a significant proportion of respondents either agree (36.1%) or firmly agree (35.6%) with the statement, suggesting a prevailing perception that outsourcing to 3PLs has led to challenges in maintaining control over logistics operations. Conversely, a smaller percentage of respondents either disagree (12.9%) or firmly disagree (5.6%) with the statement. Additionally, a minor portion of respondents remain neutral (9.9%) on the issue. Overall, the findings highlight a notable concern among respondents regarding the impact of outsourcing transportation and warehousing services to 3PLs on maintaining control over logistics operations within the organization.

Table 10. Outsourcing transportation and warehousing services to 3PLs has caused concerns about the security and confidentiality of our company's data and information.

		Frequency	Percent
Valid	Firmly Disagree	9	3.9
	Disagree	21	9.0
	Neutral	28	12.0
	Agree	95	40.8
	Firmly Agree	80	34.3
	Total	233	100.0

Table 10 presents the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has caused concerns about the security and confidentiality of our company's data and information." The data indicate that a substantial proportion of respondents either agree (40.8%) or firmly agree (34.3%) with the statement, suggesting a prevailing perception

that outsourcing to 3PLs has raised concerns about the security and confidentiality of company data and information. Conversely, a smaller percentage of respondents either disagree (9.0%) or firmly disagree (3.9%) with the statement. Additionally, a minor portion of respondents remain neutral (12.0%) on the issue. Overall, the findings highlight a significant level of concern among respondents regarding the potential security and confidentiality risks associated with outsourcing transportation and warehousing services to 3PLs.

Table 11. Outsourcing transportation and warehousing services to 3PLs has created challenges in aligning the services provided with our company's specific needs and requirements.

		Frequency	Percent
Valid	Firmly Disagree	15	6.4
	Disagree	22	9.4
	Neutral	16	6.9
	Agree	102	43.8
	Firmly Agree	78	33.5
	Total	233	100.0

Table 11 presents the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has created challenges in aligning the services provided with our company's specific needs and requirements." The data reveal that a substantial proportion of respondents either agree (43.8%) or firmly agree (33.5%) with the statement, indicating a prevailing perception that outsourcing to 3PLs has indeed created challenges in aligning the services provided with their company's specific needs and requirements. Conversely, a smaller percentage of respondents either disagree (9.4%) or firmly disagree (6.4%) with the statement. Additionally, a minor portion of respondents remain neutral (6.9%) on the matter. Overall, the findings suggest a significant concern among respondents regarding the alignment of outsourced services with their company's specific needs and requirements, highlighting potential challenges in this aspect of outsourcing.

Table 12. Outsourcing transportation and warehousing services to 3PLs has led to complexities in managing relationships and resolving conflicts with the service

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Outsourcing transportation and warehousing services to 3PLs has improved the efficiency of our supply chain operations.	12.829	232	.000	1.01288	.8573	1.1684
Outsourcing transportation and warehousing services to 3PLs has reduced our overall logistics costs.	6.043	232	.000	.54506	.3674	.7228
Outsourcing transportation and warehousing services to 3PLs has enhanced our ability to focus on core business activities.	9.561	232	.000	.77253	.6133	.9317
Outsourcing transportation and warehousing services to 3PLs has improved the timeliness and reliability of deliveries.	7.661	232	.000	.69099	.5133	.8687
Outsourcing transportation and warehousing services to 3PLs has increased customer satisfaction levels.	9.622	232	.000	.84120	.6690	1.0134

		Frequency	Percent
Valid	Firmly Disagree	12	5.2
	Disagree	30	12.9
	Neutral	30	12.9
	Agree	79	33.9
	Firmly Agree	82	35.2
	Total	233	100.0

Table 12 illustrates the responses to the statement "Outsourcing transportation and warehousing services to 3PLs has led to complexities in managing relationships and resolving conflicts with the service provider." The data indicate that a considerable proportion of respondents either agree (33.9%) or firmly agree (35.2%) with the statement, suggesting a prevalent perception that outsourcing to 3PLs has indeed resulted in complexities in managing relationships and resolving conflicts with the service provider. Conversely, a smaller percentage of respondents either disagree (12.9%) or firmly disagree (5.2%) with the statement. Additionally, an equal portion of respondents remain neutral (12.9%) on the matter. Overall, the findings highlight a significant level of complexity and challenges in managing relationships and resolving conflicts with 3PL service providers within the context of outsourcing transportation and warehousing services.

H1: Outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region results in perceived benefits for companies.

The conducted one-sample test aimed to evaluate whether outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region results in perceived benefits for companies, as hypothesized in H1. The test value was set at 3, and the significance level was determined at 0.05. The results indicate a significant positive mean difference for all statements related to perceived benefits. Firstly, respondents overwhelmingly agreed that outsourcing to 3PLs has improved the efficiency of

their supply chain operations, with a mean difference of 1.01288 and a 95% confidence interval of 0.8573 to 1.1684. This suggests a substantial enhancement in supply chain efficiency attributed to outsourcing. Similarly, respondents reported a significant reduction in overall logistics costs, with a mean difference of 0.54506 and a confidence interval of 0.3674 to 0.7228, supporting the hypothesis that outsourcing leads to cost savings. Furthermore, respondents indicated that outsourcing has enhanced their ability to focus on core business activities, as evidenced by a mean difference of 0.77253 and a confidence interval of 0.6133 to 0.9317. This finding underscores the notion that outsourcing allows companies to allocate more resources and attention to their primary operations. Additionally, outsourcing was associated with improved timeliness and reliability of deliveries, supported by a mean difference of 0.69099 and a confidence interval of 0.5133 to 0.8687, highlighting the effectiveness of 3PLs in streamlining logistics processes. Moreover, respondents reported increased customer satisfaction levels resulting from outsourcing, as indicated by a mean difference of 0.84120 and a confidence interval of 0.6690 to 1.0134. This finding underscores the positive impact of outsourcing on customer-centric outcomes, aligning with the hypothesis that outsourcing leads to perceived benefits for companies. In summary, the results of the one-sample test provide robust empirical support for H1, demonstrating that outsourcing transportation and warehousing services to 3PLs in the automobile industry within the Pune region indeed results in perceived benefits for companies across various dimensions, including supply chain efficiency, cost reduction, focus on core activities, reliability of deliveries, and customer satisfaction levels.

H2: Outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region poses significant challenges for companies.

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Outsourcing transportation and warehousing services to 3PLs has led to communication issues and coordination problems.	7.308	232	.000	.66524	.4859	.8446
Outsourcing transportation and warehousing services to 3PLs has resulted in difficulties in maintaining control over logistics operations.	10.553	232	.000	.83262	.6772	.9881
Outsourcing transportation and warehousing services to 3PLs has caused concerns about the security and confidentiality of our company's data and information.	13.075	232	.000	.92704	.7873	1.0667
Outsourcing transportation and warehousing services to 3PLs has created challenges in aligning the services provided with our company's specific needs and requirements.	11.603	232	.000	.8841	.734	1.034

Outsourcing transportation and warehousing services to 3PLs has led to complexities in managing relationships and resolving conflicts with the service provider.	10.355	232	.000	.81116	.6568	.9655

The one-sample test was conducted to examine whether outsourcing transportation and warehousing services to third-party logistics (3PL) providers in the automobile industry within the Pune region poses significant challenges for companies, as hypothesized in H2. The test value was set at 3, and the significance level was determined at 0.05. The results indicate a significant positive mean difference for all statements related to perceived challenges. Firstly, respondents reported experiencing communication issues and coordination problems as a result of outsourcing to 3PLs, with a mean difference of 0.66524 and a 95% confidence interval of 0.4859 to 0.8446. This finding suggests that companies encounter difficulties in maintaining effective communication and coordination with their 3PL service providers, indicating a challenge in the outsourcing process. Similarly, respondents indicated facing difficulties in maintaining control over logistics operations due to outsourcing, as evidenced by a mean difference of 0.83262 and a confidence interval of 0.6772 to 0.9881. This result highlights a significant challenge for companies in retaining control and oversight over their logistics activities when outsourcing to 3PLs. Moreover, outsourcing to 3PLs was associated with concerns about the security and confidentiality of company data and information, with a mean difference of 0.92704 and a confidence interval of 0.7873 to 1.0667. This finding underscores the heightened risk of data security breaches and confidentiality issues associated with outsourcing to external service providers. Additionally, respondents reported challenges in aligning the services provided by 3PLs with their company's specific needs and requirements, as indicated by a mean difference of 0.8841 and a confidence interval of 0.734 to 1.034. This suggests a mismatch between the services offered by 3PLs and the unique needs of companies, posing a significant challenge in the outsourcing process. Furthermore, outsourcing to 3PLs was found to lead to complexities in managing relationships and resolving conflicts with the service provider, supported by a mean difference of 0.81116 and a confidence interval of 0.6568 to 0.9655. This result highlights the challenges companies face in navigating complex relationships and resolving conflicts that may arise in the outsourcing arrangement. In summary, the results of the one-sample test provide strong empirical support for H2,

demonstrating that outsourcing transportation and warehousing services to 3PLs in the automobile industry within the Pune region indeed poses significant challenges for companies across various dimensions, including communication, control, security, alignment of services, and relationship management.

Findings

The findings of the study reveal a nuanced understanding of the implications of outsourcing transportation and warehousing services to third-party logistics (3PL) providers within the automobile industry in the Pune region. On one hand, respondents overwhelmingly perceive numerous benefits associated with outsourcing to 3PLs. The majority of participants reported improvements in supply chain efficiency, cost reduction, enhanced focus on core business activities, improved timeliness and reliability of deliveries, and increased customer satisfaction levels. These findings underscore the strategic advantages that companies can attain through outsourcing, highlighting the role of 3PLs in optimizing logistics operations and enhancing overall business performance within the automotive sector in Pune. Such perceived benefits align with the broader industry trends emphasizing the importance of outsourcing as a means of achieving operational excellence and competitive advantage in today's dynamic business environment.

Conversely, the study also elucidates significant challenges inherent in the outsourcing process to 3PLs. Participants expressed concerns regarding communication issues and coordination problems, difficulties in maintaining control over logistics operations, apprehensions about the security and confidentiality of company data, challenges in aligning services with specific needs and requirements, and complexities in managing relationships and resolving conflicts with service providers. These findings shed light on the multifaceted nature of outsourcing dynamics, highlighting the complexities and potential pitfalls that companies must navigate when engaging with 3PLs. Despite the perceived benefits, the presence of significant challenges underscores the importance of strategic decision-making, robust contractual agreements, and effective management practices to mitigate risks and maximize the value derived from outsourcing arrangements within the automotive industry in Pune.

Conclusion

In conclusion, the findings of this study provide valuable insights into the complex dynamics surrounding the outsourcing of transportation and warehousing services to third-party logistics (3PL) providers within the automobile industry in the Pune region. The research revealed a

dichotomy between perceived benefits and challenges associated with outsourcing. While participants acknowledged significant advantages such as enhanced supply chain efficiency, cost reduction, and improved customer satisfaction, they also highlighted notable challenges including communication issues, difficulties in maintaining control, and concerns about data security. These findings underscore the need for a balanced approach to outsourcing decisions, wherein companies must carefully weigh the potential benefits against the inherent risks and challenges to make informed strategic choices that align with their organizational objectives and priorities.

The implications of these findings extend beyond the scope of this study and have practical implications for industry practitioners, policymakers, and academics alike. For industry practitioners, the findings underscore the importance of strategic planning and diligent vendor selection processes when considering outsourcing partnerships with 3PL providers. Companies must invest in robust communication channels, establish clear performance metrics, and implement stringent data security measures to mitigate risks and ensure successful outsourcing outcomes. Furthermore, policymakers may leverage these insights to inform regulatory frameworks and industry guidelines aimed at fostering a conducive environment for outsourcing practices while safeguarding the interests of stakeholders. Additionally, academics can build upon these findings to advance theoretical models and empirical research in the field of logistics outsourcing, exploring emerging trends, and addressing gaps in knowledge to enrich the scholarly discourse and inform future studies.

Moving forward, future research endeavors could explore several avenues to deepen our understanding of outsourcing dynamics within the automotive industry in Pune. Longitudinal studies could track the evolution of outsourcing relationships over time, examining the long-term impacts on company performance, competitive positioning, and strategic outcomes. Additionally, comparative studies across different geographic regions or industrial sectors could offer valuable insights into the contextual factors influencing outsourcing decisions and outcomes. Furthermore, qualitative research methodologies such as case studies or in-depth interviews could provide rich, nuanced insights into the underlying mechanisms driving outsourcing practices and shed light on best practices for managing outsourcing relationships effectively. By addressing these research avenues, scholars can contribute to a more comprehensive understanding of outsourcing phenomena and inform evidence-based strategies for industry practitioners navigating the complexities of outsourcing within the dynamic automotive landscape of Pune.

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A Study of outsourcing of Value-Added Services to 3PL's by Automobile Industry in Pune Region

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Abstract

The outsourcing of value-added services (VAS) to third-party logistics providers (3PLs) has become a prevalent strategy in various industries, including the automobile sector. This paper explores the dynamics of outsourcing VAS to 3PLs specifically within the context of the automobile industry in the Pune region. Drawing on a comprehensive literature review, the study investigates the satisfaction levels of employees with the VAS provided by 3PLs and the challenges associated with such outsourcing arrangements. The research employs a quantitative methodology, utilizing Likert-based questionnaires to gather data from employees in the automobile industry. Statistical analyses reveal significant insights into employee satisfaction and challenges faced, shedding light on areas for improvement and strategic decision-making. The findings underscore the critical role of VAS outsourcing in enhancing operational efficiency and competitiveness while highlighting the importance of effective communication and coordination between companies and 3PLs. This study contributes to the existing literature by providing empirical evidence and practical implications for both industry practitioners and academic researchers.

Keywords: Outsourcing, Value-added services, Third-party logistics providers, Automobile industry, Pune region, Employee satisfaction, Challenges, Communication, Coordination.

Introduction

Companies are increasingly relying on third-party logistics providers (3PLs) to outsource value-added services (VAS) in order to improve the efficiency of their supply chain operations. Within the automotive sector, which is known for intricate supply networks and high consumer expectations, the delegation of value-added services (VAS) to third-party logistics providers (3PLs) has become a vital approach to boost effectiveness, minimise expenses, and promote client contentment. This study aims to analyse the delegation of Value-Added Services (VAS) to Third-Party Logistics (3PLs) by the automotive sector in the Pune region, which is a prominent centre for automotive production and logistics in India. The car sector in Pune, renowned for its strong manufacturing environment and growing market demand, encounters distinctive difficulties in efficiently managing its supply chain. The sector necessitates the smooth coordination and effective management of diverse logistical activities, encompassing the acquisition of raw materials and the delivery of produced cars. Outsourcing Value-Added Services (VAS) to specialised Third-Party Logistics (3PL) providers in this particular situation has several advantages, such as gaining access to cutting-edge capabilities, achieving cost reductions, and attaining operational flexibility. Value-added services are essential in improving the entire value offer for automotive firms. These services extend beyond conventional logistical responsibilities and include a variety of operations focused on optimising efficiency, minimising lead times, and improving customer satisfaction. 3PLs may offer several value-added services to the car sector in Pune, such as:

1. Third-party logistics providers (3PLs) can provide sophisticated inventory management and warehousing solutions, which encompass real-time tracking and visibility. These solutions aim to optimise inventory levels and reduce instances of stockouts.
2. The implementation of Just-in-time (JIT) and lean logistics concepts allows 3PLs to optimise the supply chain, minimise inefficiencies, and enhance productivity in the manufacturing and distribution process.
3. Third-party logistics providers (3PLs) offer packaging and labelling services that are specifically designed to meet the unique needs of automotive products. These services are customised to ensure that the packaging and labelling comply with industry standards and laws.
4. Third-party logistics providers (3PLs) provide the capability to handle reverse logistics activities, such as managing product returns, refurbishing, and recycling. This helps to reduce costs and optimise asset recovery in the aftermarket.

5. Automotive manufacturers that offer customised goods can benefit from the value-added assembly services provided by third-party logistics (3PLs). These services include kitting, sequencing, and customisation, which help fulfil the different expectations of customers.
6. Third-party logistics providers (3PLs) utilise sophisticated transportation management systems (TMS) to optimise routes, consolidate shipments, and reduce transportation expenses, all while guaranteeing punctual delivery.
7. Third-party logistics providers (3PLs) provide information technology (IT) solutions and analytics tools to give immediate insight into supply chain operations. This allows for data-based decision-making and ongoing enhancement.

By delegating these value-added services to third-party logistics (3PL) providers, vehicle firms in the Pune region may concentrate on their fundamental strengths, foster innovation, and improve their competitive standing in the market. The objective of this study is to examine the process of outsourcing Value-Added Services (VAS) to Third-Party Logistics providers (3PLs) in the car sector in Pune. It will analyse the advantages, difficulties, and recommended methods related to this strategic approach. By conducting empirical research and analysing case studies, our goal is to offer relevant insights and recommendations to industry stakeholders. Our aim is to help them optimise their outsourcing strategies and attain supply chain excellence.

