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"OORJA" is an incredibly potent term, Meaning 'energy' in Sanskrit, "OORJA" is also the name of a Vedic deity, who in many ancient and modern scriptures has been compared with Uzza (Shakti as Venus) in Arabic and Divine Energy in English. "OORJA", our Journal, signifies a confluence of diverse cultures and assorted intelligence to stir up the cerebral powers of its readers.

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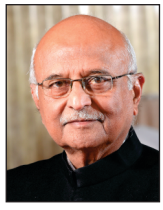

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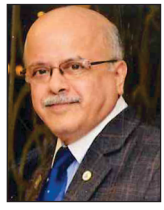

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EDITOR'S NOTE

'Culture is shaped by what is celebrated'. While 'Consistency' strengthens organizations and ensures longevity, when it hardens into a rigid practice it can limit openness and inhibit renewal. Practices that once served as strengths may with time restrain an organization's ability to adapt & innovate. Innovation, hence, must be continuously rooted in everyday work and supported by leadership that encourages experimentation and learning.

A culture where success alone is rewarded and efficiency is valued over enquiry; experimentation is unlikely to take root. When traditions commemorate accomplishments alone, they inadvertently weigh down risk-taking. Not every experiment is destined to be a success and so the true value lies in efforts driven towards capability building and generating multiple pathways for future. When employees experience that challenging the status quo is rather encouraged and not penalized, reinvention gets to become a collective goal than just being exceptional.

Thus, organizations need to treasure learning thereby inspiring innovation and fostering long-term capability. Resilience lies in balancing 'stability' with 'change', anchoring 'identity' while enabling 'reinvention'. Organizations that master this balance do not merely survive but earn a sustained competitive edge over time by integrating 'discipline' with 'agility' and 'purpose' with 'progress'.

The present issue of our journal as always brings together a rich and comprehensive collection of research papers & case studies on topics as broad as sustainable practices and customer satisfaction in the Indian canned food industry, spending pattern of corporate social responsibility funds in Uttarakhand, Artificial intelligence to overcome challenges in achieving sustainable goals in India, effectiveness of Human Resource Information Systems in manufacturing organizations, Emotional Intelligence of academicians in professional teaching and Bibliometric analysis of risk for portfolio creation.

We hope this issue incites dialogue, reflection and further inquiry among our readers. As we continue to build a vibrant platform for scholarly exchange, we warmly invite academicians, practitioners and researchers to contribute insightful, impactful and original work to forthcoming issues. Your contributions are critical in enriching discourse and progressing knowledge across domains. We look forward to your suggestions and to sustaining this collective journey of learning and discovery.

Happy Reading!

Dr. Manju Nair
Editor-in-Chief

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A STUDY ON ENVIRONMENT FRIENDLY PRODUCT QUALITY AND PREFERENCES & ITS IMPACT ON CUSTOMER SATISFACTION

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Abstract

This study's goal is to analyse consumer preferences for and the quality of eco-friendly products, as well as any partial or simultaneous effects they may have on customer satisfaction. The study employed a quantitative approach using several linear analysis of regression. The independent parameters (X) that were measured were the quality and preference of eco-friendly products, while the dependent variable (Y) was customer satisfaction. The research object used for study and analysis is consumers of Rajasthan. Random sampling was utilized, and 100 respondents who were Rajasthan market customers participated. The Eviews program was used to calculate the statistical analysis, which included the Classical Assumption Test and the Z, T, and F hypothesis testing tests with a significant level (α) of 5%. The findings showed that consumer fulfilment was considerably improved by eco-friendly product quality and eco-friendly preference. This outcome was attained because the statistical analysis showed that when consumer demand for and the superiority of eco-friendly products rises, so does customer satisfaction. Eco-Friendly Preference and Eco-Friendly Product Quality are two characteristics that either partially or simultaneously affect customer satisfaction.

Keywords: Customer Satisfaction, Eco-friendly products

Introduction

The general public's consumption of the numerous products available on the market is very high in the modern day, and most purchases are made in the neighborhood where the clients reside. Are the items we consume are safe and do not damage the surroundings? It is exciting to note down that a product's marketability is linked to its fascinating design, widespread communication, and outstanding product quality. The assessment, which involved the author conducting direct conversations with customers in the current market in January 2023, revealed the phenomena of consumers using environmentally friendly items, as shown in the figure 1.

Figure 1: Consumers Consumption of Environmentally Friendly Products

Customers are frequently assisted by a variety of widely disseminated information regarding the caliber of the things being offered. Customers are invited to select goods that are not only practical for fulfilling needs and meeting consumption feasibility norms, but also have an eco-friendly manufacturing process. In light of the current situation, this study looks at how the market is trying to develop environmentally friendly liking and the caliber of eco-friendly products, which will influence consumer satisfaction and promote the contemporary market.

Green marketing is a tactic used by marketers in response to customers' increasing ecological distress. In general, green marketing entails (1) producing merchandise that are less detrimental to the environment in conditions of manufacturing, utilization, or discarding than their usual corresponding items; (2) creating products that benefit the atmosphere; or (3) linking the buy of a product to an environmental organization or event: (Hawkins, D. I., & Mothersbaugh, D. L. 2013) . One promotion strategy that puts an importance on shielding the environment is called "green marketing."(Solomon, M. R. 2011). Green marketing is inextricably linked to consumer comprehension, behavior based on eco-preferences, and product quality, which ensures that the expected features of the product satisfy the customer. By educating consumers and creating better products, respectively, it is possible to address the lack of knowledge about and unfavorable opinions of green products(Bonini, S., & Oppenheim, J. 2008).

Eco-friendly Consumer Preferences

Finding out what customers like and hate about environmentally friendly items, as well as their awareness and interest in these products in the contemporary market, are the goals of eco-friendly consumer preferences. Products like plastic wrappers, coffee cups, cake wrap, pouches, food items, electronics, and more are developed and produced without harming the environment. After they are used up, none of the products damage the environment. Setting a good example and ensuring that the products you buy are environmentally safe are two of the finest strategies to combat pollution. Studies show that although the target market may like the product, but it is not preferred over alternatives. (Kotler, P., & Keller, K. L. 2009). In order for the customer to react to the provided goods, (Best, R. J. 2009). it states that consumer preferences are made up of awareness and attraction. Because the product is known thanks to the communication mix process, the customer is aware of it and is intrigued. The decision to buy environmentally friendly items is heavily influenced by customer awareness of and attraction to a product promoted through green marketing. (Ivancevich, J. M. 2010).

A preference is an attitude that assesses a thing, concept, or somebody favourably or unfavourably. The preference-for-prototypes theory (Whitfield, T. W. A., & Slatter, P. E. 1979) states that an object will be more aesthetically favoured if it is more prototypical. Environmental concerns pertaining to product labelling, packaging, use, and disposal must be taken into account. Environmental protection entails a complicated web of trade-offs between social, political, economic, and technological factors (Schlegelmilch, B. B., Bohlen, G. M., & Diamantopoulos, A.1996).

A straightforward capture technique might not be sufficient because prolonged decision-making typically encompasses multiple brands, numerous qualities, and multiple information sources. Alternatively, the marketer needs to create an informational campaign that will increase brand favourability among the target audience. An efficient preference method presupposes a thorough

search and offers comprehensive details about various product features, retail locations, and other factors.

A strong stance on those market-relevant traits is the next stage. Globally, there are noticeable and significant variations in tastes for things like colour and flavour. It is risky for marketers to disregard preferences (Cravens, D. W., & Piercy, N. F. 2003) & (Warren, J. K. 1999). Customers with a higher degree of environmental awareness were more affected by their attitude toward the environment than those with a lower level of environmental knowledge (Noor, N. A. M., Muhammad, A., Kassim, A., Jamil, C. Z. M., Mat, N., Mat, N., & Salleh, H. S. 2012). It offers insight into the specific antecedents of eco-friendly product purchasing for both green and non-green consumers, allowing for the evaluation of potential similarities and differences in the eco-friendly product purchasing process, the hypothesized antecedents, their influence on eco-friendly product purchase intention and behaviour, and the intention–behavior relation.