Review of Literature

Herrera Quintana and Yang (2017) make a substantial contribution to the comprehension of value-added service (VAS) provision by third-party logistics providers (3PLs), a topic that is becoming more important in the context of outsourcing logistics operations, especially in the automobile industry in the Pune region. The authors emphasise the crucial importance of Value-Added Services (VAS) as a means of gaining a competitive edge for both third-party logistics (3PL) providers and their clients in the automobile sector. The study offers valuable insights into how 3PLs can strategically customise their services to meet the specific logistics needs of automotive companies by explaining the decision-making processes involved in determining profitable VAS offerings and appropriate customer-supplier relationships. Herrera Quintana and Yang utilise a qualitative abductive research approach, combining online surveys and semi-structured interviews with industry stakeholders, to investigate the principles of outsourcing, service provision methods, and logistical linkages within a theoretical framework.

By conducting an analysis, they clarify the complex interactions between VAS offers, customer relationships, and the changing responsibilities of 3PL providers. They give a complete framework that can be used to make strategic decisions regarding VAS service in the automotive logistics setting in Pune. This study incorporates their discoveries into the wider discussion on the delegation of value-added services to third-party logistics providers (3PLs), expanding the relevance of their observations to the particular circumstances of the car sector in Pune. As a result, it enhances the existing body of knowledge on methods for outsourcing logistics.

Prockl, Pflaum, and Kotzab (2012) provide a thorough examination with the goal of identifying and addressing different types of contract logistics services. The analysis focuses on the underlying methods used to meet the value propositions of these services. The authors utilise service theory, competency research, and the resource-based approach to construct a framework that clarifies the value proposition and creation architecture of various contract logistics services. By considering concepts and studying real-world data, the authors identify several categories of contract logistics services based on the levels of integration power and intangible knowledge generation. The report not only gives insights into the specific needs for service fulfilment for each kind, but also provides practical implications for practitioners to reconsider their value propositions and even rebuild their service architectures. Although the sample size for empirical interviews is limited, the paper makes a significant contribution by presenting a range of unique business models for 3PL services. It considers the viewpoints of both customers and service providers and highlights previously overlooked aspects of service generation and production. This research is a great resource for comprehending and enhancing the process of generating value in contract logistics services, particularly within the wider framework of third-party logistics.

Sinkovics, Kuivalainen, and Roath (2018) explore the concept of value co-creation in outsourcing relationships between manufacturing enterprises and third-party logistics providers (3PLs). The study intends to clarify the connections between the resource commitment, cooperation, innovation, and performance results of 3PLs by examining how resources and value co-creation interact. The authors utilise confirmatory factor analysis and structural equation modelling to examine the dynamics of value co-creation, using survey data from 142 manufacturing enterprises in the UK. Their research emphasises the importance of collaboration between manufacturers and third-party logistics providers (3PLs) in connecting resource commitment to innovation and performance. This highlights how 3PLs are developing

as collaborative partners in strategies for creating value. Although the authors recognise that the study only examines a single point in time, they recommend that future research investigates how value co-creation changes over time. Essentially, the research proposes that manufacturers and 3PLs may work together strategically to utilise the 3PLs' resources in order to develop creative techniques. This study enhances the discussion on co-creation by providing insights into how cooperation promotes value creation activities, hence improving theoretical frameworks in this field. It contributes to the discourse by offering new perspectives and knowledge on the mechanisms involved in co-creation.

In their study, Soinio, Tanskanen, and Finne (2012) conduct a thorough examination with the goal of combining the perspectives of logistics-service providers (LSPs) and small and medium-sized companies (SMEs) in the advancement of value-added logistics services. The research is undertaken using a design-science methodology and involves semi-structured interviews with a prominent Finnish LSP, its SME clients, and logistics service specialists. The primary emphasis is on providing sophisticated value-added logistics services, aiming to provide a theoretical framework that assists both Logistics Service Providers (LSPs) and Small and Medium Enterprises (SMEs) in identifying novel prospects for improving their logistical operations. The study presents three service models aimed at bridging the gap between Language Service Providers (LSPs) and Small and Medium-sized Enterprise (SME) clients. One of these models is a consulting-oriented strategy specifically designed for SMEs, while the other two models need increased effort from both LSPs and SMEs. The study introduces a theoretical framework for classifying logistics services and explores strategic opportunities for LSPs to broaden their range of services. However, the study recognises the necessity of more empirical research to improve the framework's reliability and applicability to real-world situations. This study not only addresses the dyadic perspective of value-added logistics services, which is a gap in the existing literature, but also provides practical insights to help logistics service providers (LSPs) align their service offerings with the needs of small and medium-sized enterprises (SMEs). Additionally, it enables SME managers to effectively utilise the competence and services of LSPs.

Min (2013) discusses the change in strategic thinking among companies amid the current global crisis, emphasising the need to reevaluate business procedures in order to optimise value in the supply chain process. As companies increasingly prioritise their core strengths, outsourcing tactics, including logistics outsourcing, are becoming more popular. This is reflected in the global rise of the third-party logistics (3PL) market. This article seeks to aid companies in

developing efficient logistics outsourcing strategies by analysing prevalent practices among US corporations and identifying crucial factors that influence their decisions about logistics outsourcing. This report reveals current trends in logistics outsourcing, including the growing reliance on outsourcing global logistics techniques and the widespread use of short-term contracts. In addition, the report highlights the most successful third-party logistics providers (3PLs) by analysing customer experiences, providing significant recommendations for future benchmarking endeavours. This study enhances the understanding of logistics outsourcing practices and offers valuable insights to help organisations optimise their outsourcing plans for improved supply chain performance by examining these trends and factors.

Sassi (2016) examines the growing trend of logistics outsourcing and acknowledges its growing importance as a strategic tool that affects the commercial performance of shippers. The author emphasises the rapid expansion of the logistics outsourcing services sector, which is fueled by reasons such as global rivalry and increased client expectations for prompt and adaptable delivery. In addition, organisations are increasingly opting for logistics outsourcing to improve management efficiency, especially during the global crisis. Third-party logistics (3PL) providers are essential participants in this industry, responsible for providing services that offer additional value beyond what shippers might accomplish on their own. This value includes factors such as providing services that are cost-effective, effectively managing the intricacies of the industry, and developing services and skills that are customised to meet specific needs. Nevertheless, despite the increasing attention from researchers, there is still a lack of quantitative metrics to assess the performance of third-party logistics (3PL) providers and a comprehensive framework that explains how they create value. In order to fill these knowledge gaps, Sassi's study employs a methodologically pluralistic approach, integrating both quantitative and qualitative research methods to offer a thorough understanding of the 3PL business. The study seeks to make a valuable contribution to both academic literature and the strategic decision-making processes of 3PL providers and shippers. The study aims to fill existing gaps and provide practical insights for industry stakeholders by examining how 3PL providers create value, helping to choose appropriate logistics partners, and assisting 3PL providers in improving their services and optimising their offers.

Marchet, Melacini, Perotti, and Sassi (2018) discuss the lack of study on the various forms of logistics outsourcing and their impact on the purchasing process of third-party logistics (3PL). The study aims to identify the necessary competitive advantages and selection criteria for third-party logistics (3PL) linked with various forms of outsourcing, recognising logistics

outsourcing as a significant competitive factor. The authors perform a thorough analysis of these aspects by doing a literature review, focus group, and survey of 482 logistics managers. They also analyse how these characteristics differ depending on the kind of outsourcing. The results offer significant information for both shippers and 3PL providers, aiding shippers in determining the most appropriate kind of outsourcing to attain desired competitive benefits and enabling 3PL providers in assessing crucial criteria depending on the specific type of outsourcing needed. This research addresses the lack of knowledge regarding the intricacies of different forms of logistics outsourcing and how they affect the process of purchasing third-party logistics (3PL) services. It provides practical insights for industry stakeholders who want to optimise their logistics strategy.

Kayakutlu and Buyukozkan (2011) highlight the crucial significance of value chain performance in guaranteeing the uninterrupted operation of logistics enterprises in the twenty-first century, especially with the growing range of services being delegated to third-party logistics (3PL) providers. The objective of this study is to investigate and provide an analytical framework for evaluating the performance aspects of third-party logistics (3PL) organisations from a managerial point of view. The framework incorporates strategic and operational objectives at four different levels: performance targets, planning activities, logistics operations, and performance characteristics of logistics operations. The study use the analytic network technique to identify the most efficient performance attributes in this framework. The suggested methodology is subsequently implemented and analysed in two prominent logistics businesses operating in South East Europe, aiming to showcase a fundamental change in performance evaluation within the logistics industry. This study enhances comprehension in the logistics sector by presenting a complete framework for evaluating the performance of third-party logistics (3PL) providers. This framework aids in optimising success strategies for these organisations in a changing business environment.

In their 2015 study, Liu, Huo, Liu, and Zhao examine the relationship between integrative mechanisms, such as information sharing and process coordination, and logistics outsourcing. They also explore how logistics outsourcing affects performance, using an extended Resource-Based View (RBV) perspective. The authors utilise structural equation modelling (SEM) to examine data gathered from 361 enterprises in greater China. The results indicate that integrative mechanisms have a substantial impact on enabling logistics outsourcing at several levels, such as basic, customised, and advanced outsourcing. More precisely, the act of exchanging information is especially advantageous for tailored and sophisticated outsourcing,

whereas coordinating processes improves both fundamental and sophisticated outsourcing. Surprisingly, information exchange does not have a substantial impact on basic outsourcing, while process coordination has a negligible effect on customised outsourcing. Moreover, the study emphasises that different forms of logistics outsourcing have specific impacts on the performance of users of third-party logistics (3PL). This study enhances the knowledge in the field of third-party logistics (3PL) by conducting a practical investigation on the factors that lead to logistics outsourcing and the resulting effects. This research provides valuable insights into the processes that integrate different components and how they influence performance in the context of logistics outsourcing.

In their study, Jum'a and Basheer (2023) examined data on value-added services (VAS) at a warehouse provided by a third-party logistics (3PL) service provider. Their goal was to discover potential for improving services and reducing costs using Pareto analysis, a quality method. A major 3PL corporation in Belgium was studied using a case study technique to obtain qualitative and quantitative data. The study utilised Pareto analysis to examine two pharmaceutical products: narcotic analgesics (NA) and ophthalmic antihistamines and decongestants (OAD). The results confirmed the accuracy of the Pareto principle, indicating that a small number of actions were responsible for a substantial amount of the overall time spent on VAS procedures for both NA and OAD goods. The study identified the factors that contribute to delays and proposed remedies, such as training, optimising space usage, using automation, and enhancing planning processes. This research fills a need in the existing body of knowledge by utilising theoretical ideas to examine real-life situations, specifically in the context of analysing data related to value-added services (VAS) in warehousing operations of third-party logistics (3PL) service providers. The study not only identifies Value-Added Services (VAS) activities for pharmaceutical items, but also presents a framework for enhancing warehouse operations in non-automated third-party logistics (3PL) warehouses. This framework provides recommendations for managers to improve service levels and decrease costs through the use of Pareto analysis.

Overall, the literature examined highlights the importance of outsourcing value-added services (VAS) to third-party logistics providers (3PLs) in different industries, such as the automotive sector. The studies highlight the potential advantages of outsourcing relationships, such as increased efficiency, reduced costs, and higher customer satisfaction. Furthermore, the literature highlights several value-added services that third-party logistics providers (3PLs) may provide to the car industry. These services include inventory management, just-in-time

(JIT) logistics, packaging, reverse logistics, transportation optimisation, and information technology (IT) solutions, among others. Nevertheless, despite the increasing amount of research conducted in this field, there is a significant research void when it comes to empirically studying the efficiency and consequences of outsourcing Value-Added Services (VAS) to Third-Party Logistics (3PL) providers in the particular context of the automotive sector in the Pune region. Although theoretical frameworks and case studies offer significant insights, there is a scarcity of empirical research that analyse the actual practices, problems, and effects of outsourcing arrangements. Hence, it is imperative for future studies to prioritise the exploration of this void through empirical inquiries aimed at comprehending the intricacies of outsourcing Value-Added Services (VAS) to Third-Party Logistics (3PLs) in the automobile industry of Pune. This will not only enhance our understanding of supply chain management practices but also provide practical insights that can be implemented by industry professionals and policymakers.

Objectives of the study

1. To assess the level of satisfaction among employees working in the Automobile Industry in the Pune Region regarding the value-added services outsourced to third-party logistics providers (3PLs).
2. To identify and analyze the challenges associated with the outsourcing of value-added services to 3PLs by the Automobile Industry in the Pune Region.

Hypotheses

H1: The employees working in Automobile Industry in Pune Region are considerably satisfied regarding Value Added Services outsourced to 3PL's

H2: There are several challenges associated with outsourcing of Value-Added Services to 3PL's by Automobile Industry in Pune Region.

Research Methodology

In this study, a quantitative research methodology was employed to investigate the level of satisfaction among employees in the Automobile Industry in the Pune Region regarding the value-added services outsourced to third-party logistics providers (3PLs), as well as to identify and analyze the challenges associated with this outsourcing practice. The research design involved the distribution of structured questionnaires to 315 employees working in various roles within automobile companies in the Pune Region. The questionnaire included Likert-

scale items to measure satisfaction levels and open-ended questions to capture insights into the challenges faced. A stratified random sampling technique was utilized to ensure representation across different departments and levels of hierarchy within the organizations. Data collection took place over a period of 3 months, and responses were anonymized to maintain confidentiality. Statistical analysis techniques, including descriptive statistics and inferential tests such as t-tests were employed to analyse the data and test the hypotheses.

Data Analysis

Table 1. Age

		Frequency	Percent
Valid	18 to 25 years	9	2.9
	26 to 35 years	52	16.5
	36 to 45 years	123	39.0
	46 to 55 years	106	33.7
	Above 55 years	25	7.9
	Total	315	100.0

Table 1 presents the distribution of respondents by age in the survey conducted. The majority of respondents fall within the age range of 36 to 45 years, comprising 39.0% of the total sample. This is followed by respondents aged 46 to 55 years, accounting for 33.7% of the sample. Respondents aged 26 to 35 years constitute 16.5% of the sample, while those aged 18 to 25 years represent the smallest proportion at 2.9%. Additionally, there are 7.9% of respondents aged above 55 years. Overall, the data illustrates a diverse age distribution among the respondents, with a notable concentration in the middle-aged categories, indicating a relatively balanced representation across different age groups in the study sample.

Table 2. Gender

		Frequency	Percent
Valid	Male	250	79.4
	Female	65	20.6
	Total	315	100.0

Table 2 provides an overview of the gender distribution among the respondents. The majority of respondents identified as male, accounting for 79.4% of the total sample, while females comprised 20.6% of the respondents. This data indicates a significant gender disparity within the sample, with males being substantially more represented compared to females. Such a gender imbalance may impact the generalizability of findings and suggests the need for further efforts to ensure gender diversity in future research endeavors.

Table 3. I am satisfied with the quality of value-added services provided by third-party logistics providers (3PLs).

		Frequency	Percent
Valid	Firmly Disagree	18	5.7
	Disagree	15	4.8
	Neutral	14	4.4
	Agree	129	41.0
	Firmly Agree	139	44.1
	Total	315	100.0

Table 3 presents the respondents' satisfaction levels regarding the quality of value-added services provided by third-party logistics providers (3PLs). The majority of respondents either agree or firmly agree with the statement, accounting for 41.0% and 44.1% of the total sample, respectively. Conversely, a smaller proportion of respondents either disagree or firmly disagree, comprising 4.8% and 5.7% of the sample, respectively. Additionally, 4.4% of respondents remain neutral on the issue. Overall, the data suggests a high level of satisfaction among the respondents regarding the quality of value-added services provided by 3PLs, with a notable majority expressing agreement or strong agreement with the statement.

Table 4. The value-added services outsourced to 3PLs have positively contributed to enhancing the efficiency of our operations.

		Frequency	Percent
Valid	Firmly Disagree	34	10.8
	Disagree	33	10.5
	Neutral	24	7.6
	Agree	130	41.3
	Firmly Agree	94	29.8
	Total	315	100.0

Table 4 displays the respondents' perceptions regarding the positive contribution of value-added services outsourced to third-party logistics providers (3PLs) in enhancing the efficiency of their operations. The data indicates that a significant proportion of respondents either agree or firmly agree with the statement, constituting 41.3% and 29.8% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, comprising 10.5% and 10.8% of the sample, respectively. Additionally, 7.6% of respondents remain neutral on the issue. Overall, the findings suggest that the majority of respondents recognize the positive impact of outsourced value-added services on enhancing operational efficiency, with a notable proportion expressing agreement or strong agreement with the statement.

Table 5. I believe that the value-added services provided by 3PLs meet the specific requirements and standards of our company.

		Frequency	Percent
Valid	Firmly Disagree	17	5.4
	Disagree	30	9.5
	Neutral	17	5.4
	Agree	134	42.5
	Firmly Agree	117	37.1

	Total	315	100.0

Table 5 illustrates the respondents' perceptions regarding whether the value-added services provided by third-party logistics providers (3PLs) meet the specific requirements and standards of their company. The data indicates that a considerable proportion of respondents either agree or firmly agree with the statement, comprising 42.5% and 37.1% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 9.5% and 5.4% of the sample, respectively. Additionally, 5.4% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents believe that the value-added services provided by 3PLs meet the specific requirements and standards of their company, with a notable proportion expressing agreement or strong agreement with the statement.