Eco-friendly Quality Product

Customers' awareness and confidence in the quality of the products they intend to buy are issues with eco-friendly product quality. There are two major issues: (Hawkins, D. I., & Mothersbaugh, D. L. 2013) customers can think that because a product is green, it is of lower quality, and (Solomon, M. R. 2011)they might think that the product wasn't actually so green in the first place(Kotler, P., & Keller, K. L. 2009).. Successful green or eco-friendly products effectively allay these worries to convince customers that they are simultaneously acting in the long-term best interests of society and themselves. Examples of this include energy-efficient appliances that save money and organic foods that are regarded as safer, healthier, and tastier. Additionally, emphasis should be placed on the product's safety, quality, and green image (Barbarossa, C., & De Pelsmacker, P. 2016) & (D'Souza, C., & ; Taghian, M. 2005).It was noted that improving the menu, facilities, service, and product quality all have a favourable impact on customers' perceptions of value and satisfaction, which in turn shapes positive attitudes toward consuming (Gadenne, D., Sharma, B., Kerr, D., &; Smith, T. 2011).Green items were divided into several categories, including energy-efficient products, organically grown fruit and vegetables, recycled paper products, products that aren't tested on animals, environmentally friendly detergents, and ozone-friendly aerosols. Furthermore, there was a substantial positive correlation between environmentally conscious behaviour and the intention to buy ecologically friendly products (Omar, N. A., Osman, L. H., Alam, S. S., & Sanusi, A. 2015). Green products are generally referred to as ecological or environmentally friendly products (Chen, T. B., &; Chai, L. T. 2010).

Customer Satisfaction

When a person compares the apparent performance or outcome of a product to their expectations, they can feel either satisfied or disappointed (Kotler, P., & Keller, K. L. 2009). (Wirtz, J., Hean, T. K., &; Xiongwen, L. 2005) states that satisfaction is an emotional state, and that a post-purchase reaction may include neutrality, joy, annoyance, pleasure, or discontent. (Andreasson, T. W. 2000). "A subjective assessment of emotion is linked to satisfaction." Disconfirmation and the ratio of output to input determine the feeling. A sense of fulfilment, whether favourable or unfavourable, is the ultimate outcome. Additionally, (Mowen, J. C. 1995). asserts that the attitude of the general evaluation of a good or service following purchase and use is known as customer satisfaction.

Experience and education have an impact on customers' happiness with the product and likelihood of making a second purchase (Bradley, G. L., & Sparks, B. A. 2012).

Research Methodology

Objectives

1. To analyse consumer preferences for and the quality of eco-friendly products

2. To identify the partial or simultaneous effects of consumer preferences of eco-friendly products on customer satisfaction.

Hypothesis

1. There is no positive link between eco-friendly product quality and eco-friendly preference in the Rajasthan state market, according to H0: $\beta 1 = \beta 2 = 0$.

2. Customer satisfaction is not significantly impacted by eco-friendly preferences. Ho:

$\beta 1 = 0$

Multiple linear regression analysis was the quantitative research method that was employed. The independent parameters (X) that were measured were the quality and preference of eco-friendly products, while the dependent variable (Y) was customer satisfaction.

The Rajasthan state market consumers are served as the research's object and analytical unit. Saturated random sampling was the method utilized to acquire the data from 100 respondents who were Rajasthan state market customers. The Classical Assumption Test and the Z, T, and F hypothesis testing tests with a significant level (α) of 5% were used in the statistical analysis using the Eviews program.

Customer satisfaction and the selection and quality of eco-friendly products are correlated using multiple linear regression. The E-views 7 program yields the following results from multiple linear regression analysis: The values of a, b1, and b2 are equal to 0.38, 0.32, and 0.59, respectively. Consequently, the multiple linear regression equation that follows can be created:

$Y = 0.38 + 0.32X1 + 0,59X2$

The following is an interpretation of the a and bi values in the aforementioned equations:

c = 0.38 indicates that 38% of customers will be satisfied if they had zero percent preference for quality of eco-friendly products.

According to X1=0.32, consumer satisfaction will rise by 30% if eco-friendly product quality remains constant and eco-friendly preference rises by 1%. X2= 0.59 indicates that consumer satisfaction will rise by 59% if eco-friendly product quality rises by 1% and eco-friendly choice stays the same. **Classic assumption test:** Additionally, the following is revealed by the study of the conventional assumption:

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Table 1: Analysis Of The Classical Assumption

BLUE Test	Criteria	Acceptance
Correlation serial test	X^2 statistic < X^2 table where 0.687 < 5.99	Model free from serial correlation problem
Normality test	Jarque-Bera < X^2 table where 2.28 < 5.99	Residual is normally distributed
Linearity Test	F-statistic < F-table (0.05;2;100) = 3.09 so that 1.32 < 3.09	Linear model is acceptable
Heteroscedasticity	Obs*R-squared = 0.925665 < table chi-square (5%) df = 5.99	The model passed the heteroscedasticity test
Multicollinearity	If R-squared1 > R-squared2 then R-squared1 = 0.717 > R-squared2 = 0.513	The model did not find any multicollinearity

Results and Discussion

Eco-friendly Product Quality And Preference Implications For Customer Satisfaction

The square of the correlation coefficient (R), sometimes referred to as R-Square, is the coefficient of determination (KD). The coefficient of determination is used to determine the extent to which eco-friendly choice and environmentally sustainable product quality to satisfy customers. The coefficient of determination, or R square, is 0,7175, or 71,75%, according to the results of E-Views 7. This demonstrates that eco-friendly preference and eco-friendly product quality have a significant impact on customer satisfaction, as both factors simultaneously influence the variable of 71,75%. This is because well-managed eco-friendly product quality and an increase in eco-friendly preference are expected to have a positive impact on customer satisfaction. The remaining 28.25%, however, is the result of other factors not included in the analysis of eco-friendly product quality and preference.

Correlation Between Eco-friendly Preference And Eco-friendly Product Quality

To ascertain whether there is a positive or negative connection between the variables of eco-friendly preference and eco-friendly product quality, statistical testing of z is employed. There is no positive link between eco-friendly product quality and eco-friendly preference in the Rajasthan City market, according to H0: $\beta 1 = \beta 2 = 0$. In the Rajasthan City market, eco-friendly product quality and eco-friendly preference are positively correlated (H1: $\beta i \neq 0$).

The level of significance (α): 0.05 Test criteria:

If Z-statistics > Z-table, reject H0.

accept Ha if the value of Z-statistics < Z-table

The calculation yielded a Z value of 10.9. The Z value from the table will be compared to this value. With $\alpha = 0.05$, Z-table = $Z\alpha / 2 = Z0{,}025 = 1.82$. The positive Z value suggests that there is a positive correlation between eco-friendly product quality and eco-friendly preference. The degree of eco-friendly product quality is a component of eco-friendly preference. H0 is rejected and Ha is approved because it is known from the previously reported data that the value of Z-statistics (17,34) > Z table (1,82). Assuming that variable X1 (eco-friendly desire) stays constant, value 17,34 indicates a positive association between eco-friendly product quality (X2) and eco-friendly preference (X1) in the Rajasthan market.

Effects Of Environmentally Friendly Product Quality And Preferences On Customer Satisfaction, Either Fully Or Partially

Partial testing of the relationship between eco-friendly preference (X1) and consumer happiness (Y). Ho: β1 = 0, indicating that customer happiness is not significantly impacted by eco-friendly preferences. Ha: β1 ≠ 0. This indicates that eco-friendly tastes have a somewhat significant impact on customer satisfaction. 5% is the significance level. It is evident from the EViews-7 processing that the eco-friendly preference's t-Stat value is 1.66. This value will be contrasted with the distribution table t's value. The value of the t table for the two-sided test is 1.66 with α = 0.05 and df = n-k-1 = 96-(3-1) = 94. Since t-Stat for X1 (4.05)> t-table, it is known that Ho accepted indicates that eco-friendly preference has a somewhat significant impact on customer satisfaction. In other words, increasing eco-friendly preferences will have a big impact on raising customer satisfaction.

The quality of eco-friendly products (X2) is evaluated in connection with customer satisfaction (Y). Ho: β1 = 0, suggesting that the quality of eco-friendly products has no appreciable effect on consumer satisfaction. Ha: β1 ≠ 0, suggesting that consumer pleasure is fairly significantly impacted by the caliber of eco-friendly items. Using the significance criterion of α = 5%

Criteria

If t-Stat is greater than t-table, reject Ho.

Accept in other things

The processing findings make it clear that the eco-friendly product quality has an t-Stat value of 1.66.This value will be contrasted with the distribution table t's t-table value. The value of the t table for the two-sided test is 1.66 with α = 0.05 and df = n-k-1 = 96- (3-1) = 94. Since t-Stat for X2 (7.68)> t-table, it is known that Ho accepted indicates that eco-friendly product quality has a somewhat substantial impact on customer satisfaction. In other words, if the quality of eco-friendly products is raised, customer satisfaction will rise in Rajasthan market.

Consequences of concurrently affecting customer satisfaction with eco-friendly product quality and eco-friendly preference. The following simultaneous hypothesis testing is used to determine whether eco-friendly product quality and eco-friendly preference factors have a substantial impact on customer satisfaction at the same time: H0: β1 = β2 = 0 In other words, there is no correlation between eco-friendly product quality and eco-friendly preferences in Rajasthan City market. Ha: βi ≠ 0. In other words, there are consequences for both eco-friendly product quality and eco-friendly desire at Rajasthan Market.