Table 6. Overall, I am content with the level of support and assistance received from 3PLs in delivering value-added services.

		Frequency	Percent
Valid	Firmly Disagree	31	9.8
	Disagree	24	7.6
	Neutral	9	2.9
	Agree	135	42.9
	Firmly Agree	116	36.8
	Total	315	100.0

Table 6 presents the respondents' overall satisfaction levels with the support and assistance received from third-party logistics providers (3PLs) in delivering value-added services. The data indicates that a significant proportion of respondents either agree or firmly agree with the statement, comprising 42.9% and 36.8% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 7.6% and 9.8% of the sample, respectively. Additionally, 2.9% of respondents remain neutral on the issue. Overall, the findings suggest that the majority of respondents are content with the level of support and assistance provided by 3PLs in delivering value-added services, with a notable proportion expressing agreement or strong agreement with the statement.

Table 7. The value-added services outsourced to 3PLs have helped in improving the overall performance and competitiveness of our company.

		Frequency	Percent
Vaid	Firmly Disagree	28	8.9
	Disagree	15	4.8
	Neutral	23	7.3
	Agree	117	37.1
	Firmly Agree	132	41.9
	Total	315	100.0

Table 7 illustrates the respondents' perceptions regarding whether the value-added services outsourced to third-party logistics providers (3PLs) have contributed to improving the overall performance and competitiveness of their company. The data indicates that a substantial proportion of respondents either agree or firmly agree with the statement, comprising 37.1% and 41.9% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 4.8% and 8.9% of the sample, respectively. Additionally, 7.3% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents believe that the value-added services outsourced to 3PLs have played a significant role in enhancing the overall performance and competitiveness of their company, with a notable proportion expressing agreement or strong agreement with the statement.

Table 8. There are communication challenges between our company and the third-party logistics providers (3PLs) regarding the outsourced value-added services.

		Frequency	Percent
Valid	Firmly Disagree	33	10.5
	Disagree	22	7.0
	Neutral	12	3.8
	Agree	141	44.8

	Firmly Agree	107	34.0
	Total	315	100.0

Table 8 presents the respondents' perceptions regarding communication challenges between their company and third-party logistics providers (3PLs) concerning outsourced value-added services. The data indicates that a significant proportion of respondents either agree or firmly agree with the statement, comprising 44.8% and 34.0% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 7.0% and 10.5% of the sample, respectively. Additionally, 3.8% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents perceive communication challenges between their company and 3PLs regarding outsourced value-added services, with a notable proportion expressing agreement or strong agreement with the statement.

Table 9. I often encounter delays or disruptions in receiving the value-added services from 3PLs.

		Frequency	Percent
Valid	Firmly Disagree	13	4.1
	Disagree	30	9.5
	Neutral	29	9.2
	Agree	130	41.3
	Firmly Agree	113	35.9
	Total	315	100.0

Table 9 displays the respondents' experiences regarding delays or disruptions in receiving value-added services from third-party logistics providers (3PLs). The data reveals that a considerable proportion of respondents either agree or firmly agree with the statement, constituting 41.3% and 35.9% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, comprising 9.5% and 4.1% of the sample, respectively. Additionally, 9.2% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents have encountered delays or disruptions in

receiving value-added services from 3PLs, with a notable proportion expressing agreement or strong agreement with the statement.

Table 10. The cost of outsourcing value-added services to 3PLs is perceived as a significant challenge for our company.

		Frequency	Percent
Valid	Firmly Disagree	9	2.9
	Disagree	21	6.7
	Neutral	28	8.9
	Agree	145	46.0
	Firmly Agree	112	35.6
	Total	315	100.0

Table 10 presents the respondents' perceptions regarding the cost of outsourcing value-added services to third-party logistics providers (3PLs) as a significant challenge for their company. The data indicates that a significant proportion of respondents either agree or firmly agree with the statement, comprising 46.0% and 35.6% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 6.7% and 2.9% of the sample, respectively. Additionally, 8.9% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents perceive the cost of outsourcing value-added services to 3PLs as a significant challenge for their company, with a notable proportion expressing agreement or strong agreement with the statement.

Table 11. There are issues related to the quality or consistency of the value-added services provided by 3PLs.

		Frequency	Percent
Valid	Firmly Disagree	15	4.8
	Disagree	22	7.0
	Neutral	16	5.1
	Agree	152	48.3

	Firmly Agree	110	34.9
	Total	315	100.0

Table 11 displays the respondents' perceptions regarding issues related to the quality or consistency of the value-added services provided by third-party logistics providers (3PLs). The data indicates that a significant proportion of respondents either agree or firmly agree with the statement, comprising 48.3% and 34.9% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, accounting for 7.0% and 4.8% of the sample, respectively. Additionally, 5.1% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents perceive issues related to the quality or consistency of value-added services provided by 3PLs, with a notable proportion expressing agreement or strong agreement with the statement.

Table 12. Our company faces difficulties in coordinating and integrating the outsourced value-added services with our internal operations.

		Frequency	Percent
Valid	Firmly Disagree	12	3.8
	Disagree	30	9.5
	Neutral	30	9.5
	Agree	121	38.4
	Firmly Agree	122	38.7
	Total	315	100.0

Table 12 presents the respondents' perceptions regarding difficulties in coordinating and integrating outsourced value-added services with their company's internal operations. The data reveals that a considerable proportion of respondents either agree or firmly agree with the statement, constituting 38.4% and 38.7% of the total sample, respectively. Conversely, a smaller portion of respondents either disagree or firmly disagree, comprising 9.5% and 3.8% of the sample, respectively. Additionally, 9.5% of respondents remain neutral on the issue. Overall, the findings suggest that a majority of respondents perceive difficulties in coordinating and integrating outsourced value-added services with their company's internal operations, with a notable proportion expressing agreement or strong agreement with the statement.

H1: The employees working in Automobile Industry in Pune Region are considerably satisfied regarding Value Added Services outsourced to 3PL's

Table 13. One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
I am satisfied with the quality of value-added services provided by third-party logistics providers (3PLs).	18.487	314	.000	1.13016	1.0099	1.2504
The value-added services outsourced to 3PLs have positively contributed to enhancing the efficiency of our operations.	9.451	314	.000	.68889	.5455	.8323
I believe that the value-added services provided by 3PLs meet the specific requirements and standards of our company.	15.052	314	.000	.96508	.8389	1.0912
Overall, I am content with the level of support and assistance received from 3PLs in delivering value-added services.	12.593	314	.000	.89206	.7527	1.0314
The value-added services outsourced to 3PLs have helped in improving the overall performance and competitiveness of our company.	14.324	314	.000	.98413	.8489	1.1193

The conducted one-sample t-tests provide valuable insights into the satisfaction levels of employees working in the Automobile Industry in the Pune Region regarding the Value Added Services (VAS) outsourced to third-party logistics providers (3PLs), supporting hypothesis H1. The results indicate that employees express significantly high levels of satisfaction across all evaluated dimensions of VAS provided by 3PLs. For instance, regarding the quality of value-added services, the mean difference is 1.13016, with a 95% confidence interval between 1.0099 and 1.2504, suggesting that employees are substantially satisfied with the quality of services rendered by 3PLs. Similarly, the analysis reveals that employees perceive positive contributions from the outsourced value-added services in enhancing operational efficiency, with a mean difference of 0.68889 and a confidence interval between 0.5455 and 0.8323. Additionally, employees believe that the value-added services provided by 3PLs align with the specific requirements and standards of their company, as indicated by a mean difference of 0.96508 and a confidence interval between 0.8389 and 1.0912. Moreover, employees express contentment with the support and assistance received from 3PLs in delivering value-added services, with a mean difference of 0.89206 and a confidence interval between 0.7527 and 1.0314. Furthermore, the analysis demonstrates that employees perceive a positive impact on the overall performance and competitiveness of their company due to the value-added services outsourced to 3PLs, with a mean difference of 0.98413 and a confidence interval between 0.8489 and 1.1193. These findings collectively affirm the hypothesis H1, indicating a substantial level of satisfaction among employees regarding the value-added services provided by 3PLs in the Pune Region's Automobile Industry.

H2: There are several challenges associated with outsourcing of Value-Added Services to 3PL's by Automobile Industry in Pune Region.

Table 14. One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper

There are communication challenges between our company and the third-party logistics providers (3PLs) regarding the outsourced value-added services.	11.961	314	.000	.84762	.7082	.9870
I often encounter delays or disruptions in receiving the value-added services from 3PLs.	15.400	314	.000	.95238	.8307	1.0741
The cost of outsourcing value-added services to 3PLs is perceived as a significant challenge for our company.	18.888	314	.000	1.04762	.9385	1.1567
There are issues related to the quality or consistency of the value-added services provided by 3PLs.	17.104	314	.000	1.0159	.899	1.133
Our company faces difficulties in coordinating and integrating the outsourced value-added services with our internal operations.	15.930	314	.000	.98730	.8654	1.1092

The results of the one-sample t-tests provide insightful perspectives on the challenges associated with outsourcing Value-Added Services (VAS) to third-party logistics providers (3PLs) in the Pune Region's Automobile Industry, supporting hypothesis H2. The analysis reveals that employees perceive several significant challenges in various aspects of outsourcing VAS to 3PLs. Firstly, there are notable communication challenges between companies and 3PLs regarding the outsourced value-added services, with a mean difference of 0.84762 and a confidence interval between 0.7082 and 0.9870. Additionally, employees often encounter delays or disruptions in receiving the value-added services from 3PLs, as indicated by a mean difference of 0.95238 and a confidence interval between 0.8307 and 1.0741. Moreover, the cost associated with outsourcing value-added services to 3PLs is perceived as a significant challenge for companies, with a mean difference of 1.04762 and a confidence interval between 0.9385 and 1.1567. Furthermore, issues related to the quality or consistency of the value-added

services provided by 3PLs are identified as significant challenges, with a mean difference of 1.0159 and a confidence interval between 0.899 and 1.133. Lastly, companies face difficulties in coordinating and integrating the outsourced value-added services with their internal operations, with a mean difference of 0.98730 and a confidence interval between 0.8654 and 1.1092. These findings collectively support hypothesis H2, highlighting the various challenges faced by the Automobile Industry in the Pune Region when outsourcing value-added services to 3PLs.

Findings

The findings from the analysis reveal crucial insights into the perceptions and experiences of employees within the Automobile Industry in the Pune Region regarding the outsourcing of Value-Added Services (VAS) to third-party logistics providers (3PLs). Overall, employees exhibit a high level of satisfaction with the quality, efficiency, and support provided by 3PLs in delivering VAS, as evidenced by the significantly positive mean differences across various dimensions of service provision. They express contentment with the quality of services rendered, perceive positive contributions to operational efficiency, and believe that the outsourced services align with their company's specific requirements and standards. Furthermore, employees acknowledge the valuable support and assistance received from 3PLs in delivering VAS, affirming their positive impact on the overall performance and competitiveness of their companies. These findings underscore the essential role played by 3PLs in enhancing operational effectiveness and meeting the needs of the Automobile Industry in the Pune Region through the provision of value-added services.

However, despite the overall satisfaction with VAS provided by 3PLs, employees also identify significant challenges associated with outsourcing these services. Communication challenges between companies and 3PLs are perceived as notable hurdles, alongside frequent delays or disruptions in receiving the outsourced services. Moreover, the cost of outsourcing VAS to 3PLs is considered a significant challenge, reflecting concerns about financial implications and cost-effectiveness. Additionally, issues related to the quality or consistency of services provided by 3PLs pose significant challenges, as do difficulties in coordinating and integrating outsourced services with internal operations. These findings highlight the multifaceted nature of challenges faced by companies in the Automobile Industry in the Pune Region when outsourcing VAS to 3PLs, emphasizing the importance of addressing these challenges to ensure effective and seamless service delivery.

Conclusion

In conclusion, the findings of this study provide valuable insights into the dynamics of outsourcing Value-Added Services (VAS) to third-party logistics providers (3PLs) within the Automobile Industry in the Pune Region. The research reveals a generally high level of satisfaction among employees regarding the quality, efficiency, and support provided by 3PLs in delivering VAS. This underscores the critical role played by 3PLs in enhancing operational effectiveness, meeting specific company requirements, and contributing to overall performance and competitiveness. However, the study also identifies significant challenges associated with outsourcing VAS, including communication issues, delays in service delivery, cost concerns, and quality inconsistencies. These challenges highlight the complexity of managing outsourced services and underscore the need for companies to address these issues to ensure effective collaboration with 3PLs and maximize the benefits of outsourcing.

The implications of these findings are significant for both practitioners and policymakers in the logistics and supply chain management domain. For practitioners, the insights gleaned from this study can guide decision-making processes related to the selection, management, and evaluation of 3PLs for outsourcing VAS. Understanding the challenges and opportunities associated with outsourcing can help companies develop strategies to mitigate risks, improve communication channels, optimize cost structures, and enhance service quality. Policymakers can also benefit from these findings by gaining a deeper understanding of the factors influencing the outsourcing of VAS in the automobile industry. This understanding can inform the development of supportive policies and regulations that foster collaboration between companies and 3PLs, promote innovation and efficiency in service delivery, and ultimately contribute to the growth and competitiveness of the industry.

Future research in this area could focus on several avenues to further enrich our understanding of outsourcing VAS to 3PLs. Firstly, longitudinal studies could investigate the evolving dynamics of outsourcing relationships over time and assess the long-term impact of outsourcing on company performance and competitiveness. Additionally, qualitative studies could explore the underlying factors driving employee perceptions and experiences with outsourced services, providing deeper insights into the challenges and opportunities encountered. Furthermore, comparative studies across different industries or regions could shed light on the contextual factors shaping outsourcing practices and outcomes, offering valuable insights for practitioners and policymakers alike. Overall, continued research in this

area is essential to inform evidence-based decision-making and drive innovation and improvement in outsourcing practices within the automobile industry and beyond.

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Effectiveness of Corporate Social Responsibility programs conducted for the wellbeing of women in Indian society

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Abstract

Corporate Social Responsibility (CSR) programs have become instrumental in addressing social issues, including the wellbeing of women, in Indian society. This quantitative study aims to assess the effectiveness of CSR programs in improving the wellbeing of women and to investigate the challenges and barriers faced by beneficiaries. Through a survey conducted among women beneficiaries of CSR initiatives, data were collected on various aspects of their experiences, satisfaction levels, and perceived barriers. The findings reveal a mixed picture, with beneficiaries expressing satisfaction with the outcomes of CSR programs while also highlighting significant challenges such as limited awareness, societal norms, and infrastructure constraints. Despite the positive impact of CSR programs on aspects such as overall wellbeing, access to education and skill development, and economic empowerment, addressing these barriers is crucial for enhancing the inclusivity and effectiveness of CSR initiatives.

Keywords: Corporate Social Responsibility, women's wellbeing, India, effectiveness, challenges, barriers.

Introduction

Corporate Social Responsibility (CSR) has become a crucial framework in modern business operations, indicating a transition from a focus on profits to a focus on the interests of all stakeholders involved. In India, where there are ongoing socioeconomic inequalities, corporate social responsibility (CSR) efforts have become increasingly important in tackling societal issues and promoting equitable economic development. CSR programmes often target various society sectors, and there has been a notable emphasis on promoting women's wellness. This

approach is seen as having the ability to drive comprehensive development and promote gender equality. This introduction provides a detailed overview of corporate social responsibility (CSR) activities that are specifically designed to benefit women in Indian society. It explores the specific contextual factors, problems, and possibilities associated with these interventions. The justification for giving priority to the well-being of women within corporate social responsibility (CSR) frameworks in India is based on very complex socio-economic factors. Despite making progress towards achieving gender equality, women in India still face deep-rooted inequalities in areas such as education, healthcare, work, and societal involvement. The dominance of male authority in Indian culture, together with unequal social structures and cultural expectations, highlights the urgent need for collaborative actions to uplift and empower women. In response to this urgent need, both governmental and non-governmental entities have increasingly utilised corporate social responsibility (CSR) as a means to promote positive transformation and improve women's empowerment and socio-economic results. It is crucial to comprehend the fundamental principles and practical aspects of CSR in the midst of the growing discussion around it. Corporate Social Responsibility (CSR), as understood in India, goes beyond simple acts of charity or following regulations. It is a strategic strategy where corporations incorporate social and environmental factors into their fundamental operations and value chains. The implementation of the Companies Act, 2013, which requires companies that satisfy specific requirements to donate a percentage of their revenues towards business Social Responsibility (CSR) activities, has significantly motivated business involvement in social projects, particularly those focused on promoting the well-being of women. As a result, a wide range of corporate social responsibility (CSR) programmes have expanded, including areas such as education and skill training, healthcare, improving livelihoods, promoting gender awareness, and advocating for women's rights. Nevertheless, the impact of CSR programmes in promoting long-lasting advancements in women's welfare is still a topic of examination and discussion. Although there are many programmes, there are still several hurdles in effectively turning corporate social responsibility (CSR) expenditures into measurable results on the ground. The effectiveness of CSR activities is hindered by many issues, including poor targeting, restricted scalability, insufficient monitoring and evaluation procedures, and a lack of linkage with wider development goals. Furthermore, the intricate interaction of socio-cultural factors, geographical differences, and institutional limitations makes it challenging to create and execute programmes that are both culturally appropriate and effective. This research aims to thoroughly analyse the efficacy of corporate social responsibility (CSR) initiatives aimed at improving the welfare of women in Indian society. It will delve into the complexities

of programme development, execution, and results. Ultimately, the combination of corporate resources, social needs, and developmental goals highlights the importance of CSR programmes in advancing the welfare of women in Indian society. However, fully grasping the ability of such efforts to bring about significant change requires a detailed comprehension of the specific circumstances, careful coordination with strategic goals, and strong systems for managing and overseeing the initiatives. This research aims to clarify strategies for improving the effectiveness and influence of CSR activities, therefore promoting inclusive and sustainable development outcomes for women throughout India.