The significance threshold (α) is 0.05.

Criteria for testing: If value F-stat>F-table, reject H0

If the F-statistic value is less than the F-table, accept H0.

Using Eviews-7 to process the data, we can calculate that the F-statistic is 33.06. This value will be compared to the value in the F table. With α = 0,05, v = 2, and df = 94, the F table value is 3.09. F-stat (123,16) > F table (3.09), as indicated by the previously mentioned numbers, indicating that Ha is rejected and H0 is accepted. This suggests that eco-friendly preference (X1) and eco-friendly product quality (X2) have a significant impact on customer satisfaction (variable Y) at the same time, suggesting that eco-friendly preference and eco-friendly product quality have a significant impact on

customer satisfaction at the same time. According to the study's findings, the customer satisfaction variable is impacted by eco-friendly product quality and eco-friendly preference 71.75% of the time.This implies that eco-friendly preferences and product quality will have a bigger influence on customer satisfaction if they are successfully controlled and enhanced. The study's conclusions are in line with other research showing that consumer satisfaction was impacted by successful green marketing of eco-friendly goods.

Conclusion

On the basis of data analysis and discussion, the authors arrive at the following conclusions: Eco-friendly product quality (X2) and eco-friendly preference (X1) are positively connected in Rajasthan's modern market. The eminence of eco-friendly products can be improved by successfully implementing eco-friendly preferences, and superior eco-friendly products can have a bigger effect on customer satisfaction.

The impact of eco-friendly preferences on customer satisfaction is somewhat considerable. This could be because eco-friendly preferences have a partial impact on customer satisfaction in the Rajasthan market, which also affects the quality of green products. The quality of eco-friendly products has a somewhat substantial impact on customer satisfaction. In other words, in the market of Rajasthan, customer satisfaction would rise if the quality of eco-friendly products is enhanced.

Customers will feel good about the business and its eco-friendly items as a result. According to the survey, customer happiness is significantly impacted by both eco-friendly product quality and eco-friendly desire. Additionally, it was discovered that customer happiness is greatly impacted by eco-friendly product quality and eco-friendly preferences. This suggests that if eco-friendly preferences and eco-friendly product quality are enhanced and improved, customer satisfaction will increase in tandem.

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SUSTAINABLE PRACTICES AND CUSTOMER SATISFACTION: EXAMINING ECO-CONSCIOUS BEHAVIOUR AND LOYALTY IN THE INDIAN CANNED FOOD INDUSTRY

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Abstract

Consumers' food consumption patterns have changed significantly alongside the rapid shift in lifestyles. The main objective of this paper is to determine the sustainability of canned food in relation to customer satisfaction. This research examines the multifaceted dynamics impacting eco-conscious consumer behaviour (ECCB). The study provides an in-depth understanding of consumer satisfaction and perceived value regarding canned food consumption. A structured questionnaire was administered to between 300 and 500 respondents through various communication channels, employing an empirical research design. The analysis tests the hypothesis that there is a positive and significant relationship between the variables. The findings indicate that ECCB is significantly enhanced by sustainable qualities and perceived values. Results offer new insight, showing that customer loyalty and satisfaction are strongly predicted by perceived value, which is vital for sustaining success in the market. Overall, these findings contribute to both academic research and real-world applications involving environmentally conscious consumer interactions

Keywords: Perceived Value, Canned Food, Consumer Behaviour, Sustainability, Satisfaction, Loyalty

Introduction

Canning is a method of food preservation that extends the shelf life of tinned food by sealing it in airtight containers and using heat to eliminate potential impurities (Grunert et al., 2014). By 2023, tin-plated iron sheets were being rolled into cylinders and manually welded at the top and bottom to create cans (IMARC Group, 2023). To reduce costs, some companies have started to use plastic wrapping, hardboard packaging, and bottle packaging, reflecting a shift toward materials perceived as environmentally friendly by increasingly eco-conscious consumers (Mishra et al., 2020; Verma & Chandra, 2022).

Sustainability is an essential factor in retaining existing customers and attracting new ones, playing a crucial role in brand success (Mohr & Webb, 2005; Ottman et al., 2006). In India, the fast-moving consumer goods (FMCG) industry is rapidly expanding (IMARC Group, 2023). Sustainable practices also influence customer satisfaction and perceptions, affecting how customers view both the product and the brand as a whole (Zeithaml, 1988; Chaudhary & Bisai, 2018). To enhance customer experience and identify areas for improvement, businesses must continually measure customer satisfaction (Oliver, 1980; Oliver, 1999).

In this study, a systematic approach is adopted to develop a model that integrates the Sustainability-Driven Satisfaction Model (SDSM) with Eco-Conscious Consumer Behaviour (ECCB) (Ng & Paladino, 2020). The primary aim of this model is to assess the impact of sustainability on consumer satisfaction, especially among environmentally conscious individuals. This framework emphasises

four key aspects that influence long-term brand loyalty and offers new insights into sustainability, sustainable business practices, and consumer behavioural responses (Singh & Pandey, 2018; Paul et al., 2016).

The Sustainability-Driven Satisfaction Model is grounded in three established behavioural theories. The first is the Theory of Planned Behaviour, which suggests that pro-environmental consumer behaviour is shaped by attitudes, social norms, and perceived behavioural control (Ajzen, 1991; Phang & Ilham, 2023). The second, Expectancy–Disconfirmation Theory, proposes that satisfaction depends on whether sustainability-related expectations such as eco-friendly product performance are met; positive disconfirmation reinforces satisfaction with green choices (Oliver, 1980; Mahat & Shekhar, 2024). Finally, Social Identity Theory highlights that satisfaction increases when sustainability experiences align with an individual's eco-identity and group values (Tajfel & Turner, 1979; Fielding & Hornsey, 2016; Westin et al., 2024). The SDSM for Eco-Conscious Consumer Behaviour functions as an independent variable shaping consumers' environmental engagement and product perceptions. These factors influence perceived value a mediating construct reflecting consumers' assessments of both ethical and functional benefits (Chen & Chang, 2012). In this context, the Theory of Planned Behaviour and Expectancy–Disconfirmation Theory are foundational to the model (Ajzen, 1991; Oliver, 1980).

Sustainability-Driven Satisfaction Model (SDSM) for Eco-Conscious Consumer Behaviour (ECCB) in Canned Food

Stage 1: Sustainability-Driven Attributes in Canned Food

Sustainability has become a significant competitive advantage, as consumers increasingly choose brands that align with their ethical and environmental values (Ottman et al., 2006; Biswas & Roy, 2015).

Stage 2: Eco-Conscious Consumer Behaviour (ECCB)

This refers to the attitudes, awareness, and behaviours of customers who prioritise sustainability when making purchasing decisions (Ng & Paladino, 2020). ECCB reflects an evolution toward green consumption, influenced by both societal and personal beliefs (Roberts, 1996; White et al., 2019). Engaging consumers in sustainability practices is crucial, as it places pressure on companies to produce eco-friendly products (Chaudhary & Bisai, 2018).

Stage 3: Satisfaction Mechanism (SM)

According to this theory, satisfaction consists of multiple dimensions and is influenced by perceived green values, beliefs, and emotional connections with sustainable brands (Zeithaml, 1988; Chen & Chang, 2012). Consumers are more likely to remain loyal to companies that act ethically and meet their needs (Mohr & Webb, 2005; Oliver, 1999).

Stage 4: Behavioural Outcomes (Loyalty and Advocacy)

Customers remain loyal to brands that actively support ecological efforts and often promote these brands through advocacy (Singh & Pandey, 2018). This loyalty is important as it not only strengthens the customer–brand relationship but also increases market share, even when products are priced higher (Paul et al., 2016).

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Despite these advantages, the tinned food industry is highly volatile because customer satisfaction and perceptions can change rapidly (IMARC Group, 2023). According to Oliver (1980), consumer fulfilment is understood as customer contentment a conclusion that a feature of a good or service, or the product as a whole, offers a satisfactory level of fulfilment associated with its consumption. Satisfaction is essentially the customer's evaluation of whether a product or service meets their needs and expectations (Oliver, 1999; Zeithaml, 1988). If these wants and expectations are unmet, customers will not be satisfied with the product (Oliver, 1999). Therefore, the success of any tinned food product largely depends on consumer satisfaction. Tinned food has also eased the burden for women by reducing the time and effort needed to source, clean, organise, and cook ingredients (IMARC Group, 2023). This sector has experienced annual growth of more than 13% in recent years, fuelled by changing lifestyles, favourable demographics, and rising incomes (IMARC Group, 2023; Mishra et al., 2020).