Review of Literature

McCarthy (2017) provides a critical analysis of the efficacy of Corporate Social Responsibility (CSR) initiatives that try to improve the welfare of women in Indian society, utilising a feminist Foucauldian criticism. McCarthy's study questions the fundamental assumptions and results of CSR projects that are commonly presented as means of promoting women's empowerment and gender equality. McCarthy demonstrates the involvement of women participants in acts of resistance and self-formation inside a CSR women's empowerment programme in Ghana, challenging oversimplified accounts of empowerment. This feminist perspective, influenced by the theories of Michel Foucault, emphasises the interconnected and influential aspects of power, while also challenging the corporate-driven approach to empowerment. McCarthy argues that empowerment should be seen as a self-directed process based on self-care, rather than a corporate plan imposed from above. This critique calls for a reassessment of the objectives and methods of corporate social responsibility (CSR) initiatives aimed at improving the welfare of women in Indian society. It emphasises the need for a more sophisticated comprehension of empowerment and gender equality that goes beyond corporate language and acknowledges the intricate realities of women's lives.

Johnstone-Louis (2017) examines the connection between corporate social responsibility (CSR) and women's entrepreneurship, revealing the gender-based dynamics present in CSR programmes that attempt to support women's entrepreneurial pursuits. Johnstone-Louis utilises feminist economics to question the traditional division between production and reproduction when considering work in the field of entrepreneurship. She contends that the restrictive and gender-biased interpretation of labour sustains current disparities and constrains our comprehension of women's involvement in the economy. Johnstone-Louis argues for a comprehensive and all-encompassing perspective on gender within CSR frameworks, taking into account the interconnectedness of production and reproduction. This viewpoint is

informed by a feminist perspective. This essay enhances our comprehension of women's entrepreneurship in the context of corporate social responsibility (CSR) discussions, advocating for a reevaluation of work that goes beyond conventional limitations and incorporates feminist viewpoints. When assessing how successfully CSR programmes benefit women in Indian society, Johnstone-Louis emphasises the need to examine the fundamental assumptions and gendered dynamics that are present in these activities. By including feminist economics into the discussion, academics may enhance their analysis and make a valuable contribution towards achieving fair and comprehensive results for women entrepreneurs in India.

In this study, Babu and Sahay (2018) explore the relationship between corporate social responsibility (CSR) and women's empowerment. They emphasise the potential of CSR programmes to promote gender equality and uphold women's rights. CSR, or Corporate Social Responsibility, is a strategic strategy that organisations use to go beyond legal requirements and participate in activities that promote social welfare and improve their public image. Babu and Sahay emphasise the crucial significance of education and economic engagement in the realm of women's empowerment, which involves advancements in social, economic, political, and legal aspects. Organisations may use CSR initiatives to tackle obstacles to women's empowerment by offering fundamental education, promoting awareness, and cultivating economic prospects. This approach helps reduce prejudice and strengthens women's ability to take action. The authors underscore the imperative of joint endeavours involving diverse stakeholders, such as families, societies, enterprises, NGOs, and government entities, in order to tackle structural obstacles and advance gender equality. Babu and Sahay explain how corporate social responsibility (CSR) initiatives may enhance women's empowerment and contribute to the success of organisations using a system dynamics approach. The text highlights the strong connection between corporate social responsibility (CSR) programmes, the empowerment of women, and the overall success of organisations. It emphasises the need of long-term dedication and collaborative efforts to elevate marginalised women and assure their active involvement in socio-economic progress. Babu and Sahay's conclusions highlight the capacity of CSR programmes to stimulate revolutionary change and promote inclusive growth when assessing their impact on the welfare of women in Indian society. Their discoveries emphasise the necessity for organisations to include gender-responsive methods into their CSR initiatives, therefore promoting the empowerment of women and helping to the achievement of sustainable development goals.

Álvarez-Pérez, Carballo-Penela, and Rivera-Torres (2020) examine how work-life balance, corporate social responsibility (CSR), and gender inequalities intersect in relation to altruistic behaviours in the workplace. Their research, carried out with a sample of 511 Spanish employees, investigates the influence of a family-friendly psychological climate (FFPC) on altruistic behaviour, which is influenced by job satisfaction, while also taking into account gender as a moderating variable. The authors employ structural equation analysis to uncover several significant findings. Firstly, they establish a positive correlation between FFPC (Firm-Focused Psychological Capital) and employees' altruistic behaviours. Secondly, they identify job satisfaction as a mediating factor in the relationship between managerial support and altruism. Lastly, they observe that gender has a differential effect on this relationship. More precisely, the way women perceive assistance from their managers directly affects their altruistic behaviours. However, for males, this effect depends on how it promotes their job happiness. These findings have important implications for managers, indicating that organisations that want to encourage selflessness among employees should make it a priority to create a work environment that is supportive of family needs. Additionally, they should include evaluations of management support in their performance evaluation systems. This study highlights the significance of creating supportive work environments and addressing gender-specific factors in promoting altruistic behaviours and gender equality within organisations, when evaluating the effectiveness of CSR programmes for the wellbeing of women in Indian society. Organisations may improve their efforts to support women's welfare and empowerment in India by comprehending the relationship between work-life balance, corporate social responsibility (CSR), and gender dynamics.

Jatana and Crowther (2007) explore the connection between corporate social responsibility (CSR) and the empowerment of women, focusing specifically on the Indian context. The article seeks to advocate for the significance of Corporate Social Responsibility (CSR) in promoting the empowerment of women in India. It intends to present compelling data that supports the occurrence of this empowerment. The research examines the relationship between corporate social responsibility (CSR) and women's empowerment by analysing data from Indian enterprises. This study sheds light on a hitherto unexplored connection and adds to our overall understanding of the consequences of CSR. The paper's practical implications are relevant to both Indian corporations and global organisations, highlighting the significance of corporate social responsibility (CSR) programmes in tackling gender inequity and advancing women's empowerment. The study emphasises the need of include gender views in corporate social

responsibility (CSR) strategies and practices. It highlights how CSR may contribute to improving women's rights and socio-economic outcomes. This study offers unique insights on the transformative capacity of CSR activities in promoting gender equality and empowerment, specifically in relation to the welfare of women in Indian society. This statement highlights the need of collaborative actions by corporations, governments, and civil society to utilise corporate social responsibility (CSR) as a strategy to promote women's rights and improve their socio-economic standing in India and other regions.

Mishra, Sravan, Pisipati, and Mishra (2024) thoroughly analyse the incorporation of women's concerns into the Corporate Social Responsibility (CSR) approach of Coal India Limited, with a specific emphasis on the coal mining industry in India. The research examines the endeavours to integrate women's issues into corporate social responsibility (CSR) programmes and policies, specifically within the subsidiaries of Coal India Limited, the nation's largest coal-producing firm. The results indicate a notable disparity in the distribution of resources and the types of programmes focused on women's well-being within the wider context of corporate social responsibility (CSR) efforts. Although CSR covers a wide range of areas, there is a noticeable lack of investment and breadth in programmes that serve the needs of women. The report suggests that Coal India Limited's subsidiaries should reassess their objectives and give greater importance to the implementation of corporate social responsibility (CSR) programmes that focus on women's welfare. Additionally, the study emphasises the significance of advancing gender equality and empowerment through corporate social responsibility (CSR) activities. It calls for a collaborative endeavour to close the current gap and strengthen the incorporation of women's concerns in CSR plans. This research emphasises the importance of corporate entities, especially those in extractive industries, to strengthen their dedication to addressing women's needs and promoting gender equality through CSR initiatives. It focuses on evaluating the effectiveness of CSR programmes in improving the wellbeing of women in Indian society. The study highlights the need of promoting a CSR strategy that is inclusive and sensitive to gender issues. It emphasises the potential of such programmes to contribute to the overall development and empowerment of women in the coal mining districts of India.

Uduji, Okolo-Obasi, Onodugo, Nnabuko, and Adedibu (2021) explore the impact of corporate social responsibility (CSR) initiatives undertaken by multinational oil companies (MOCs) on rural women empowerment and the development of agriculture-tourism connections in Nigeria's oil-producing communities, particularly in the Niger Delta region. Their study

contributes to the existing literature on tourism for transformative and inclusive growth. This study examines the influence of corporate social responsibility (CSR) initiatives, namely through global memoranda of understanding (GMoUs), on the involvement of rural women in agritourism value chain projects. The research is conducted by analysing a sample of 800 rural women from the region. The utilisation of a logit model demonstrates that the involvement of rural women in GMoUs activities is restricted as a result of the prevalent norms and cultural practices within rural communities. This constraint highlights the difficulty of attaining gender equality and cultural transformation in the area, since rural women persistently face exclusion from the economic advantages of agritourism in comparison to males. The study highlights the significance of including women smallholders in the tourist value chain using GMoU interventions to promote gender empowerment and enhance social inclusion. Furthermore, it emphasises the necessity of utilising cluster development boards (CDBs) to overcome longstanding obstacles that impede the involvement of rural women in GMoUs initiatives. This approach aims to foster increased inclusion and fair allocation of benefits within the agritourism industry. This study examines the impact of CSR programmes on the welfare of women in Nigerian society. It emphasises that CSR initiatives have the ability to empower rural women and improve their economic prospects. Additionally, the study emphasises the need to address cultural norms and gender inequalities to ensure that women are fully involved and included in agritourism development projects.

Vilkė, Raišienė, and Simanavičienė (2014) examine how gender and corporate social responsibility (CSR) connect, with a specific focus on the changing discussion about the possible significant benefits for both businesses and society. In the late 1990s and early 2000s, the concept of Corporate Social Responsibility (CSR) started to overlap with gender-related concerns, namely in discussions about charitable giving, responsibility, and relationships with stakeholders. The research seeks to examine current discussions on gender and corporate social responsibility (CSR), particularly on their potential advantages for both businesses and society. The authors conduct a comprehensive analysis of scientific literature and research institution findings to systematically organise and synthesise different gender and CSR-related matters. The results suggest that although the CSR framework has started to include gender issues, especially in respect to corporate philanthropy, there is still a requirement for more investigation and comprehension of the complex connection between gender and CSR. This study enhances our comprehension of the significant benefits that arise from incorporating gender views into corporate social responsibility (CSR) activities. It underscores the crucial

role of promoting gender equality and social inclusion within business efforts. This research highlights the need of tackling gender gaps and supporting inclusive methods within CSR frameworks to maximise the benefits for both enterprises and communities. It emphasises the necessity of measuring the efficacy of CSR programmes for the welfare of women in society.

In his study, Abraham (2013) analyses the consequences of the recently implemented Companies Bill in India. This legislation requires firms to allocate a certain amount of funds towards Corporate Social Responsibility (CSR) initiatives. As a result, companies are now held more accountable and expected to produce demonstrable results in their CSR operations. The study highlights the capacity of CSR activities to contribute to inclusive economic expansion and specifically focuses on the empowerment of women as a crucial area for action. More precisely, the author proposes that corporate social responsibility (CSR) initiatives should prioritise the establishment of businesses to provide job opportunities, with a specific focus on empowering women, especially those affiliated with self-help groups (SHGs). The help offered might include monetary aid, education, and promotional assistance, therefore enabling women to engage in business endeavours. In addition, the study suggests the establishment of firms using the cooperative model, with corporate participation in offering early assistance and direction. Corporate organisations may have a significant impact on promoting gender equality and inclusive growth in India by utilising their CSR resources to empower women and support economic development. This paper provides practical insights and recommendations for corporate engagement in evaluating the effectiveness of CSR programmes for the wellbeing of women in Indian society. It emphasises the potential of CSR initiatives to stimulate positive change and empower women through entrepreneurship and economic opportunities.

Mohapatra (2018) investigates the participation of business organisations in advancing gender equality and women's empowerment in India via the lens of corporate social responsibility (CSR). The study highlights the importance of business participation in welfare initiatives, especially in response to compulsory regulations that mandate corporate social responsibility (CSR) involvement in many areas, such as women's empowerment and gender equality. The report offers a comprehensive analysis of budget allocations, action plans, and programmes undertaken by various corporate organisations to tackle women's empowerment and gender equality, with a special focus on corporate activities. In addition, it provides a detailed comparison of the amount of corporate social responsibility (CSR) spending allocated to promoting women's empowerment and gender equality in different states. The report finishes

by conducting a critical assessment of the efficacy of corporate involvement in promoting women's empowerment and gender equality, drawing on the provided data. The study explores the connection between corporate social responsibility and women's empowerment in India, aiming to enhance our comprehension of how business organisations may advance gender equality and inclusive development. This study provides valuable insights into the success of CSR programmes in promoting the welfare of women in Indian society. It examines the breadth and impact of corporate initiatives aimed at empowering women and promoting gender equality. The study also identifies areas where improvements may be made and further actions can be taken.

In conclusion, the review of literature reveals the growing recognition of the importance of Corporate Social Responsibility (CSR) initiatives in promoting gender equality and women's empowerment, both globally and within specific contexts such as India and Nigeria. Studies have explored various dimensions of CSR, including its impact on women's entrepreneurship, work-life balance, and integration of women's issues in CSR strategies. However, despite the wealth of research in this area, there remains a notable research gap in understanding the effectiveness of CSR programs specifically tailored to address the wellbeing of women in Indian society. While some studies have examined CSR interventions targeting women's empowerment, such as enterprise formation and education initiatives, there is a need for more comprehensive assessments of the outcomes and impacts of these programs on the overall wellbeing and empowerment of women in India. Future research should focus on evaluating the effectiveness of CSR initiatives in addressing the diverse needs and challenges faced by women across different socio-economic contexts in India, thereby informing more targeted and impactful CSR strategies aimed at promoting gender equality and women's empowerment.

Objectives of the study

1. Assessing the effectiveness of Corporate Social Responsibility programs conducted for the wellbeing of women in Indian society.
2. Investigate the challenges and barriers faced by the beneficiaries related to the CSR initiatives aimed at improving the wellbeing of women.

Hypotheses

H1: The beneficiaries are considerably satisfied with the outcomes of the CSR programs conducted for the wellbeing of women in Indian society.

H2: There are several challenges and barriers faced by the beneficiaries related to the CSR initiatives aimed at improving the wellbeing of women.

Research Methodology

The research methodology employed a quantitative approach to investigate the effectiveness of Corporate Social Responsibility (CSR) programs for the wellbeing of women in Indian society and to explore the challenges and barriers faced by the beneficiaries of these initiatives. A structured questionnaire was developed based on the research objectives and hypotheses, comprising both closed-ended and Likert scale questions. The questionnaire was distributed to a sample of 330 women who were beneficiaries of CSR programs in various sectors such as education, healthcare, employment, and empowerment initiatives. Data collection was conducted through face-to-face interviews and online surveys, ensuring a diverse representation of respondents from different socio-economic backgrounds and geographical regions across Pune city. The collected data were then analysed using statistical techniques such as descriptive statistics to assess the effectiveness of CSR programs and identify the challenges and barriers faced by the beneficiaries.

Data Analysis

Table 1. Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30 years	36	10.9	10.9	10.9
	30-40 years	161	48.8	48.8	59.7
	40-50 years	66	20.0	20.0	79.7
	50-60 years	46	13.9	13.9	93.6
	Above 60 years	21	6.4	6.4	100.0
	Total	330	100.0	100.0	

Table 1 presents the distribution of respondents according to age groups. The majority of respondents, comprising 48.8%, fell within the age range of 30 to 40 years, followed by 20.0% in the 40 to 50 years age group. Additionally, 10.9% were aged between 18 to 30 years, 13.9% were between 50 to 60 years old, and 6.4% were above 60 years old. This distribution indicates a diverse representation of age groups among the respondents. Overall, the table illustrates the

age demographics of the sample population, providing insights into the age distribution of women beneficiaries participating in the study.

Table 2. The CSR programs have positively contributed to improving my overall wellbeing.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	27	8.2	8.2	8.2
	Disagree	24	7.3	7.3	15.5
	Neutral	21	6.4	6.4	21.8
	Agree	90	27.3	27.3	49.1
	Strongly Agree	168	50.9	50.9	100.0
	Total	330	100.0	100.0	

Table 2 presents the responses of respondents regarding the statement "The CSR programs have positively contributed to improving my overall wellbeing." The majority of respondents, constituting 50.9%, strongly agreed with the statement, indicating a high level of agreement with the positive impact of CSR programs on their overall wellbeing. Additionally, 27.3% agreed with the statement, while 8.2% strongly disagreed, 7.3% disagreed, and 6.4% remained neutral. This distribution suggests a significant proportion of respondents acknowledging the beneficial effects of CSR programs on their wellbeing, with a minority expressing disagreement or neutrality. Overall, the table highlights a predominantly positive perception among respondents regarding the contribution of CSR programs to their overall wellbeing.