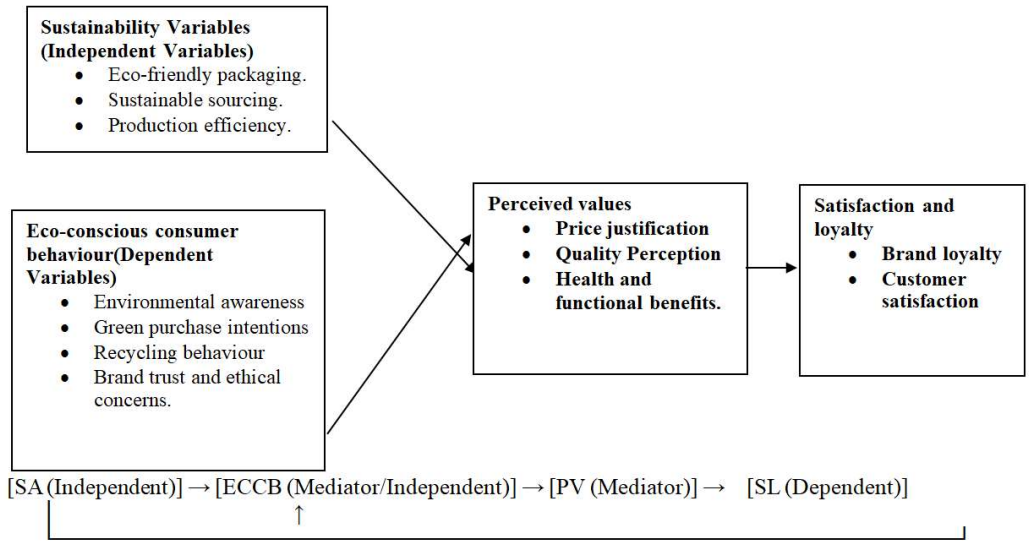

Figure 1: Conceptual framework depicting the hypothesized relationships between sustainability attributes (independent variable), eco-conscious consumer behaviour (mediator/independent variable), perceived value (mediator variable), and satisfaction & loyalty (dependent variable). Arrow directions represent the hypothesized causal flows tested in the study (H1–H4).

The diagram depicts the conceptual framework for this study. It illustrates how sustainability attributes (independent variable) directly influence eco-conscious consumer behaviour, which subsequently impacts perceived value. Perceived value, in turn, leads to satisfaction and loyalty (dependent variable). The diagram also illustrates a direct link from sustainability attributes to satisfaction and loyalty, highlighting both mediated and direct paths within the model (Ajzen, 1991; Oliver, 1980; Chen & Chang, 2012).

Review of Literature

This literature review explores how sustainability can be integrated with customer satisfaction

models, particularly in the context of consumer behaviour within the food sector (Zeithaml, 1988; Chen & Chang, 2012). Many consumers believe canned food is less fresh and contains excessive preservatives (Verma & Chandra, 2022). This review investigates how the Sustainability-Driven Satisfaction Model (SDSM) can help understand and predict eco-conscious consumer behaviour (ECCB) in the context of canned food (Ng & Paladino, 2020; Paul et al., 2016). It aims to clarify how sustainability-driven satisfaction is related to ECCB and why these factors matter in today's marketplace. Increasingly, the decision to purchase a product is based on its sustainability attributes (Straughan & Roberts, 1999; Biswas & Roy, 2015). Modern consumers seek features such as BPA-free packaging, reusable cans, locally sourced ingredients, fewer preservatives, long shelf-life, and carbon-neutral production (Mishra et al., 2020; Grunert et al., 2014). Previous research has demonstrated that consumer behaviour is shaped by social norms (White et al., 2019), individual values (Ng & Paladino, 2020), perceived consumer efficacy (Roberts, 1996), and environmental concerns (Schlegelmilch et al., 1996). In India, the canned food industry is rapidly moving toward sustainability, adopting ethical sourcing practices, reducing waste and carbon emissions, and investing in biodegradable packaging (Chaudhary & Bisai, 2018; Grunert et al., 2014).

Eco-conscious consumer behaviour plays a pivotal role in integrating sustainability within customer satisfaction frameworks (Ng & Paladino, 2020). Such behaviour characterises individuals who prioritise environmentally responsible purchases and aim to reduce their ecological footprint through their consumption choices (Schlegelmilch et al., 1996; White et al., 2019). This study examines the SDSM, which combines insights from consumer psychology, food marketing, and sustainable consumption. The findings offer valuable guidance for marketers and researchers (Paul et al., 2016). Although canned food is often seen as less environmentally friendly than fresh produce, it presents both opportunities and challenges for brands striving to align with eco-friendly values (Jain & Kaur, 2004; Roberts, 1996). Roberts (1996) conceptualised consumer behaviour as a spectrum encompassing awareness, attitude, and action. Recent research points to a steady increase in green consumerism in emerging markets like India, and consumers have provided positive feedback on eco-friendly products (Chaudhary & Bisai, 2018; Biswas & Roy, 2015). Nevertheless, Jain and Kaur (2004) identified a pronounced attitude–behaviour gap, in which awareness does not always translate into consumer action. Biswas and Roy (2015) found that eco-labelling and sustainable packaging have a measurable impact on purchase decisions, further influenced by shifts in consumer values, greater media attention, and environmental education. Eco-consciousness has increasingly gone mainstream, particularly among the middle and upper classes in urban centres (IMARC Group, 2023; Singh & Pandey, 2018).

Ottman, Stafford, and Hartman (2006) argued that sustainable qualities must align with core consumer values such as quality, trust, and health. These characteristics are often key differentiators in the packaged food sector (Zeithaml, 1988). Mishra, Sharma, and Sinha (2020) found that the sourcing of ingredients (local or organic) and use of recyclable or biodegradable packaging significantly influence eco-conscious choices among Indian consumers. According to Verma and Chandra (2022), customers are becoming more concerned about the environmental impact and safety of canned foods, especially regarding recyclability, the absence of BPA, and transparency about ingredients. They asserted that companies that embrace these qualities are likely to gain a competitive edge as the Indian canned food market develops (IMARC Group, 2023).

Zeithaml (1988) defined perceived value as the customer's assessment of a product's worth by weighing the benefits received against the resources invested. In the realm of sustainable consumption, this evaluation extends beyond basic utility to include emotional resonance, ethical alignment, and social impact (Chen & Chang, 2012). Environmentally conscious customers are more likely to appreciate products that reflect their ethical and environmental principles (Paul et al., 2016). In a study of the Indian market, Paul, Modi, and Patel (2016) found that green purchasing intentions are strongly linked to green perceived value. Their research highlights that when consumers perceive eco-friendly products as offering added social, health, or environmental benefits, they are willing to pay premium prices crucial in the canned food sector, where convenience, ethics, and safety intersect (Chaudhary & Bisai, 2018; Mishra et al., 2020).

Customer loyalty is defined as a persistent preference for a particular brand, often reinforced by emotional connection, perceived trustworthiness, and consistently positive experiences (Oliver, 1999; Zeithaml, 1988). In sustainable markets, loyalty is increasingly shaped by brands' ethical and environmental practices. Customers tend to rely on businesses they see as genuinely committed to sustainability (Mohr & Webb, 2005). Millennials and Generation Z, in particular, demonstrate stronger loyalty to brands that visibly champion sustainability (Singh & Pandey, 2018). Their research found that loyalty can be strengthened by eco-labels, transparency, and corporate social responsibility (CSR) initiatives. For socially conscious consumers, loyalty often results when a brand's principles and identity align with their own (Ottman et al., 2006).

Although the canned food market is still relatively new in India, it is expanding due to factors such as urbanisation, rising incomes, and an increasing preference for convenience (IMARC Group, 2023). The IMARC Group (2023) forecasts steady growth in the market, driven by demand for ready-to-eat, shelf-stable foods. However, concerns regarding preservatives, packaging safety, and environmental impact remain prevalent (Verma & Chandra, 2022; Mishra et al., 2020).

Despite these trends, there is limited academic research in India specifically focusing on the sustainability aspects of canned foods. This reveals a gap in the literature and signals the need for further study to investigate how sustainability attributes influence long-term loyalty, perceived value, and consumer behaviour within this niche market (Chaudhary & Bisai, 2018; IMARC Group, 2023).

Research objective

The objectives of this research are as follows: to evaluate the impact of satisfaction variables (SV) on eco-conscious consumer behaviour (ECCB); to analyse the relationship between ECCB and perceived values (PV); to examine the relationship between satisfaction and loyalty (SL) and perceived values; and to compare the direct effect of satisfaction variables on satisfaction and loyalty (Zeithaml, 1988; Chen & Chang, 2012).