Table 3. I feel satisfied with the support and assistance provided to me through the CSR initiatives.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	51	15.5	15.5	15.5
	Disagree	37	11.2	11.2	26.7
	Neutral	12	3.6	3.6	30.3
	Agree	92	27.9	27.9	58.2
	Strongly Agree	138	41.8	41.8	100.0
	Total	330	100.0	100.0	

Table 3 displays the responses of respondents regarding their satisfaction with the support and assistance provided to them through CSR initiatives. The majority of respondents, accounting for 41.8%, strongly agreed that they feel satisfied with the support received, while an additional 27.9% agreed with the statement. Conversely, 15.5% strongly disagreed and 11.2% disagreed with the statement, indicating dissatisfaction with the support provided. Only a small proportion of respondents, 3.6%, remained neutral. This distribution suggests a predominantly positive perception among respondents regarding the support and assistance received through CSR initiatives, with a minority expressing dissatisfaction. Overall, the table indicates a significant level of satisfaction among respondents with the support provided by CSR programs.

Table 4. The CSR programs have enhanced my access to education and skill development opportunities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	38	11.5	11.5	11.5
	Disagree	33	10.0	10.0	21.5
	Neutral	18	5.5	5.5	27.0
	Agree	68	20.6	20.6	47.6
	Strongly Agree	173	52.4	52.4	100.0
	Total	330	100.0	100.0	

Table 4 illustrates the responses of respondents regarding the statement "The CSR programs have enhanced my access to education and skill development opportunities." The majority of respondents, comprising 52.4%, strongly agreed that CSR programs have enhanced their access to education and skill development opportunities, while an additional 20.6% agreed with the statement. Conversely, 11.5% strongly disagreed and 10.0% disagreed with the statement, indicating a perception of limited enhancement in access to education and skill development opportunities. A small proportion of respondents, 5.5%, remained neutral. This distribution suggests a predominantly positive perception among respondents regarding the role of CSR programs in improving their access to education and skill development opportunities. Overall, the table indicates a significant level of agreement among respondents regarding the positive impact of CSR initiatives on their educational and skill development prospects.

Table 5. I believe that the CSR initiatives have helped in increasing my economic empowerment and financial stability.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	39	11.8	11.8	11.8
	Disagree	27	8.2	8.2	20.0
	Neutral	15	4.5	4.5	24.5
	Agree	93	28.2	28.2	52.7
	Strongly Agree	156	47.3	47.3	100.0
	Total	330	100.0	100.0	

Table 5 presents the responses of respondents regarding their beliefs about the impact of CSR initiatives on their economic empowerment and financial stability. The majority of respondents, constituting 47.3%, strongly agreed that CSR initiatives have helped in increasing their economic empowerment and financial stability, while an additional 28.2% agreed with the statement. Conversely, 11.8% strongly disagreed and 8.2% disagreed with the statement, indicating skepticism or disagreement with the notion of CSR initiatives contributing to economic empowerment and financial stability. A small proportion of respondents, 4.5%, remained neutral. This distribution suggests a predominantly positive perception among respondents regarding the role of CSR initiatives in enhancing their economic empowerment and financial stability. Overall, the table indicates a significant level of agreement among respondents regarding the positive impact of CSR programs on their economic wellbeing.

Table 6. Overall, I agree that the CSR programs have positively impacted the lives of women in Indian society.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	33	10.0	10.0	10.0
	Disagree	36	10.9	10.9	20.9
	Neutral	16	4.8	4.8	25.8
	Agree	63	19.1	19.1	44.8
	Strongly Agree	182	55.2	55.2	100.0
	Total	330	100.0	100.0	

Table 6 displays the responses of respondents regarding their overall agreement with the statement "The CSR programs have positively impacted the lives of women in Indian society." The majority of respondents, comprising 55.2%, strongly agreed that CSR programs have positively impacted the lives of women, while an additional 19.1% agreed with the statement. Conversely, 10.0% strongly disagreed and 10.9% disagreed with the statement, indicating skepticism or disagreement with the notion of CSR programs positively impacting women's lives. A small proportion of respondents, 4.8%, remained neutral. This distribution suggests a predominantly positive perception among respondents regarding the overall impact of CSR programs on the lives of women in Indian society. Overall, the table indicates a significant level of agreement among respondents regarding the positive contribution of CSR initiatives to women's wellbeing.

Table 7. I have faced challenges in accessing and utilizing the services offered by the CSR programs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	45	13.6	13.6	13.6
	Disagree	31	9.4	9.4	23.0
	Neutral	27	8.2	8.2	31.2
	Agree	113	34.2	34.2	65.5
	Strongly Agree	114	34.5	34.5	100.0
	Total	330	100.0	100.0	

Table 7 presents respondents' perceptions regarding the challenges they faced in accessing and utilizing the services offered by CSR programs. A significant portion of respondents, comprising 34.5%, strongly agreed that they faced challenges in accessing and utilizing these services, while an additional 34.2% agreed with the statement. Conversely, 13.6% strongly disagreed and 9.4% disagreed with the statement, indicating that they did not perceive facing challenges in accessing and utilizing CSR services. A smaller proportion of respondents, 8.2%, remained neutral on the matter. This distribution suggests a substantial acknowledgment among respondents of encountering challenges in accessing and utilizing CSR program services. Overall, the table indicates a notable level of agreement among respondents regarding the challenges faced in accessing and utilizing CSR services.

Table 8. The lack of awareness about available CSR initiatives has hindered my participation and involvement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	46	13.9	13.9	13.9
	Disagree	33	10.0	10.0	23.9
	Neutral	15	4.5	4.5	28.5
	Agree	68	20.6	20.6	49.1
	Strongly Agree	168	50.9	50.9	100.0
	Total	330	100.0	100.0	

Table 8 illustrates respondents' perspectives on how the lack of awareness about available CSR initiatives has affected their participation and involvement. A majority of respondents, constituting 50.9%, strongly agreed that their lack of awareness hindered their participation, while an additional 20.6% agreed with the statement. In contrast, 13.9% of respondents strongly disagreed, and 10.0% disagreed with the notion that lack of awareness affected their participation. A smaller proportion, 4.5%, remained neutral on the issue. These findings suggest a widespread acknowledgment among respondents that lack of awareness poses a significant barrier to their participation and involvement in CSR initiatives. Overall, the table underscores the importance of increasing awareness about CSR initiatives to enhance beneficiaries' engagement with such programs.

Table 9. I have encountered obstacles such as societal norms and cultural barriers while engaging with the CSR initiatives.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	27	8.2	8.2	8.2
	Disagree	50	15.2	15.2	23.3
	Neutral	33	10.0	10.0	33.3
	Agree	103	31.2	31.2	64.5
	Strongly Agree	117	35.5	35.5	100.0
	Total	330	100.0	100.0	

Table 9 presents respondents' perspectives on encountering obstacles such as societal norms and cultural barriers while engaging with CSR initiatives. A substantial proportion of respondents, comprising 35.5%, strongly agreed that they faced such obstacles, while an additional 31.2% agreed with the statement. Furthermore, 15.2% of respondents disagreed, and

8.2% strongly disagreed with the notion of encountering societal norms and cultural barriers. A smaller percentage, 10.0%, remained neutral on this issue. These findings highlight the prevalence of societal and cultural challenges that beneficiaries encounter when engaging with CSR initiatives, underscoring the importance of addressing these barriers to ensure the effectiveness and inclusivity of such programs.

Table 10. The limited resources and infrastructure have posed challenges in fully benefiting from the CSR programs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	40	12.1	12.1	12.1
	Disagree	33	10.0	10.0	22.1
	Neutral	27	8.2	8.2	30.3
	Agree	99	30.0	30.0	60.3
	Strongly Agree	131	39.7	39.7	100.0
	Total	330	100.0	100.0	

Table 10 illustrates respondents' perspectives on the challenges posed by limited resources and infrastructure in fully benefiting from CSR programs. The majority of respondents, constituting 39.7%, strongly agreed that such limitations have hindered their ability to fully benefit from the CSR initiatives. Additionally, 30.0% of respondents agreed with the statement, while 10.0% disagreed, and 12.1% strongly disagreed with this notion. A smaller percentage, 8.2%, remained neutral regarding the impact of limited resources and infrastructure on their ability to benefit from CSR programs. These findings underscore the significance of addressing resource constraints and enhancing infrastructure to maximize the effectiveness and reach of CSR initiatives for women beneficiaries.

Table 11. Overall, I agree that there are several barriers that have affected the effectiveness of CSR initiatives aimed at improving the wellbeing of women.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	33	10.0	10.0	10.0
	Disagree	36	10.9	10.9	20.9
	Neutral	27	8.2	8.2	29.1
	Agree	59	17.9	17.9	47.0
	Strongly Agree	175	53.0	53.0	100.0
	Total	330	100.0	100.0	

Table 11 presents respondents' perceptions regarding the presence of barriers affecting the effectiveness of CSR initiatives aimed at improving the wellbeing of women. The majority of respondents, comprising 53.0%, strongly agreed that various barriers have indeed impacted the effectiveness of these initiatives. Additionally, 17.9% of respondents agreed with the statement, while 10.9% disagreed, and 10.0% strongly disagreed with this notion. A smaller percentage, 8.2%, remained neutral regarding the existence of barriers affecting the effectiveness of CSR initiatives. These findings highlight the widespread acknowledgment among respondents regarding the challenges and barriers hindering the success of CSR programs targeting women's wellbeing, underscoring the importance of addressing these issues to enhance the impact of such initiatives.

H1: The beneficiaries are considerably satisfied with the outcomes of the CSR programs conducted for the wellbeing of women in Indian society.

Table 12. One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The CSR programs have positively contributed to improving my overall wellbeing.	15.136	329	.000	1.05455	.9175	1.1916
I feel satisfied with the support and assistance provided to me through the CSR initiatives.	8.486	329	.000	.69394	.5331	.8548
The CSR programs have enhanced my access to education and skill development opportunities.	11.826	329	.000	.92424	.7705	1.0780
I believe that the CSR initiatives have helped in increasing my economic empowerment and financial stability.	11.960	329	.000	.90909	.7596	1.0586
Overall, I agree that the CSR programs have positively impacted the lives of women in Indian society.	12.838	329	.000	.98485	.8339	1.1358

The results of the one-sample t-tests indicate significant positive perceptions among the beneficiaries regarding the outcomes of CSR programs aimed at enhancing the wellbeing of women in Indian society. For the statement "The CSR programs have positively contributed to improving my overall wellbeing," respondents exhibited a mean difference of 1.05455, significantly higher than the test value of 3 ($t(329) = 15.136$, $p < .001$). This suggests that

respondents overwhelmingly perceive CSR programs as beneficial to their overall wellbeing. Similarly, participants expressed satisfaction with the support and assistance provided through CSR initiatives, with a mean difference of 0.69394, significantly exceeding the test value ($t(329) = 8.486$, $p < .001$). Furthermore, respondents reported that CSR programs have enhanced their access to education and skill development opportunities, as evidenced by a mean difference of 0.92424 ($t(329) = 11.826$, $p < .001$). Additionally, beneficiaries believed that CSR initiatives have contributed to their economic empowerment and financial stability, with a mean difference of 0.90909 ($t(329) = 11.960$, $p < .001$). Finally, participants agreed that CSR programs have positively impacted the lives of women in Indian society, demonstrating a mean difference of 0.98485 ($t(329) = 12.838$, $p < .001$). These findings collectively support hypothesis H1, indicating a high level of satisfaction and positive perceptions among beneficiaries regarding the effectiveness of CSR programs for women's wellbeing in Indian society.

H2: There are several challenges and barriers faced by the beneficiaries related to the CSR initiatives aimed at improving the wellbeing of women.

Table 13. One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
I have faced challenges in accessing and utilizing the services offered by the CSR programs.	8.729	329	.000	.66667	.5164	.8169
The lack of awareness about available CSR initiatives has hindered my participation and involvement.	10.374	329	.000	.84545	.6851	1.0058
I have encountered obstacles such as societal norms and cultural barriers while engaging with the CSR initiatives.	9.792	329	.000	.70606	.5642	.8479
The limited resources and infrastructure have posed challenges in fully benefiting from the CSR programs.	9.869	329	.000	.75152	.6017	.9013
Overall, I agree that there are several barriers that have affected the effectiveness of CSR initiatives aimed at improving the wellbeing of women.	12.104	329	.000	.93030	.7791	1.0815

The results of the one-sample t-tests reveal significant challenges and barriers faced by beneficiaries regarding CSR initiatives aimed at enhancing the wellbeing of women in Indian society, supporting hypothesis H2. Participants reported facing difficulties in accessing and utilizing the services offered by CSR programs, with a mean difference of 0.66667, significantly exceeding the test value of 3 ($t(329) = 8.729$, $p < .001$). Additionally, respondents expressed that a lack of awareness about available CSR initiatives hindered their participation and involvement, as evidenced by a mean difference of 0.84545 ($t(329) = 10.374$, $p < .001$). Moreover, beneficiaries encountered obstacles such as societal norms and cultural barriers while engaging with CSR initiatives, with a mean difference of 0.70606 ($t(329) = 9.792$, $p < .001$). Furthermore, limited resources and infrastructure posed challenges in fully benefiting from CSR programs, with a mean difference of 0.75152 ($t(329) = 9.869$, $p < .001$). Overall, respondents agreed that several barriers have affected the effectiveness of CSR initiatives aimed at improving the wellbeing of women, with a mean difference of 0.93030 ($t(329) = 12.104$, $p < .001$). These findings highlight the significant challenges and barriers faced by beneficiaries, indicating the need for addressing these issues to enhance the effectiveness of CSR initiatives for women's wellbeing in Indian society.

Findings

The findings of the study reveal both positive outcomes and significant challenges regarding the effectiveness of Corporate Social Responsibility (CSR) programs aimed at improving the wellbeing of women in Indian society. On one hand, the beneficiaries expressed considerable satisfaction with the outcomes of the CSR programs. The results indicate that the CSR initiatives have positively contributed to enhancing the overall wellbeing of women, providing them with support, assistance, and opportunities for education, skill development, economic empowerment, and financial stability. Additionally, the respondents agreed that these CSR programs have had a positive impact on the lives of women in Indian society, reflecting a recognition of the benefits derived from such initiatives. These findings underscore the potential of CSR programs to uplift women and address socio-economic challenges, aligning with the broader objectives of promoting gender equality and empowerment.

However, the study also identified several challenges and barriers faced by beneficiaries in accessing and benefiting from CSR initiatives. Participants reported difficulties in accessing and utilizing the services offered by these programs, indicating potential gaps in implementation and outreach. Additionally, a lack of awareness about available CSR initiatives

emerged as a significant barrier, hindering the participation and involvement of women. Societal norms, cultural barriers, and limited resources and infrastructure further posed challenges in fully benefiting from CSR programs, highlighting the complex socio-cultural and economic contexts in which these initiatives operate. These findings underscore the importance of addressing these challenges to enhance the effectiveness and inclusivity of CSR initiatives aimed at improving the wellbeing of women in Indian society.

Conclusion

In conclusion, this study sheds light on the nuanced landscape of Corporate Social Responsibility (CSR) programs targeted at enhancing the wellbeing of women in Indian society. The findings suggest a mixed picture, with beneficiaries expressing satisfaction with the outcomes of CSR initiatives while also highlighting significant challenges and barriers. While the positive impact of these programs on various aspects of women's lives is evident, including their overall wellbeing, access to education and skill development, and economic empowerment, there is also a pressing need to address the hurdles that impede their full effectiveness. The identification of challenges such as limited awareness, societal norms, and infrastructure constraints underscores the importance of a comprehensive approach to CSR implementation that considers the diverse socio-cultural contexts and systemic barriers faced by women.

The implications of these findings extend to multiple stakeholders, including corporations, policymakers, and civil society organizations involved in CSR activities. Firstly, corporations need to enhance the inclusivity and effectiveness of their CSR programs by addressing the identified challenges and barriers. This may involve implementing targeted awareness campaigns, engaging with local communities to understand their needs and preferences, and collaborating with government agencies and NGOs to leverage resources and expertise. Policymakers play a crucial role in creating an enabling environment for CSR initiatives by providing supportive regulatory frameworks, promoting gender-sensitive policies, and fostering partnerships between various stakeholders. Civil society organizations can contribute by advocating for women's rights and empowerment, facilitating community participation, and monitoring the implementation of CSR programs to ensure accountability and transparency.

Looking ahead, future research should delve deeper into understanding the dynamics of CSR implementation and its impact on gender equality and women's empowerment in Indian society. Longitudinal studies can provide insights into the long-term effects of CSR programs and

identify strategies for sustaining positive outcomes over time. Additionally, comparative analyses across different regions and sectors can elucidate variations in CSR practices and their effectiveness in addressing gender disparities. Moreover, qualitative research methodologies such as interviews and focus group discussions can offer a more nuanced understanding of women's experiences and perspectives regarding CSR initiatives, complementing quantitative findings and enriching our understanding of the complex interplay between CSR, gender, and social change. By addressing these research gaps, scholars can contribute to the advancement of knowledge and inform evidence-based interventions that promote the holistic wellbeing and empowerment of women in Indian society.

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Exploring Corporate Social Responsibility initiatives for development of life skills amongst Children: Past, Present and Future

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Abstract

This research paper investigates the perceptions and impacts of Corporate Social Responsibility (CSR) and Social Responsibility (SR) initiatives aimed at developing life skills among children. Using a quantitative approach, data were collected from 294 respondents through Likert-scale statements assessing their perceptions of CSR and SR initiatives. The findings reveal a widespread positive perception of these initiatives, with respondents overwhelmingly agreeing on their importance for fostering inclusive societies and enhancing children's opportunities for personal growth and success. Moreover, the study highlights the significant role of CSR and SR initiatives in contributing to broader societal well-being and breaking the cycle of poverty and inequality. Implications of the findings for businesses, policymakers, educators, and communities are discussed, along with suggestions for future research directions.

Keywords: Corporate Social Responsibility, Social Responsibility, life skills, children, perception, impact, inclusive society, poverty, inequality.

Introduction

Corporate Social Responsibility (CSR) efforts are now seen as crucial catalysts for societal advancement, comprising a variety of actions that aim to promote beneficial social and environmental outcomes in addition to corporate goals. CSR encompasses several efforts aimed at developing life skills in children, which play a vital role in fostering the potential of future generations. This introduction establishes the context for a comprehensive examination of corporate social responsibility (CSR) programmes that aim to improve the life skills of

children. It will examine the historical development of these projects and speculate on their future directions.

1. Importance of Corporate Social Responsibility: Corporate Social Responsibility (CSR), which refers to the deliberate incorporation of social and environmental considerations into company activities and engagement with stakeholders, has gained significant prominence in recent years. Although the idea originated in the early 20th century, it has gained traction due to increasing social demands for corporations to make constructive contributions to the communities in which they operate. Corporate Social Responsibility (CSR) comprises a range of activities, such as charity, environmental sustainability initiatives, ethical labour practices, and community participation. The main goal of these activities is to provide long-term benefit for society that goes beyond financial gains.

2. Significance of Life Skills Development in Children: Life skills cover a wide range of abilities that empower individuals to effectively traverse many obstacles and opportunities in personal, academic, and professional domains. The acquisition of these abilities, such as critical thinking, communication, teamwork, creativity, flexibility, and resilience, is crucial for individuals to effectively navigate their life and achieve personal fulfilment and productivity. Furthermore, studies suggest that the development of life skills in early infancy establishes the groundwork for future achievements, including academic accomplishments, job opportunities, and general quality of life. Hence, allocating resources to enhance the acquisition of life skills in children is not only a moral obligation but also a strategic necessity for both enterprises and societies.

3. Justification for Investigating Corporate Social Responsibility (CSR) Initiatives for the Development of Children's Life Skills: In light of this situation, the examination of corporate social responsibility (CSR) projects that focus on enhancing life skills in children is both important and relevant. Through the strategic use of their assets, knowledge, and impact, firms has the capacity to make substantial contributions to the comprehensive growth and well-being of children. Corporate social responsibility (CSR) initiatives in this field involve a wide range of activities, such as educational programmes, mentorship programmes, extracurricular activities, and community partnerships. The goal of these initiatives is to provide children with the necessary skills and competencies to succeed in a complex and interconnected world. This study article aims to conduct a thorough analysis of corporate social responsibility (CSR) efforts that contribute to the enhancement of life skills in children. In the upcoming sections,

we will examine the historical progression of CSR initiatives in this field, assess the current state of CSR involvement, and investigate potential future paths and prospects for promoting children's life skills development through corporate social responsibility.

Review of Literature

Varghese and Supraja (2016) emphasise the growing importance of corporate social responsibility (CSR) among multinational corporations, specifically in India. Prominent companies are progressively integrating their operations with socially significant initiatives in an effort to enhance their brand reputation. With an emphasis on environmental accountability and social responsibility rather than profit-driven strategies, the authors underscore the extensive participation of Indian corporations in corporate social responsibility endeavours that encompass health, education, skill development, livelihood provision, and societal empowerment. In this particular context, the authors explore CSR initiatives that are specifically designed to enhance the welfare of children, recognising that certain Indian companies pursue comprehensive development goals. By conducting an analysis of the aims, sectors, operational approaches, and boundaries of corporate social responsibility (CSR) initiatives, this paper emphasises the criticality of protecting the rights of children who are marginalised and promoting enduring positive changes for them. In addition, the authors propose the incorporation of child rights protection into corporate social responsibility (CSR) frameworks and integrated empowerment strategies. They argue that corporations have significant power to improve children's access to vital resources and promote their growth. This review functions as a fundamental investigation into the realm of corporate social responsibility (CSR) initiatives that focus on the welfare of children. It offers significant perspectives and governing principles that contribute to the wider discussion surrounding the impact of CSR initiatives on the development of life skills in children.

Jaysawal and Saha (2015) emphasise the significance of Corporate Social Responsibility (CSR) as a foundational principle that advocates for the accountability of public and private organisations and corporations to the communities in which they conduct business. CSR involves the alignment of business operations with societal objectives and values, with the aim of minimising costs and risks while adding value and repute to the brand. CSR, according to Howard Bowen, involves the pursuit of policies and choices that benefit society as a whole. The significance of strategic alignment in corporate social responsibility (CSR) endeavours to attain sustainable advancements in the realms of the environment, society, and economy is

underscored by the authors. The article examines the various corporate social responsibility (CSR) initiatives implemented by companies in India with the aim of promoting the growth of life skills in children. The paper not only emphasises the expansion of corporate social responsibility (CSR) endeavours but also discusses significant obstacles faced during the execution of these initiatives, thus illuminating the intricate and multifaceted nature of corporate involvement in fostering the development of life skills in children.
In his work, Sadasivan (2018) explores the critical nature of skill development in India, which is prompted by the country's demographic shift marked by a rapidly expanding adolescent demographic. In light of the imperative to exploit this demographic advantage, the Indian government has implemented a range of initiatives, most notably the "Skill India Campaign," aimed at augmenting the skill sets of the youth. Notwithstanding the endeavours of governmental bodies, the corporate sector has made a comparatively modest contribution to skill development via Corporate Social Responsibility (CSR) endeavours. The paper begins with an analysis of the skill environment in India, evaluating the contributions of the public and private sectors in rectifying the existing deficiency in skills. In order to bridge this divide, it subsequently proposes a redefined CSR strategy and advocates for a proactive Public-Private Partnership (PPP) model. By encouraging corporate and governmental collaboration in skill development initiatives, the paper proposes a sustainable and mutually advantageous strategy for establishing India as a global "skill capital." Moreover, it elucidates the prospective benefits that this collaboration may bestow upon every participant, emphasising the profound influence it might exert on the socioeconomic fabric of India.

Bihari and Pradhan (2011) provide insight into the proliferation of socially responsible initiatives in the banking industry as a specific sector within the Indian corporate sphere. The objective of this article is to examine the Corporate Social Responsibility (CSR) initiatives implemented by prominent entities in the Indian banking sector and evaluate the degree to which these initiatives affect the performance and reputation of the respective organisations. By conducting an extensive examination of published records that detail corporate social responsibility (CSR) initiatives carried out by prominent Indian institutions in recent times, this research investigates the effects of these endeavours on both business performance and brand perception. The results highlight a significant rise in corporate social responsibility (CSR) initiatives among banks in India, which have observable beneficial impacts on business performance, organisational reputation, and benevolence. This correlation implies that the societal contributions undertaken by banks yield benefits not only for the broader community

but also for the corporate sector, thereby enhancing their value proposition as a whole. Moreover, the research stands as evidence of the profound impact that CSR initiatives can have, establishing a praiseworthy example for other service industries to follow. The provision of financial aid to students so they may pursue an education and sponsorship programmes that aim to train orphans and students living in slums on computers are noteworthy instances that demonstrate the multifaceted impact of CSR initiatives beyond the banking industry.

In his work, Simorangkir (2018) examines the integration of life skills education into the curriculum of Swiss German University's high school pupils during Social Media Week (SMW), an annual occasion coordinated by the Department of Communication and Public Relations. Students will have the opportunity to exhibit their abilities in project management, communication, and talent management in accordance with the department's tenth anniversary theme, "A Decade of Communication Excellence." SMW 2016, which was conducted from November 8th to 10th, 2016, integrates three fundamental components: entertainment, education, and community service. Significantly, the initial two days of the occasion are devoted to workshops specifically designed for high school pupils. These workshops provide valuable prospects for augmenting their self-assurance and communication proficiencies via a diverse array of endeavours, including videography and photography, exercises that foster self-assurance, e-commerce, and public speaking. SMW facilitates practical skills training for high school students, thereby equipping them with fundamental life skills that are indispensable for their advancement in both their personal and professional lives during the digital age. In their qualitative research, Richards and Phillipson (2017) sought to investigate the perspectives of children and parents concerning the corporate social responsibility (CSR) initiatives of Big Food and the way in which they affect local communities. The findings of the research indicated that both parents and children exhibited a significant degree of cognizance and identification with regards to corporate social responsibility (CSR) initiatives linked to well-known brands like McDonald's and Coca-Cola. The presence of CSR initiatives aimed at children's contexts was acknowledged by the participants, suggesting a significant correlation between these brands and endeavours that prioritise social responsibility. Although a proportion of parents and the majority of children regarded these CSR initiatives as admirable deeds consistent with concepts of merit and value, others cast doubt on their veracity and ethical soundness. Certain individuals perceived CSR initiatives as an indication of the organization's ethical standing, as they corresponded with their personal convictions regarding philanthropy and well-being. Nevertheless, a portion of the respondents perceived CSR strategies as being

in direct opposition to the fundamental business goals of the organisations or as shady tactics intended to obscure unethical conduct. By shedding light on the multifaceted viewpoints held by communities concerning the perceived worth and consequences of Big Food's CSR tactics, this research emphasises the difficulty of assessing the societal ramifications of food industry corporate social responsibility initiatives.

In their study, Loh and Shukhaila (2019) investigate the potential and implementation of corporate social responsibility (CSR) endeavours within the education industry. Specifically, they concentrate on the utilisation of three-dimensional hologram (3DH) technology as a means to augment the cognitive abilities of primary school students. The authors emphasise the potential for corporations to enhance their local standing and benevolence by supporting technological advancements in education via corporate social responsibility (CSR) initiatives, thereby benefiting both the academic and business communities. The research underscores the advantages of digital learning technologies, specifically 3DH, in fostering student motivation and engagement while delivering high-quality instruction. By conducting an extensive examination and meta-analysis of 3DH in its capacity as a digital learning instrument, this research highlights its capacity to engage students' focus and alleviate cognitive strain, ultimately leading to improved academic achievements. By utilising observational methods and qualitative analysis, this research offers valuable insights into the efficacy of 3DH technology in the context of education. In general, the results indicate a favourable association between 3DH technology and improved cognitive abilities in primary school students; thus, they support the implementation of these groundbreaking tools in the field of education. The paper concludes with a discussion of its limitations and implicit suggestions for further investigation, thus making a contribution to the ongoing dialogue surrounding the utilisation of technology to promote educational progress via corporate social responsibility endeavours.

The authors of Ismail, Amat Johar, Mohd Rasdi, and Alias (2014) highlight the lack of understanding concerning the effects of corporate social responsibility (CSR) initiatives on the progress of educational institutions, with a specific focus on developing nations such as Malaysia. The impacts of various categories of CSR programmes on school development as perceived by educators are examined in this study. The study utilisations information obtained from focus group discussions with two cohorts of teachers and data collected through a survey of 273 educators from institutions that are engaged in CSR initiatives. Through the provision of funds, CSR programmes have significantly influenced school development, specifically in

terms of improving the physical infrastructure and facilities of educational institutions, according to the results of this exploratory study. Furthermore, the implementation of CSR initiatives has enabled the provision of reading materials for instructors and students, which has resulted in enhancements to school environments and scholastic performance. This research emphasises the importance of corporate social responsibility (CSR) involvement in advancing school progress and demonstrates the concrete advantages that schools gain from such endeavours; thus, it contributes to the understanding of future CSR approaches that seek to improve educational achievements in the context of developing nations.

In his work, Mahapatra (2019) discusses the dynamic nature of the business environment and the growing demands of stakeholders. He underscores the significance of implementing strong Corporate Social Responsibility (CSR) initiatives that generate considerable advantages. Acknowledging communities as critical constituents who authorise corporations to function, the article emphasises the critical significance of corporate social responsibility (CSR) in meeting community requirements and ensuring long-term viability. In addition, corporate social responsibility (CSR) initiatives are portrayed as pivotal in promoting employee attraction, retention, and motivation, as well as improving community livelihoods and income levels; thus, they foster corporate citizenship. Corporate Social Responsibility (CSR) serves as an avenue for the private sector to actively participate in social initiatives, thereby making a positive contribution to the overall welfare of society. Examining CSR practices in the private and public sectors of India, the study extracts insights from a representative sample of businesses. By utilising secondary sources, including annual sustainability reports, the research demonstrates that private sector organisations allocate greater resources to corporate social responsibility (CSR) initiatives and employ a more strategic approach in comparison to their public sector counterparts, which primarily focus on addressing community needs in a problem-oriented manner. This analysis illuminates the discrepancies in corporate social responsibility (CSR) practices between the public and private sectors, offering significant insights for policymakers and stakeholders aiming to improve CSR initiatives in India.

In his study, Werner (2009) investigates the capacity of corporate social responsibility (CSR) endeavours to mitigate social exclusion among the juvenile population in Bangladesh. Notwithstanding the historical correlation between exclusionary practices and the private sector, corporate social responsibility (CSR) endeavours present prospects to enhance the social standing, financial prospects, and service accessibility of marginalised communities.

This paper examines CSR projects that provide healthcare services to female workers and their communities, as well as case studies of initiatives that improve job skills and employment opportunities for marginalised groups (including women, disabled individuals, and rehabilitated drug users) in an effort to reduce social exclusion among children. In addition to providing valuable insights into effective corporate social responsibility (CSR) initiatives, these case studies underscore attributes and methodologies that are transferable and scalable across diverse sectors, nations, and demographics. As a result of the analysis-identified common success factors, recommendations for designing and executing CSR initiatives that target socially excluded groups are formulated. The research highlights the potential for corporate social responsibility (CSR) to generate enduring benefits for developing nations, specifically for marginalised communities. However, it also underlines the imperative for continuous surveillance and discerning assessment to guarantee the efficacy and viability of such endeavours.

In summary, the literature review underscores the wide array of Corporate Social Responsibility (CSR) endeavours that seek to tackle a variety of social concerns, one of which is the instruction of children in life skills. The analysed studies emphasise the growing acknowledgement of corporate social responsibility (CSR) as a strategy for organisations to improve their brand image and reputation while making a positive contribution to society. Despite this, a significant research void arises regarding the thorough assessment of the efficacy and enduring consequences of corporate social responsibility (CSR) endeavours on the development of life skills in children. Although numerous studies provide valuable insights into the outcomes of particular corporate social responsibility (CSR) initiatives, more comprehensive assessments are necessary to comprehend the intricate dynamics at play and ascertain optimal strategies that promote long-term sustainability. Furthermore, the alignment of corporate social responsibility (CSR) initiatives with wider societal objectives and educational frameworks has received little attention, which presents a substantial opportunity for future research to fill this void and provide guidance for strategic interventions that utilise CSR to foster the holistic development of children.

Objectives

1. To assess the extent of positive perception among individuals towards Corporate Social Responsibility initiatives aimed at developing life skills among children.

2. To examine the influence of Social Responsibility initiatives focused on the development of life skills among children on their future prospects and overall well-being.

Hypotheses

H1: People have a positive perception towards Corporate Social Responsibility initiatives for development of life skills amongst Children.

H2: Social Responsibility initiatives for development of life skills amongst Children have a deep impact on the future prospects of the children involved.

Research Methodology

The research utilized a quantitative approach to investigate the hypotheses outlined. A structured survey instrument was developed to collect data from a sample of 294 participants. The survey included questions designed to assess individuals' perceptions towards Corporate Social Responsibility initiatives aimed at developing life skills among children, as well as their opinions on the impact of such initiatives on the future prospects and overall well-being of the children involved. The sample was selected using random sampling techniques to ensure representativeness and generalizability of the findings. Data collection took place through online surveys administered to participants, and responses were anonymized to encourage candid and honest feedback. Statistical analysis, including descriptive statistics and inferential test was conducted to examine the relationships between variables and test the hypotheses. The research methodology adhered to ethical guidelines, ensuring participant confidentiality and informed consent throughout the study.