Research Hypothesis

- Eco-Conscious Consumer Behaviour (ECCB) is positively impacted by Sustainability Attributes (SA).
- Perceived Value (PV) is positively impacted by Eco-Conscious Consumer Behaviour (ECCB).
- Satisfaction and Loyalty (SL) are positively impacted by Perceived Value (PV).

- Satisfaction and Loyalty (SL) are directly impacted by Sustainability Attributes (SA).

Research Methodology

A research design serves as a strategic blueprint for answering research questions through empirical data collection and analysis (Zeithaml, 1988). A well-constructed design ensures that methods align with the study's objectives and that appropriate analytical techniques are employed for accurate data interpretation (Paul et al., 2016). In this research, a deductive approach is adopted to rigorously test the proposed hypotheses.

To gather the necessary data, a cross-sectional survey design was implemented (Ng & Paladino, 2020). Data collection was carried out using a structured online questionnaire, created in Google Forms, featuring a 5-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree” (Mishra et al., 2020). The survey targeted Indian consumers who prioritize sustainability in their canned food purchases, focusing specifically on those who view eco-friendly canned foods favourably. The sample comprised a diverse group of respondents, selected across various ages, genders, income brackets, and economic backgrounds (Chaudhary & Bisai, 2018).

This empirical research utilized regression analysis to examine the relationships among the study variables and test the research hypotheses (Chen & Chang, 2012). Microsoft Excel's Data Analysis ToolPak was employed to perform the regression analyses. First, mean scores were calculated for each key variable, including Sustainability Attributes (SA), Eco-Conscious Consumer Behaviour (ECCB), Perceived Value (PV), and Satisfaction & Loyalty (SL). Regression analysis was then conducted to determine coefficients, R-squared values, significance levels (p-values), and standard errors. The results were interpreted using conventional significance thresholds ($p < 0.05$) (Paul et al., 2016).

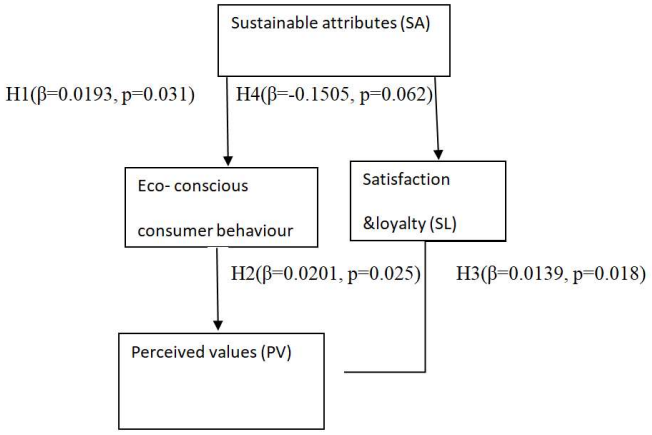

Figure 2: Conceptual Framework Illustrating the Relationships between SA, ECCB, PV, and SL

This configuration illustrates that sustainability attributes have a measurable influence on both eco-conscious consumer behaviour (ECCB), as reflected in Hypothesis 1 (H1), and on satisfaction and loyalty (SL), as outlined in Hypothesis 4 (H4) (Ajzen, 1991; Paul et al., 2016). Furthermore, eco-conscious consumer behaviour directly impacts perceived value (H2) and contributes to satisfaction

and loyalty (H3), highlighting the interconnectedness of these constructs within the model (Chen & Chang, 2012; Zeithaml, 1988).

Figure 3 provides an overview of the demographic responses collected in the study. This representation assists in evaluating the representativeness and diversity of the sample, ensuring that the data utilised in the analysis accurately reflect the broader population under investigation (Chaudhary & Bisai, 2018).

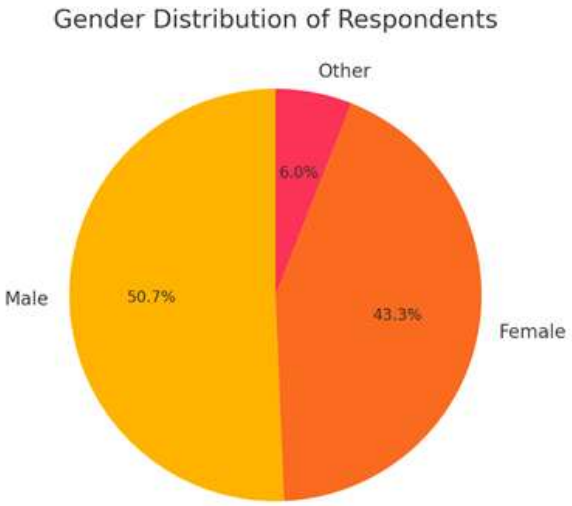

Figure 3: Gender distribution of respondents.

Data Analysis and Interpretation

In this section, each hypothesis is explicitly identified and tested using regression analysis (Chen & Chang, 2012; Paul et al., 2016). For every key construct sustainability attributes (SA), eco-conscious consumer behaviour (ECCB), perceived value (PV), and satisfaction & loyalty (SL) average scores were calculated from the questionnaire responses provided by participants (Mishra et al., 2020). Regression analysis was then conducted using the Excel Data Analysis ToolPak, generating coefficients, R-squared values, and p-values to assess both the significance and strength of the relationships among these variables (Ng & Paladino, 2020).

Hypothesis Statements and Results

The study tested four hypotheses using regression analysis. The results for each hypothesis—including coefficients, R-squared values, and p-values are summarised in the table below and discussed in detail (Paul et al., 2016).

Table 1: R-squared & P-value of the hypothesis

Hypothesis	Dependent Variable (Y)	Independent Variable (X)	Coefficient	R-squared	P-value
H1	ECCB	SA	0.0193	0.412	0.031
H2	PV	ECCB	0.0201	0.389	0.025
H3	SL	PV	0.0139	0.425	0.018
H4	SL	SA	-0.1505	0.23	0.062

Hypothesis (H1): Eco-conscious consumer behaviour (ECCB) is positively impacted by sustainability attributes (SA). The regression analysis reveals a positive coefficient of 0.0193 and an R-squared value of 0.412, suggesting a moderate, positive relationship between sustainability attributes and ECCB. The p-value of 0.031 is below the conventional significance threshold of 0.05, indicating statistical significance. This result supports H1, demonstrating that increased sustainability attributes in products are associated with greater eco-conscious behaviour among consumers (Ajzen, 1991; Biswas & Roy, 2015).

Hypothesis (H2): Perceived value (PV) is positively impacted by eco-conscious consumer behaviour (ECCB). The coefficient for this relationship is 0.0201, with an R-squared of 0.389 and a p-value of 0.025. The statistical significance of these results confirms H2, meaning that when consumers exhibit stronger eco-conscious behaviour, they also perceive more value in sustainable products (Chen & Chang, 2012; Ng & Paladino, 2020).

Hypothesis (H3): Satisfaction and loyalty (SL) are positively impacted by perceived value (PV). The data show a coefficient of 0.0139, an R-squared value of 0.425, and a p-value of 0.018. The strength and statistical significance of this relationship indicate that increased perceived value leads to higher levels of satisfaction and loyalty, thus supporting H3 (Oliver, 1999; Zeithaml, 1988).

Hypothesis (H4): Satisfaction and loyalty (SL) are directly impacted by sustainability attributes (SA). For this hypothesis, the coefficient is negative (-0.1505), the R-squared value is 0.23, and the p-value is 0.062. Since the p-value exceeds 0.05, the relationship is not statistically significant. Therefore, H4 is not supported by the data, suggesting that sustainability attributes alone do not directly increase satisfaction and loyalty; their effect is likely mediated by other variables such as perceived value and eco-conscious consumer behaviour (Paul et al., 2016; Ottman et al., 2006).

The analysis provides substantial evidence for the first three hypotheses, highlighting the importance of sustainability attributes, eco-conscious behaviour, and perceived value in shaping satisfaction and loyalty in the context of eco-friendly canned food (Ng & Paladino, 2020). However, the fourth hypothesis is not supported, indicating that sustainability attributes do not directly impact satisfaction and loyalty but do so indirectly through other mediating variables (Chaudhary & Bisai, 2018).

Analysis and Interpretation

The study examined four hypotheses using regression analysis to understand the relationships among sustainability attributes (SA), eco-conscious consumer behaviour (ECCB), perceived value (PV), and satisfaction and loyalty (SL) within the context of sustainable canned food consumption in

India (Paul et al., 2016; Chen & Chang, 2012).

For Hypothesis 1 (H1), the data show a positive coefficient of 0.0193 and an R-squared value of 0.412 between sustainability attributes and eco-conscious consumer behaviour, with a p-value of 0.031. This statistically significant result suggests that stronger sustainability features in products are associated with greater eco-conscious behaviour among Indian consumers (Ajzen, 1991; Biswas & Roy, 2015).