Data Analysis

Table 1. Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30 years	29	9.9	9.9	9.9
	30-40 years	151	51.4	51.4	61.2
	40-50 years	59	20.1	20.1	81.3
	50-60 years	37	12.6	12.6	93.9
	Above 60 years	18	6.1	6.1	100.0
	Total	294	100.0	100.0	

The table presents the distribution of respondents' age groups in the study sample. The majority of respondents were aged between 30 and 40 years, constituting 51.4% of the total sample. Following this, the 40-50 years age group comprised 20.1% of the respondents, while the 50-

60 years and above 60 years age groups accounted for 12.6% and 6.1%, respectively. The smallest proportion of respondents fell within the 18-30 years age group, making up 9.9% of the total sample. Overall, the data indicate a relatively balanced representation across different age categories, with a significant portion of respondents falling within the middle-aged range of 30 to 50 years.

Table 2. Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	158	53.7	53.7	53.7
	Female	136	46.3	46.3	100.0
	Total	294	100.0	100.0	

Table 2 illustrates the gender distribution among the respondents in the study. The majority of respondents identified as male, constituting 53.7% of the total sample, while the remaining 46.3% identified as female. Overall, the data indicate a slightly higher representation of males compared to females within the study sample.

Table 3. Corporate Social Responsibility initiatives aimed at developing life skills among children are important for fostering a supportive and inclusive society.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	22	7.5	7.5	7.5
	Disagree	22	7.5	7.5	15.0
	Neutral	17	5.8	5.8	20.7
	Agree	76	25.9	25.9	46.6
	Strongly Agree	157	53.4	53.4	100.0
	Total	294	100.0	100.0	

Table 3 presents the responses to the statement "Corporate Social Responsibility initiatives aimed at developing life skills among children are important for fostering a supportive and inclusive society." The majority of respondents strongly agreed with this statement, comprising 53.4% of the total sample, while 25.9% agreed. A smaller proportion of respondents were neutral (5.8%), disagreed (7.5%), or strongly disagreed (7.5%) with the statement. Overall, the data reflect a strong consensus among respondents regarding the importance of CSR initiatives focused on developing life skills among children for promoting a supportive and inclusive society.

Table 4. I believe that companies should actively invest in programs that promote the development of life skills among children in their communities.

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Strongly Disagree	44	15.0	15.0	15.0
	Disagree	33	11.2	11.2	26.2
	Neutral	10	3.4	3.4	29.6
	Agree	79	26.9	26.9	56.5
	Strongly Agree	128	43.5	43.5	100.0
	Total	294	100.0	100.0	

Table 4 displays the responses to the statement "I believe that companies should actively invest in programs that promote the development of life skills among children in their communities." The majority of respondents strongly agreed with this statement, constituting 43.5% of the total sample, while an additional 26.9% agreed. A smaller percentage of respondents were neutral (3.4%), disagreed (11.2%), or strongly disagreed (15.0%) with the statement. Overall, the data indicate a strong inclination among respondents towards the active investment of companies in programs aimed at fostering the development of life skills among children in their communities.

Table 5. I perceive Corporate Social Responsibility initiatives focused on children's life skill development as a valuable contribution to societal well-being.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	32	10.9	10.9	10.9
	Disagree	27	9.2	9.2	20.1
	Neutral	15	5.1	5.1	25.2
	Agree	59	20.1	20.1	45.2
	Strongly Agree	161	54.8	54.8	100.0
	Total	294	100.0	100.0	

Table 5 illustrates the responses to the statement "I perceive Corporate Social Responsibility initiatives focused on children's life skill development as a valuable contribution to societal well-being." The data reveal that a significant majority of respondents strongly agreed with the statement, comprising 54.8% of the total sample. Additionally, 20.1% of respondents agreed with the statement. Conversely, a smaller proportion of respondents were neutral (5.1%), disagreed (9.2%), or strongly disagreed (10.9%) with the statement. Overall, the findings suggest a widespread perception among respondents regarding the value of Corporate Social Responsibility initiatives targeting children's life skill development in enhancing societal well-being.

Table 6. I agree that Corporate Social Responsibility initiatives play a significant role in enhancing children's opportunities for personal growth and success.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	9.9	9.9	9.9
	Disagree	27	9.2	9.2	19.0
	Neutral	15	5.1	5.1	24.1
	Agree	77	26.2	26.2	50.3
	Strongly Agree	146	49.7	49.7	100.0
	Total	294	100.0	100.0	

Table 6 displays respondents' perspectives on the statement "I agree that Corporate Social Responsibility initiatives play a significant role in enhancing children's opportunities for personal growth and success." The data indicate that a majority of respondents strongly agreed with the statement, constituting 49.7% of the total sample. Additionally, 26.2% of respondents agreed with the statement. In contrast, a smaller percentage of respondents were neutral (5.1%), disagreed (9.2%), or strongly disagreed (9.9%) with the statement. These findings underscore a prevalent belief among respondents regarding the substantial impact of Corporate Social Responsibility initiatives in facilitating children's personal growth and success opportunities.

Table 7. Supporting Corporate Social Responsibility initiatives for children's life skill development reflects positively on a company's reputation and brand image.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	26	8.8	8.8	8.8
	Disagree	28	9.5	9.5	18.4
	Neutral	16	5.4	5.4	23.8
	Agree	53	18.0	18.0	41.8
	Strongly Agree	171	58.2	58.2	100.0
	Total	294	100.0	100.0	

Table 7 illustrates respondents' opinions regarding the statement "Supporting Corporate Social Responsibility initiatives for children's life skill development reflects positively on a company's reputation and brand image." The data indicate a strong inclination towards agreement with the statement, with 58.2% of respondents strongly agreeing and 18.0% agreeing. Conversely, a minority of respondents expressed disagreement, with 9.5% disagreeing and 8.8% strongly disagreeing. Additionally, a small proportion of respondents remained neutral, comprising 5.4% of the total sample. These findings suggest a widespread belief among respondents that endorsing Corporate Social Responsibility initiatives targeting children's life skill development has a favorable impact on a company's reputation and brand image.

Table 8. I believe that children who participate in Social Responsibility initiatives for life skill development are better equipped for future challenges and opportunities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	40	13.6	13.6	13.6
	Disagree	26	8.8	8.8	22.4
	Neutral	21	7.1	7.1	29.6
	Agree	100	34.0	34.0	63.6
	Strongly Agree	107	36.4	36.4	100.0
	Total	294	100.0	100.0	

Table 8 presents the distribution of responses regarding the statement "I believe that children who participate in Social Responsibility initiatives for life skill development are better equipped for future challenges and opportunities." The data reveal a notable trend towards agreement, with 36.4% of respondents strongly agreeing and 34.0% agreeing with the statement. Conversely, a minority of respondents expressed disagreement, with 8.8% disagreeing and 13.6% strongly disagreeing. A smaller proportion of respondents remained neutral, comprising 7.1% of the total sample. These findings suggest a prevailing belief among respondents that children who engage in Social Responsibility initiatives for life skill development are more prepared to navigate future challenges and seize opportunities.

Table 9. Social Responsibility initiatives aimed at developing life skills among children contribute significantly to their overall well-being and future success.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	38	12.9	12.9	12.9
	Disagree	29	9.9	9.9	22.8
	Neutral	13	4.4	4.4	27.2
	Agree	55	18.7	18.7	45.9
	Strongly Agree	159	54.1	54.1	100.0
	Total	294	100.0	100.0	

Table 9 illustrates the responses concerning the statement "Social Responsibility initiatives aimed at developing life skills among children contribute significantly to their overall well-being and future success." The data display a predominant inclination towards agreement, with 54.1% of respondents strongly agreeing and 18.7% agreeing with the statement. Conversely, a minority of respondents expressed disagreement, with 9.9% disagreeing and 12.9% strongly disagreeing. A smaller proportion of respondents remained neutral, constituting 4.4% of the total sample. These findings suggest a prevailing belief among respondents regarding the substantial contribution of Social Responsibility initiatives targeting children's life skills development to their overall well-being and future success.

Table 10. Children who engage in Social Responsibility initiatives for life skill development are likely to experience positive long-term outcomes in various aspects of their lives.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	23	7.8	7.8	7.8
	Disagree	42	14.3	14.3	22.1
	Neutral	29	9.9	9.9	32.0
	Agree	95	32.3	32.3	64.3
	Strongly Agree	105	35.7	35.7	100.0
	Total	294	100.0	100.0	

Table 10 presents the distribution of responses regarding the assertion "Children who engage in Social Responsibility initiatives for life skill development are likely to experience positive long-term outcomes in various aspects of their lives." The majority of respondents expressed agreement with the statement, with 35.7% strongly agreeing and 32.3% agreeing. Conversely, a smaller percentage of respondents disagreed, with 14.3% disagreeing and 7.8% strongly disagreeing. Additionally, 9.9% of respondents remained neutral. These findings indicate a prevailing belief among respondents that children participating in Social Responsibility initiatives for life skill development are likely to encounter positive long-term outcomes across various facets of their lives.

Table 11. I perceive Social Responsibility initiatives focused on children's life skill development as crucial for breaking the cycle of poverty and inequality.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	34	11.6	11.6	11.6
	Disagree	30	10.2	10.2	21.8
	Neutral	25	8.5	8.5	30.3
	Agree	82	27.9	27.9	58.2
	Strongly Agree	123	41.8	41.8	100.0
	Total	294	100.0	100.0	

Table 11 illustrates the distribution of responses concerning the statement "I perceive Social Responsibility initiatives focused on children's life skill development as crucial for breaking the cycle of poverty and inequality." The majority of respondents expressed strong agreement with the assertion, with 41.8% strongly agreeing and 27.9% agreeing. Conversely, a smaller proportion of respondents disagreed, with 10.2% disagreeing and 11.6% strongly disagreeing. Additionally, 8.5% of respondents remained neutral. These findings suggest a prevailing belief among respondents regarding the significance of Social Responsibility initiatives targeting children's life skill development in addressing and potentially mitigating the cycle of poverty and inequality.

Table 12. Supporting Social Responsibility initiatives for children's life skill development is essential for creating a more prosperous and equitable society.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	27	9.2	9.2	9.2
	Disagree	29	9.9	9.9	19.0
	Neutral	22	7.5	7.5	26.5
	Agree	52	17.7	17.7	44.2
	Strongly Agree	164	55.8	55.8	100.0
	Total	294	100.0	100.0	

Table 12 summarizes responses to the statement "Supporting Social Responsibility initiatives for children's life skill development is essential for creating a more prosperous and equitable society." The data reveals a strong inclination towards agreement, as the majority of respondents either strongly agreed (55.8%) or agreed (17.7%) with the statement. Conversely, a smaller proportion of respondents disagreed, with 9.9% indicating disagreement and 9.2% strongly disagreeing. Additionally, 7.5% of respondents remained neutral. These results underscore the perceived importance of supporting Social Responsibility initiatives aimed at fostering children's life skill development in the pursuit of a more prosperous and equitable society.

H1: People have a positive perception towards Corporate Social Responsibility initiatives for development of life skills amongst Children.

Table 13. One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Corporate Social Responsibility initiatives aimed at developing life skills among children are important for fostering a supportive and inclusive society.	15.131	293	.000	1.10204	.9587	1.2454
I believe that companies should actively invest in programs that promote the development of life skills among children in their communities.	8.417	293	.000	.72789	.5577	.8981
I perceive Corporate Social Responsibility initiatives focused on children's life skill development as a valuable contribution to societal well-being.	12.105	293	.000	.98639	.8260	1.1468

I agree that Corporate Social Responsibility initiatives play a significant role in enhancing children's opportunities for personal growth and success.	12.319	293	.000	.96599	.8117	1.1203
Supporting Corporate Social Responsibility initiatives for children's life skill development reflects positively on a company's reputation and brand image.	13.640	293	.000	1.07143	.9168	1.2260

The results of the one-sample t-tests conducted to assess people's perception towards Corporate Social Responsibility (CSR) initiatives for the development of life skills among children are indicative of a significantly positive perception across all statements, supporting H1. The first statement, which asserts that CSR initiatives aimed at developing life skills among children are important for fostering a supportive and inclusive society, yielded a mean difference of 1.10204 ($t = 15.131$, $p < .001$), signifying a strong agreement among respondents. This aligns with the hypothesis, suggesting that individuals perceive such initiatives as crucial for societal well-being and inclusivity. Similarly, respondents expressed substantial support for the statement advocating for active investment by companies in programs promoting children's life skills development within their communities, with a mean difference of 0.72789 ($t = 8.417$, $p < .001$). This underscores the belief that corporate investment in such initiatives is viewed positively and deemed necessary for societal advancement. Moreover, respondents strongly agreed that CSR initiatives focused on children's life skill development make a valuable contribution to societal well-being, as evidenced by a mean difference of 0.98639 ($t = 12.105$, $p < .001$). This supports the notion that individuals perceive these initiatives as impactful and beneficial for society at large. Furthermore, participants indicated a significant belief in the role of CSR initiatives in enhancing children's opportunities for personal growth and success, with a mean difference of 0.96599 ($t = 12.319$, $p < .001$), reinforcing the hypothesis that such initiatives are viewed positively in terms of their potential outcomes for children. Lastly, respondents strongly agreed that supporting CSR initiatives for children's life skill development reflects positively on a company's reputation and brand image, as indicated by a mean difference of 1.07143 ($t = 13.640$, $p < .001$). This supports the hypothesis by suggesting that individuals perceive corporate support for such initiatives as beneficial not only for children but also for the company itself, enhancing its reputation and brand image within the community. Overall, the findings demonstrate a consistent and robustly positive perception towards CSR initiatives aimed at the development of life skills among children, aligning closely with the hypothesis posited.

H2: Social Responsibility initiatives for development of life skills amongst Children have a deep impact on the future prospects of the children involved.

Table 14. One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
I believe that children who participate in Social Responsibility initiatives for life skill development are better equipped for future challenges and opportunities.	8.722	293	.000	.70748	.5478	.8671
Social Responsibility initiatives aimed at developing life skills among children contribute significantly to their overall well-being and future success.	10.679	293	.000	.91156	.7436	1.0796
Children who engage in Social Responsibility initiatives for life skill development are likely to experience positive long-term outcomes in various aspects of their lives.	9.798	293	.000	.73810	.5898	.8864
I perceive Social Responsibility initiatives focused on children's life skill development as crucial for breaking the cycle of poverty and inequality.	9.702	293	.000	.78231	.6236	.9410
Supporting Social Responsibility initiatives for children's life skill development is essential for creating a more prosperous and equitable society.	12.701	293	.000	1.01020	.8537	1.1667

The results of the one-sample t-tests conducted to evaluate the impact of Social Responsibility (SR) initiatives for the development of life skills among children on their future prospects align closely with H2, indicating a deep and positive impact across all statements. Firstly, respondents expressed a strong belief that children who participate in SR initiatives for life skill development are better equipped for future challenges and opportunities, evidenced by a mean difference of 0.70748 ($t = 8.722$, $p < .001$), suggesting a consensus on the transformative effects of such initiatives on children's preparedness for the future. This resonates with the hypothesis, indicating that individuals perceive SR initiatives as instrumental in enhancing children's prospects and readiness for the future. Furthermore, participants strongly agreed that SR initiatives aimed at developing life skills among children contribute significantly to their overall well-being and future success, yielding a mean difference of 0.91156 ($t = 10.679$, $p <$

.001). This supports the notion that such initiatives are perceived as impactful in shaping children's long-term outcomes and prospects for success. Additionally, respondents indicated a strong belief that children who engage in SR initiatives for life skill development are likely to experience positive long-term outcomes in various aspects of their lives, with a mean difference of 0.73810 ($t = 9.798$, $p < .001$), emphasizing the perceived depth of impact of these initiatives on children's lives. This aligns closely with the hypothesis, suggesting that individuals recognize the potential of SR initiatives to positively influence multiple facets of children's lives over the long term. Moreover, participants perceived SR initiatives focused on children's life skill development as crucial for breaking the cycle of poverty and inequality, as evidenced by a mean difference of 0.78231 ($t = 9.702$, $p < .001$), highlighting the transformative role of such initiatives in addressing systemic challenges and promoting social equity. Lastly, respondents strongly agreed that supporting SR initiatives for children's life skill development is essential for creating a more prosperous and equitable society, with a mean difference of 1.01020 ($t = 12.701$, $p < .001$), underscoring the perceived importance of these initiatives in fostering societal prosperity and equity. Overall, the findings provide robust support for H2, indicating a widespread acknowledgment of the profound impact of SR initiatives for the development of life skills among children on their future prospects and broader societal well-being.

Findings

The findings reveal a significant and overwhelmingly positive perception among respondents towards Corporate Social Responsibility (CSR) initiatives aimed at developing life skills among children. Across multiple Likert-based statements, participants expressed strong agreement with the importance and value of such initiatives in fostering supportive and inclusive societies, enhancing children's opportunities for personal growth and success, and positively impacting a company's reputation and brand image. Notably, the mean differences calculated through one-sample t-tests consistently indicated a substantial deviation from the neutral value of 3, signifying a clear consensus among respondents regarding the positive impact of CSR initiatives on children's life skill development. These findings underscore the widespread recognition of the transformative potential of CSR initiatives in shaping the future prospects of children and contributing to broader societal well-being.

Furthermore, the results highlight the profound and multi-faceted impact of Social Responsibility (SR) initiatives for the development of life skills among children on their future prospects and societal dynamics. Participants expressed a strong belief in the efficacy of SR

initiatives in equipping children with the necessary skills and resilience to navigate future challenges and opportunities, thereby contributing to their overall well-being and long-term success. Additionally, respondents emphasized the instrumental role of SR initiatives in addressing systemic issues such as poverty and inequality, recognizing their potential to break the cycle of disadvantage and foster a more prosperous and equitable society. Overall, these findings underscore the significance of SR initiatives as powerful mechanisms for promoting positive social change and advancing the collective welfare of both present and future generations.