For Hypothesis 2 (H2), the regression yielded a coefficient of 0.0201, an R-squared value of 0.389, and a p-value of 0.025 for the relationship between eco-conscious consumer behaviour and perceived value. This again indicates a statistically significant and positive association, implying that consumers who value sustainability tend to perceive higher value in these products (Chen & Chang, 2012; Ng & Paladino, 2020).

Regarding Hypothesis 3 (H3), the relationship between perceived value and satisfaction and loyalty revealed a coefficient of 0.0139, with an R-squared of 0.425 and a p-value of 0.018. The statistical support for this hypothesis highlights that higher perceived value significantly enhances satisfaction and loyalty to sustainable canned food brands (Zeithaml, 1988; Oliver, 1999).

However, Hypothesis 4 (H4) is not supported by the data. The direct pathway from sustainability attributes to satisfaction and loyalty has a negative coefficient (-0.1505), a lower R-squared (0.23), and a non-significant p-value of 0.062. These metrics indicate that, on their own, sustainability attributes do not directly increase satisfaction and loyalty; thus, their influence appears to be indirect mediated by eco-conscious behaviour and perceived value (Paul et al., 2016; Chaudhary & Bisai, 2018).

Summary of Findings

The analysis confirms that sustainability attributes play a fundamental role in fostering eco-conscious consumer behaviour (Ajzen, 1991; Straughan & Roberts, 1999). This, in turn, positively shapes the perceived value of sustainable canned foods and ultimately leads to greater customer satisfaction and loyalty (Chen & Chang, 2012; Zeithaml, 1988; Oliver, 1999). Importantly, the study reveals that sustainability features by themselves do not have a direct impact on satisfaction and loyalty; rather, their effect is mediated by the extent to which consumers adopt eco-conscious behaviours and perceive added value in products (Paul et al., 2016; Chaudhary & Bisai, 2018).

Discussion

These findings reinforce existing literature on the influence of sustainability and environmental responsibility on modern consumer behaviour (Biswas & Roy, 2015; Grunert et al., 2014; Ottman et al., 2006). The results suggest that companies aiming to increase satisfaction and build loyalty in the sustainable canned foods sector should not rely solely on implementing sustainability features. Instead, they must also educate, engage, and empower consumers to adopt eco-conscious behaviours, effectively communicate the ethical and functional benefits of their products, and enhance the perceived value these products offer (Ng & Paladino, 2020; Chen & Chang, 2012).

The absence of a direct impact from sustainability attributes to satisfaction and loyalty highlights a potential gap between consumer expectations and actual brand experience (Jain & Kaur, 2004; Paul et al., 2016). It may reflect a scenario where simply having sustainable features is not enough unless

these features align with consumer values and are accompanied by tangible benefits that consumers recognize and appreciate (Mohr & Webb, 2005; Oliver, 1999).

Conclusion

In summary, the study demonstrates that sustainability attributes are vital in influencing eco-conscious behaviour and perceived value, which are, in turn, central to achieving satisfaction and loyalty in the canned food market (Ajzen, 1991; Chen & Chang, 2012; Zeithaml, 1988). Businesses that wish to thrive in this evolving consumer landscape should integrate sustainability into their overall value proposition, actively promote sustainable practices, and communicate these efforts transparently, ensuring that consumers clearly perceive the benefits (Mohr & Webb, 2005; Singh & Pandey, 2018). Further research may investigate other mediators or moderators, such as demographics, to better understand the nuances of these relationships and to support even more effective sustainability strategies in the future (Chaudhary & Bisai, 2018; Mishra et al., 2020).

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HOW AI IS INSPIRING NEW STARTUP CONCEPTS AND DISRUPTING TRADITIONAL INDUSTRIES

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Abstract

AI is growing quickly, which is changing the way businesses work, speeding up new ideas, and opening up new opportunities in every area. This study examines the significant impact of AI on startups, emphasizing the opportunities it generates, the challenges it presents, and the complexities it introduces for both emerging and established enterprises. The study's findings show that AI's ability to analyse large datasets, automate difficult tasks, and come up with new ideas has led to the creation of new business models that have greatly improved operational efficiency and completely changed the way customers interact with businesses. Also, there are some challenges faced by enterprises while using AI, such as having trouble using AI because it costs more, retraining their workers, losing market share, having trouble integrating AI, and more. Artificial intelligence (AI) could help businesses grow, make better decisions, and compete better. However, it also raises concerns regarding its application, data privacy, and the potential displacement of traditional employment.

Keywords: Artificial Intelligence (AI), Startups, Industries, Disrupting

Introduction

AI (Artificial Intelligence) is now a major factor in deciding the future of new businesses. It is now an important part of modern business and is changing things at all levels (Bruno, 2024; Prasanth et al., 2023). With the Fourth Industrial Revolution, the effects of AI are becoming clearer in both developed and developing countries, where it is slowly changing how businesses work and how people do business (Schwab, Klaus & Park, Sang-Chul, 2017). AI has sped up the use of new strategies in business and management and made it easier to make choices. It has changed basic skills like how to keep customers happy and manage information. This change is a big deal for how businesses work, how they handle information, and how they supply customers value (Chalmers et al., 2020; Lee et al., 2019).

AI changes many industries, such as healthcare, finance, manufacturing, and retail. It automates routine tasks, finds useful information in large datasets, and helps people make better decisions (B. I. Lee et al., 2023; J. Lee et al., 2019; Monge & Soriano, 2023; Weng et al., 2024). Globally, businesses are reshaping themselves with technologies like natural language processing, machine learning, and computer vision (Kaplan & Haenlein, 2020). This trend has instigated established businesses to change. At the same time, new and adaptable AI startups say they will change the way businesses work and the industries look.

AI assists in the processing of information, including acquiring knowledge, making prudent decisions, assessing experiences, and engaging in logical reasoning by making machines and software that can learn, adapt to fit their surroundings, or do things that need human intelligence

(Shabbir & Anwer, 2018). Russell and Norvig (2012) stated that AI systems are complicated algorithms that try to mimic the way people think, see, understand natural language, and solve problems. Startups are usually the first to use new technology because they are flexible and adopt technology quickly, which helps them grow. AI helps them start new businesses and shake up old ones. But there are big problems in that only 10% of startups are expected to make it through the course. In this case, disruption stands for the significant and rapid changes introduced by new technologies such as AI. Traditional companies are forced to innovate rapidly or risk losing their competitive advantage (Ries, 2011; Christiansen, 1997).

The aim of this research is to analyze the impact of AI on both startups and established companies, while also addressing the ethical, legal, and resource-related issues associated with its adoption. This analysis aims to clarify the transformative impacts of AI technologies on traditional industries and the opportunities they offer for newcomers. It seeks to educate entrepreneurs, business executives, and policymakers as they traverse a rapidly changing environment.

Research Objective

To examine how Artificial Intelligence (AI) simultaneously inspires new startups and disrupts traditional industries.

Methodology

This study examines how artificial intelligence (AI) has impacted both startups and established industries using both qualitative and secondary research methods. The study's foundation is thematic content analysis, which is done manually, and examines numerous scholarly articles (Google Scholar, JSTOR, and Scopus), business reports, case studies, and insights into international markets that were released between 2017 and 2024.

Selection Criteria: Studies that explicitly address AI influence on startups or traditional industries are included.

Analytical Process (Thematic Content Analysis)

- Reading the selected document in depth
- Coding the repeated concepts like (AI opportunities, challenges, and disruption)
- By clustering code theme is developed
- Combining everything into a final theme that fits with the research goal

AI as a Catalyst for New Startup Concepts

Artificial intelligence excels at processing and analysing extensive datasets, enabling startups to identify opportunities for innovation by uncovering market gaps and consumer demands that conventional methods may overlook and analysing vast quantities of data to identify patterns, behaviours, and preferences (Perez - Vega et al., 2020). At a CAGR of 19.20%, the worldwide AI market is expected to rise from $757.58 billion in 2025 to $3,680.47 billion by 2034 (Fig. 1). Experts predict that the adoption of artificial intelligence, with its economic influence, will lead to a 21% net rise in US GDP by 2030. With 64% of companies stating increased productivity as a result of AI integration, artificial intelligence has been demonstrated to raise efficiency and productivity in many different sectors. Driven by beneficial government policies and technological innovation, the North American AI market alone will exceed $235.63 billion in 2024.

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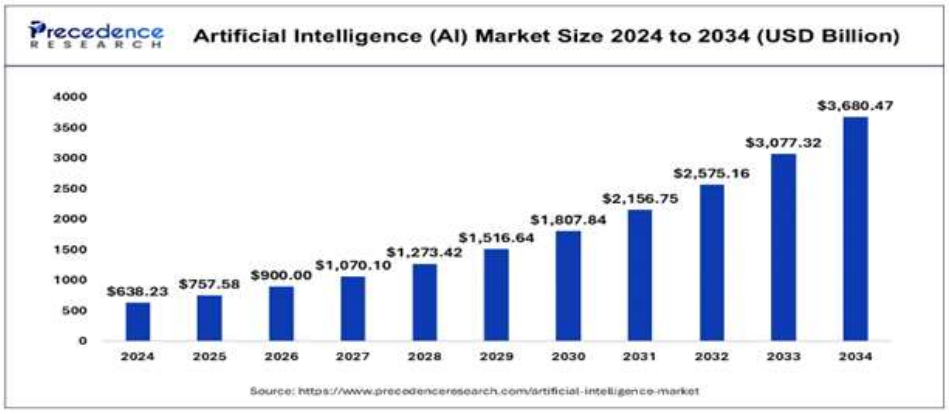

Figure 1: Showing Market Trend

Artificial intelligence can analyse consumer purchasing behaviour, social media activity, and emotional responses to identify unmet needs in product or service categories where existing options are inadequate (Davenport & Ronanki, 2018). This feature helps startups stand out in competitive markets by allowing them to focus on particular markets and provide customized solutions. AI-powered solutions simplify the process of launching new companies by automating numerous crucial steps, including conducting market research, creating a business plan, and the initial stages of product development. This allows entrepreneurs to devote more time and resources to strategic innovation (Pfau & Rimpp, 2020). AI market research tools allow us to acquire accurate information more quickly by combining and analyzing all pertinent customer data at a highly sophisticated level of interaction. Businesses can use artificial intelligence (AI) to monitor social media trends in real time with a software platform like Crimson Hexagon. This permits them to learn about their customers' preferences and business practices (Gonzalvez-Cabañas & Morcillo, 2016). An artificial intelligence tool like ChatGPT can even assist users in visualizing their future companies. An AI-powered tool called “The Grid” makes it easier than ever to design and develop websites. This saves startups a significant amount of liquid capital in addition to valuable time. AI has altered how startups provide customized products and services by using machine learning algorithms to examine how customers behave, what they like, and how they interact with the business in real time. Stitch Fix, an AI-driven fashion startup, employs machine learning to provide customers with tailored clothing recommendations based on their style preferences and previous purchases (Shin & Hwang, 2022). Similarly, Netflix employs artificial intelligence to recommend films and television series based on typical viewing patterns, thereby enhancing user engagement and satisfaction. Personalisation enhances the customer experience significantly, fostering greater loyalty and increasing the likelihood of continued patronage. This provides startups a competitive advantage over conventional companies that depend on more generic products.

Several new enterprises have successfully utilised AI to identify unmet needs and address market deficiencies. Coursera and Duolingo utilise AI to enhance personalised learning by adapting course content according to each student's pace and performance. PathAI employs AI to assist pathologists in achieving more precise disease diagnoses through the analysis of medical images (Ehteshami Bejnordi et al., 2017). A fintech startup named Zest AI employs machine learning to assess

creditworthiness. This enhances the equity and accessibility of lending by utilising non-traditional data, such as social media engagement and utility payments, to more accurately assess loan default risk compared to conventional credit scores (Maple et al., 2023).

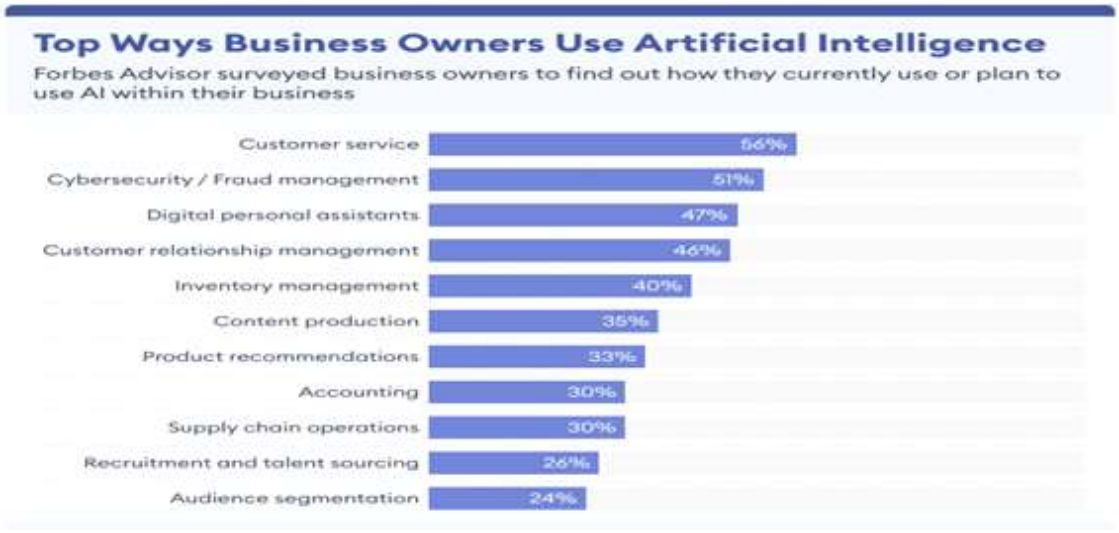

Figure 2: Showing how AI helps in different kinds of Activities

Disrupting Traditional Industries with AI

In conventional industries, AI is crucial for optimising operations and enhancing efficiency. AI-driven automation reduces human participation while enhancing productivity in sectors such as manufacturing, logistics, and customer service. In manufacturing, AI-powered robots and automation systems can perform repetitive tasks with greater speed and precision. Production can occur continuously, 24 hours a day, seven days a week, resulting in fewer errors. AI-driven predictive maintenance, such as Siemens' systems, enables real-time monitoring of manufacturing equipment, predicting failures and reducing downtime and maintenance expenses (Rojek et al., 2023). AI chatbots, like IBM's Watson, respond on their own to common customer questions. This helps businesses serve more customers and lets human workers concentrate on more complicated tasks.

Business operations are significantly changing with the help of AI. It can analyze large amounts of data and improve their strategies, which helps companies make better choices, leading to more success, new ideas, making accurate predictions, managing risks, and using resources more effectively.

In today's world, AI algorithms are used for examining market data to predict price movements and determine optimal trading times by financial industries like Kensho, Goldman Sachs' AI platform, which analyzes global financial markets in real time to assist users in making data-driven decisions (Aboshosha et al., 2023).

Additionally, AI improves logistics by providing the best delivery routes based on traffic and weather data and also helps businesses to understand how to use their resources effectively by predicting

demand and forecasting the appropriate inventory levels based on past sales data and industry trends.

AI is helping businesses operate more effectively. It is also enabling the creation of business models that once seemed impossible. AI-as-a-Service (AIaaS) exemplifies this shift. It allows companies to access powerful AI tools without needing to develop their own infrastructure. Platforms like Microsoft Azure AI and Amazon Web Services (AWS) simplify AI adoption for businesses. These platforms enable the use of machine learning, natural language processing, and predictive analytics without requiring AI experts (Ashta & Herrmann, 2021). The expansion of these platforms has fostered the growth of ecosystem-based models. For example, Uber employs AI algorithms to quickly identify optimal routes and connect drivers with passengers. These new business models are transforming traditional practices by offering services that are faster, cheaper, and more tailored to individual customers.

AI is also driving change in various fields. In finance, companies like Betterment and Wealthfront use AI-driven robo-advisors to provide automated investment guidance. This means that people who previously could not afford wealth management services can now access them (Au et al., 2021). In healthcare, AI is revolutionizing medical imaging. For instance, Zebra Medical Vision analyzes CT scans and MRIs using AI to detect diseases at an early stage. This not only improves diagnostic accuracy but also eases the workload for healthcare professionals (Ehteshami Bejnordi et al., 2017). Transportation is also evolving. Waymo is developing self-driving cars that utilize AI to plan routes intelligently, which could reduce traffic accidents and optimize fuel usage (Bimbraw, 2015). These examples illustrate how AI is profoundly altering the way businesses operate, creating new business models and transforming entire industries.