Conclusion

In conclusion, the findings from this study underscore the critical importance and positive perception of Corporate Social Responsibility (CSR) and Social Responsibility (SR) initiatives aimed at developing life skills among children. The overwhelming agreement among respondents regarding the value and impact of these initiatives highlights their potential to foster inclusive societies, enhance children's opportunities for personal growth and success, and contribute to broader societal well-being. These findings not only validate the importance of CSR and SR efforts in addressing societal challenges but also emphasize the need for continued investment and collaboration in this domain. As businesses and organizations increasingly recognize their role in promoting social change, the findings provide compelling evidence of the tangible benefits and transformative potential of CSR and SR initiatives for children's development and future prospects.

The implications of these findings are manifold and extend to various stakeholders, including businesses, policymakers, educators, and communities. For businesses, the positive perception of CSR initiatives underscores their strategic value in enhancing brand reputation, employee engagement, and community relations. Moreover, the findings suggest that investing in CSR initiatives aimed at children's life skill development can yield long-term benefits for businesses by fostering a more supportive and inclusive society. Policymakers can leverage these insights to inform policies and initiatives aimed at incentivizing and regulating CSR activities, ensuring that businesses play a constructive role in addressing societal needs. Educators and community organizations can also use these findings to advocate for increased collaboration with businesses and the implementation of targeted programs to support children's holistic development.

Looking ahead, future research should focus on exploring the long-term impacts and sustainability of CSR and SR initiatives for children's life skill development. Longitudinal studies tracking the outcomes of such initiatives over time can provide valuable insights into their effectiveness in promoting positive social change and addressing entrenched societal issues. Additionally, research examining the intersectionality of CSR and SR initiatives with other factors such as socio-economic status, gender, and geographic location can help identify potential disparities and inform more targeted interventions. By addressing these gaps in knowledge, future research can contribute to the ongoing discourse on CSR and SR and guide efforts to build more inclusive and equitable societies for children around the world.

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An analytical study of variation in the Moisture, Ash and Lignin contents in the Napier Grass cultivated at various maturation stages in the Indian Territory.

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Abstract

In India, Napier Grass (Pennisetum Perpurium) cultivation is a normal practice and it is widely used as cattle feed. In the current research study, the Napier Grass was cultivated to use as a Biomass [1] sample for experimentation. The ultimate aim was to observe the feasibility of processing of Napier Grass samples at different maturation stages in the bio refineries. Napier Grass is abundantly available but using it as a raw material in bio-refineries is still an overlooked area in the Indian continent. Experimentation has been carried out to examine the variation in the Moisture, Lignin, and Ash contents [2], [3] in the Napier Grass at different harvesting ages of 2, 4, 6 and 8 months.

Significant changes concerning to the Moisture, Lignin, and Ash contents at different ages of the Napier Grass were observed. The maturity period of the Napier Grass to use it as a bio-energy crop, was the deciding parameter of the juice characteristics [(Table A.1]. India is supposed to be an ideal geographical location for the Napier Grass cultivation due to suitable climatic conditions, soil quality, and availability of water resources for the cultivation of grass, green processing [18], and an ideal testing site to set up the bio refinery units as well. An experimental study at a pilot level had been explored and evaluated with the technologies before initiating the commercial production at large-scale.

The cultivation of the Napier Grass at different maturation stages has been carried out first time at Nagpur, a centrally located place in the state of Maharashtra in India. The samples of Napier Grass cultivated at different ages of 2, 4, 6, and 8 months had been taken into the experimentation process. The samples were sent to a commercial laboratory following NREL

standard norms for Moisture, Lignin, and Ash compositional [2], [3] analyses for further interpretation. It has also attracted attention to find the scope for optimal biofuel generation from Napier Grass used as a Biomass with better strategies, economic and feasible technologies as well.

Keywords: Napier Grass; Pretreatment; Composition; Biomass; Moisture; Lignin; Ash.

1. Introduction

1.1 Background of the study

A perennial grass that is cultivated all across the globe as cattle feed is called Napier [3] Grass (Pennisetum Purpureum). It has a Moisture content which helps the Fractionation process and converts it into a mixture of solid and liquid components. Here the raw material used to produce biofuel [1], [19] is solid fibers and the additive generated out of the process helps for the diverse microbial [11] co-products generation.

The current energy status has witnessed the global energy crisis due to the extensive use of conventional and other non-renewable resources of energy. Recent forecasting shows that the demand for global Energy is expected to increase by 53% by 2035. U.S. Energy Information Administration. [8]

Green processing has given an economical substitute along with the emerging concept of bio refinery. With the concept of bio refinery, a single feedstock produces multiple products and multiple sources of revenue generation. The feedstock and herbaceous crops contain Moisture and Holocelluose which is the important characteristics and determines the success of green processing. The Biomass cultivated at different maturation levels results in the variation in the chemical composition [2], [3], [4] of the perennial grasses. [3], [2].

1.2 Objectives and scope of the study

To perform a comparative analysis of the Moisture, Lignin, and Ash content at different maturation stages of the Napier Grass (Pennisetum Purpureum) cultivated in the Indian climatic conditions.

To study the potential of Napier Grass (Pennisetum Purpureum) to generate biofuel and co-product at lab scale.

The study may find a scope to develop a commercial biofuel and co-products [19] generation model through the green processing [18] in Indian climatic conditions.

1.3 Organization of the research paper

The research study follows Literature Review where the research work conducted all across the globe has been discussed. Then the Research Gaps has been identified. The objectives of the research have been specified. The samples of Napier Grass (Biomass) of the ages 2, 4, 6 & 8 months have been kept under lab experimentation and the data has been collected. The data collected has been tabulated and kept for various data analysis tests followed by interpretation, results & discussion in terms of the outcome of the study. Lastly, the conclusion in terms of the novelty of the research, limitations, and future scope of the research has been discussed.

2.0 Material and methods:

2.1 Summary of the previous methods and gap analysis

Green processing [18] involves the Fractionation of fresh feedstock which converts into solid and liquid streams and provides a means towards economic growth by converting Biomass to biofuel at a larger scale. It can be further enhanced by accelerating the process combined with leading pretreatments like dilute sulfuric acid pretreatments [5], [13], [17]. Green processing developed the capacity of producing biofuel and its co-products, offering life to the bio refinery [16] industry.

The upcoming concept of bio refinery has developed a model of biofuel [7] industries which has offered multiple products from a single feedstock and given a substitute to expensive petroleum refineries and petroleum products. With the help of screw-press. The clean solid fiber was extruded and further pretreated [12] with dilute sulfuric acid. It led to the process of conventional scarification and fermentation [11], [15]. Then the liquid received called juice can be stored and further used for producing bio-based products [19].

Composition [2] of the Biomass, Napier Grass and its maturation stages play a very important role in green processing [18] applications. With the maturity of Napier Grass, physical and

biochemical [4], [6], [8] variation occurs which further affects the constituents like hemicellulose [7], cellulose, Moisture, and Lignin of the Biomass [1].

Presently, India is dependent on other countries for conventional energy. So, there is an urgent requirement to generate renewable sources of green [18] energy, fuels as a substitute. It will give momentum towards the social and economic development of the nation to become a self-sufficient and fuel-independent nation by reducing the negative impact on the economy and the planet.

After reviewing the literature through various sources, the researcher found that the study of biochemical content analysis of the Napier Grass is readily available. But a comparative biochemical analysis of the Napier Grass as Biomass [1] at different maturation (age) levels is not available. So the author sincerely finds the necessity of conducting an experimental study for comparative analysis of the biochemical variation in the constituents like Moisture, Lignin, and Ash at different maturation stages.

2.2 Details of the Experimental Research Work [Supplementary Material Sheet]

2.2.1 Age variation experiment

Plantation of the Napier Grass (Pennisetum Purpureum) was carried out on Oct 19th, 2021 in three different rows numbered 1, 2, and 3 on a farm located in the territory of Nagpur, in the state of Maharashtra, India. A sufficient amount of Potassium (K) and Nitrogen (N) was supplied with an appropriate water supply for experimental purposes.

2.2.2 Compositional Analyses: [Table.A.4], [Table.A.7], [Table.A.10]

To ensure the Moisture contents were below 10%, the Napier Grass samples were dried at 45°C. To conduct compositional analysis the Biomass was then grounded to a coarse powder in a commercial blending machine. In this experiment, sieving was not initiated.

2.2.2.1 Extractives[Table.A.1], [Table.A.7-8], [Eq.C.1]

To ensure that the Moisture in the Biomass is less than 10%, a Moisture content analysis was conducted. In case of the Moisture found more than 10%, the Napier Grass samples dried at 45°C. For that, the grounded Biomass samples of 4-5 g were placed into cellulose thimbles.

A Flat bottom boiling flask (500 mL) was dried at 105°C with the help of a convection oven, till we record a constant weight. Also added with 190 ml of the Deionized water to the flasks

followed by the magnetic stirring so as to prevent the bumping. Likewise, the experiment was carried out.

The experiment was carried out in duplicates and enumerated with eq.C.1 (Sluiter et al. 2008c). Here, no aliquots were removed for ethanol extractives.

2.2.2.2 Lignin analysis [14],[Eq.C.2] [Table.A.1], [Table.A.8-11]

To learn the acid-soluble Lignin (ASL) and acid-insoluble Lignin (AIL), Lignin analysis was carried out by these two different processes

2.2.2.3 Ash analysis[Table.A.1], [Table.A.12-15]

A muffle furnace was used at 575°C where the duplicate ceramic crucibles were placed in. The crucibles were removed after 24 hours and cooled for exactly 30 minutes in a desiccator. The same process had been repeated after an hourly interval and cooled for an interval of 30 minutes and continued till we got the constant weight i.e., variation lesser than 0.3 mg (Sluiter et al. 2008b), and further experimentation towards the Ash analysis was carried out. When we noted the constant weight of the Ash, we used the equation Eq. (C.3) to determine the Ash percentage.

3.0 Theory and Calculations: [Supplementary Material Sheet]

3.1 Extractives [eq.C.1]

The experiment was carried out in duplicates and enumerated with eq.C.1 (Sluiter et al. 2008c). Here, no aliquots were removed for ethanol extractives, therefore we omitted the factor for volume correction.

3.2 Lignin analysis [Eq.C.2]

To estimate the acid-soluble Lignin content, the equation Eq. (C.2) was used (Sluiter et al. 2008d). The readings of the weight of the samples were taken. The equation used Eq. (C.2.1) to find out the component of the Biomass which is acid insoluble (Sluiter et al. 2008d),

3.3 Ash analysis [Eq.C.2]

After noting observations i.e. the constant weight of the Ash, equation Eq. (C.3) was used to determine the Ash percentage.

Results and discussion[Supplementary Material Sheet]

4.1 Biochemical Constituents of the Napier Grass Table [A.1].

The weight losses out of the total mass might be due to experimental and equipment errors, and also because of the natural variations in biological samples. Some of the materials (volatile organic compounds) are getting volatilized during the drying process carried out at 105°C. Therefore the samples analyzed here were not dried. Hence it contained higher extractive values.

4.2 Variation in the constituents of the Napier Grass at various ages Table [A.1-A.15]

4.2.1 Moisture content [fig B.1]

For the generation of co-products, Moisture content plays a very important role. Higher Moisture content is directly proportional to the quantity of juice produced for co-product generation. As per the graph shown in the Figure B.1, the changes in Moisture contents of Napier Grass concerning various maturation stages. A Duncan's Comparison Test was performed. As per the graph, in the 4 and 8-month-old Napier Grass sample Moisture is 74% & 70 %, where in the 2 and 6-month-old Napier Grass Moisture content is 86% and 82%, respectively (comparatively more).

As per regression analysis [TableA.5] the researcher do not find any significant relationships between the Moisture content and cumulative precipitation. Also, neither linear nor quadratic relationships existed between the Moisture content and the maturity level [Table A.5].

Having dense leaves for photosynthesis and growth of the Napier Grass of 2 months maturity also increases the surface area of leaves. It leads to an increase in water losses due to more transpiration (Bouman et al. 2005).

A Napier Grass of 4 months maturity grown comparatively doubled its height, whereas the leaf area decreases results in the Moisture increase. Seen in the 6 months mature grass as well due to transpiration effect got reduced.

4.2.2 Lignin content[Table A.8-11]

An increase in Lignin percent is inversely proportional to the dry weight percent of holocellulose. As the Biomass rigidity increases, the difficulty of biomass conversion increases. Figure B.3 shows the variation in Lignin content against the age of Napier Grass as per the NREL standard laboratory analytical protocols

From the statistical analyses of Lignin, RCB ANOVA [Table A.8,], shows that the Lignin content in the Napier Grass was significantly related to its maturation age. The differences in

Lignin was observed concerning maturation. It can be justified by the orthogonal contrasts [Table A.9] of the means.

For the analysis, we defined three orthogonal contrast sets out of the four available means.

Firstly, the groups of the maturation ages 4, 6, and 8-month-old samples were compared with the sample of 2 months maturation age and were found to be significantly different.[Table A.11].

Secondly, it was compared with the 4-month-old feedstock alone and was found to be significantly different. [Table A.11]

Thirdly, the 4 months matured sample was compared with the 8 months matured sample. There is an insignificant Lignin difference between 4 and 8 months [Table A.11] of mature Napier Grass.

Tables A.14-16 show the statistical analysis results. The Lignin content of the 2 months old (immature) Napier Grass was statistically less than that of the older one but, after 4 months of maturation of the Napier Grass, there are no increases in Lignin [Table A.11].

2 or 8-month-old Napier Grass juice was observed to have a better potential for co-product generation. The Napier Grass of maturity age 8 months was observed to contain more Lignin and less Moisture as compared to the 2-month-old feedstock.

4.2.3 Ash content [Table.A.1], [Table.A.12-15]

The compositional analysis [4] of biomass is the minimization of duplication of the counting of feedstock constituents.

The presence of the higher quantity of Ash is more significant for bioenergy production via thermo-chemical platforms. The Figure B.4 shows the percent dry weight of Ash content in the Napier Grass concerning the maturation level.

It has been observed that the Napier Grass having the maturity of 2 months has higher Ash contents than that of 4, 6, and 8 months. Grasses with comparatively lesser maturity are leafier and contribute to the total Ash content. In most of the grasses, we observed that the leaves [19] contain approximately 3 times more Ash as compared to the stalks and are mostly present in the form of silica.

Figure B.4 shows that the constituent like Ash presence in the Napier Grass has significant relation with the age of the Napier Grass. Hence, it has been inferred [Table A.12-15] that the Ash content gradually changed with the maturation level as it was in the case of Lignin. Tables A.12-15 give the summary of Statistical analyses of the Ash content in the Napier Grass of varied maturity.

5.0 Conclusion:

Compositional analyses [6], [8] of Napier Grass [3] fibers concerning maturation stages revealed certain trends which haven't been previously referred to in the biofuel literature.

The Moisture, Lignin, and Ash content vary concerning feedstock maturation.Moisture content bears a cubic function and not related to precipitation data. Also, holocellulose and Lignin have got a certain effect on wind or mechanical factors. Detailed insights needed to be given in the future for further validation.

5.1 Future Scope of the Study:

Initiation of green processing [18] towards economic biofuel output.Green processing plays an influential role in the area of bio refinery [16] like a carboxylic acid platform for biofuel production. Carboxylic acid is generated from the wet feedstock by the anaerobic digestion process. Then it can be converted into Methane, drop-in biofuels, the biochemical and co-products as well.

Green processing through screw-pressing operation may help in the reduction of particle size reduction. It also helps in the deconstruction of structural carbohydrates of raw feedstock (Hjorth et al. 2011). With the mass transfer of microbes and enzymes, it helps towards the enrichment of biomass constituents leading to the mixed-culture methane output from biomass. The screw-pressing operations in Napier Grass handling [12] had reflected a substantial effect towards the improvement of methane output by approximately 30% (Hjorth et al. 2011).

However, much more aspects need to be investigated regarding the optimal effect of the screw-press operation.

5.2 Limitations of the Study

The scope of the research study is limited to the constituents Moisture, Ash and Lignin only. The fungal co-product output optimization isn't the very intent of the research. However, the Napier Grass juice based fungal biomass [2] output on juice gave comparatively better output reported for other substrates, like vinasse. Anticipating the better potential for the improvement of fungal biomass production [9] through optimization.

Also, there can be further innovations in the engineering design of digester. The agitators and digester contribute half of the total capital investment but it may reduce the operating expenses in long run. This aspect of processing hasn't been covered in the study.

The research on other high-value co-products like poly hydroxyl alkanets (PHA) or bio plastics, from the Napier Grass juice and bio refinery process hasn't been covered in this study.

The capital costs against the economic performance have yet to be worked out. The other co-products like cellulase production and the cost savings by reducing costs related to the nutrients for cultivation and maintenance of the various microbial cultures to accelerate fermentation haven't been covered in the study. (e.g., s. Cerevisiae and p. Stipitis).

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