Table 1: A Comparative Table Outlining AI's Disruption Across Sectors

Sectors	Key Applications	Advantages	Challenges
Healthcare	Disease diagnosis, personalized medicine	Improved accuracy, faster treatments	Data privacy, ethical concerns
Finance	Fraud detection, algorithmic trading	Enhanced security, optimized investments	Cybersecurity risks, regulatory hurdles
Retail	Personalized recommendations, inventory management	Increased sales, better customer experience	Data dependency, implementation costs
Education	Adaptive learning platforms, virtual tutors	Personalized learning, accessibility	Digital divide, infrastructure disparities
Transportation	Autonomous vehicles, route optimization	Reduced accidents, fuel efficiency	Safety concerns, legal frameworks
Energy	Smart grids, predictive maintenance	Efficient resource use, reduced downtime	High initial costs, adoption barriers

Table 2: Effect of AI on Startups and Traditional Businesses

Aspects	Startups	Negative Impact on Traditional Businesses
Operational Costs	Reduced by up to 30% through AI-driven automation	Increased costs for adopting AI systems and retraining employees
Funding Growth	Global AI startups raised $110 billion in 2024, a 62% increase from the previous year	Competition from AI-driven startups has led to reduced investment in traditional sectors
Market Expansion	AI-enabled startups scaled faster, achieving 100k+ users/month within a year	Loss of market share as AI startups disrupt traditional business models
Productivity	Improved efficiency by 40% through AI optimization tools	Struggles to integrate AI, leading to inefficient workflows
Revenue Generation	Revenue growth rates of AI startups exceed 25% annually in sectors like healthcare and finance	Traditional businesses face declining revenue due to outdated processes
Innovation Speed	Faster product development cycles, reducing timelines by 50%	Difficulty adapting to rapid innovation cycles set by AI startups
Ethical Concerns	AI startups face fewer legacy barriers to ethical AI adoption	Traditional businesses struggle with legacy systems and ethical AI integration
Workforce Impact	Creation of new roles in data science and AI development	Workforce displacement as AI replaces traditional jobs

Challenges and Considerations

AI brings many benefits, but it also brings some problems that need to be solved to ensure that it is used in a fair and responsible way. Some of these ethical problems include the need for rules and regulations, as well as the challenge of finding the right resources. These issues negatively affect both new and established businesses.

Ethical Implications

One of the primary ethical concerns about artificial intelligence (AI) is that its decision-making may not be fair to everyone. AI systems, especially those that rely on machines, need large datasets to help them learn. If these datasets contain biased or unrepresentative data, AI can reinforce and even worsen these biases. This issue is concerning in areas like hiring algorithms, facial recognition, and predictive policing, as biased AI systems can lead to unfair treatment of certain groups (O'Neil, 2016). For example, biased hiring algorithms can create an unfair process that favors men. This kind of bias often occurs when algorithms are trained on outdated data that reflects past hiring practices, which may have favored men for many roles. As a result, these algorithms might unintentionally make it harder for women to obtain jobs.

Another significant ethical issue is job loss. As AI systems improve, they automate more routine and repetitive tasks. This raise concerns that many jobs will disappear in fields like manufacturing, retail, and customer service. Some argue that AI will generate new industries and jobs, but this transition could be difficult. If there aren't enough programs to help them learn new skills, many workers could fall behind (Ford, 2015). Data privacy is also a critical moral issue. AI systems often use a lot of personal information, particularly those designed for consumer purposes. This data is collected and used, raising questions about how it is stored, who has access, and what it is used for. Following high-profile data breaches and the misuse of personal information, people are demanding stronger data protection and more ethical AI practices (Zuboff, 2019).

Regulation and Governance

As AI technologies improve faster than the rules and regulations can keep pace, many moral and social issues remain unresolved. We need solid regulatory and governance frameworks now to promote responsible AI development. These frameworks aim to make AI systems more accountable, open, and fair. For example, there is growing interest in creating explainable AI, which ensures that people can understand and question AI decisions (Doshi-Velez & Kim, 2017). Additionally, since AI technologies are used globally, countries must collaborate to ensure that AI laws are consistent across borders. Without coordinated governance, AI could be misused for harmful purposes, like building autonomous weapons or spying on many individuals. The EU's proposed AI Act has already made strides. Its goal is to regulate dangerous AI systems to protect people and society (European Commission, 2021). But rules that are too strict could stop people from coming up with new ideas, especially startups. It is extremely difficult for policymakers to strike a balance between novel concepts and the ethical application of AI. Startups struggle to comprehend and adhere to complex regulations, which hinders their capacity to compete with larger businesses that have greater resources and personnel.

Obtaining Resources

AI systems use a lot of datasets to learn and provide results, a challenge for startups because they do not have excess funds to access the data and recruit talent. Effective AI model training may be more difficult for startups due to their limited access to high-quality datasets, but big tech companies have an advantage due to their extensive user bases and data collection capabilities (Rosa & Bechler, 2024). For the development of AI models and to train them, a lot of processing power is needed, particularly for deep learning models. Startups, particularly new ones, lack the advanced computing power they require, even though some cloud computing services are reasonably priced (Sze et al., 2017).To attract top talent, big companies pay more and provide better benefits. The rapid pace of AI development makes this talent gap worse because AI professionals must constantly learn and change (Bessen et al., 2018; Manyika, 2017). Startups struggle to innovate or compete without skilled AI experts.

Conceptual Framework

The Dual-Impact AI Business Transformation Framework shows how AI can change things by automating tasks, analyzing large amounts of data, engaging customers more personally, and creating new business models. These channels help startups grow quickly, attract funding, stay competitive, and find the right solutions. In contrast, traditional industries face high integration costs, job loss, and outdated systems. This business ecosystem speeds up innovation, opens new markets, and supports data-driven decision-making. However, it also results in job loss, data privacy issues, and regulatory challenges. Policy and governance must ensure the responsible use of AI, according to the framework. It emphasizes balancing innovation with ethics and finding ways to reduce risks while promoting fair growth.

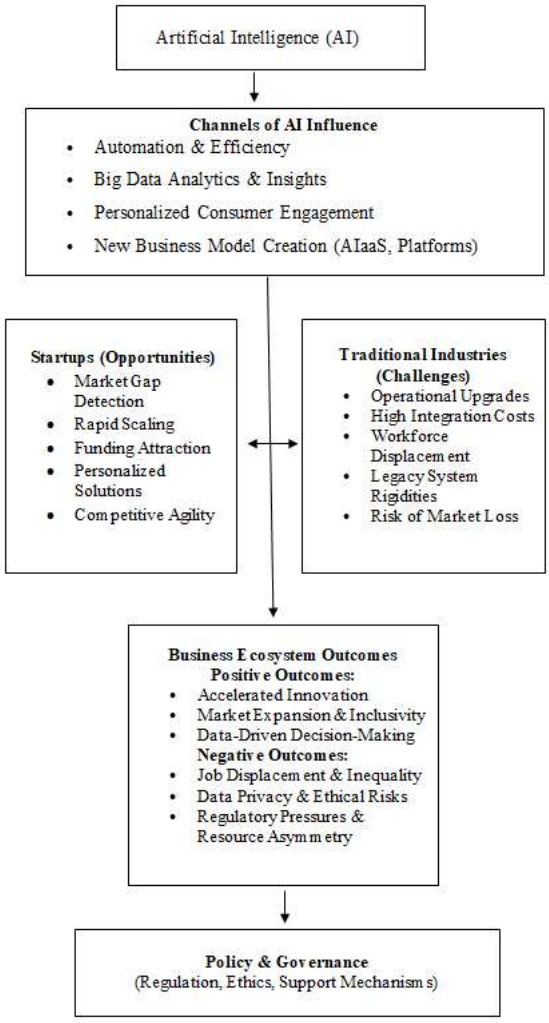

Figure 3. Dual-Impact AI Business Transformation Framework

Following organizations are incorporating AI for solving & challenging problems, accelerate development, and generate value highlight.

IBM Watson's Health

By enabling simpler organisation and analysis of enormous volumes of medical data, Watson Health has had a significant impact on the healthcare sector. Watson analyses unstructured data research papers, patient records, and clinical trial data by using artificial intelligence. Better outcomes follow from doctors making more individualised treatment recommendations and improved diagnoses based on this analysis. In this field, the smart use of artificial intelligence saves time and improves patient care by reducing the chances of human error in difficult decisions.

Google DeepMind's Alpha

Google DeepMind's AlphaFold represents an important advancement in computational biology. For years, scientists struggled to build protein structures. This AI model finally solves that problem. Understanding how proteins fold will help us discover new drugs and fight diseases. By addressing this issue, AlphaFold has accelerated pharmaceutical research. Researchers can now create new treatments more quickly and at a lower cost. Its effect on scientific discovery will continue to influence biology and medicine.

Sephora's AI chatbots

Sephora now interacts with its customers in a new way by using AI chatbots in its stores. These chatbots schedule appointments, suggest products based on customer preferences, and let users virtually try on makeup. This technology makes shopping more enjoyable and increases conversion rates, leading to higher sales. Sephora was one of the first retailers to use an AI customer support tool. Its use of AI shows how companies can balance growth and personalization.

Coca-Cola's AI-powered automation

Coca-Cola has begun using artificial intelligence to create new ideas and improve its business processes. Using AI for data analysis and supply chain management has helped the company operate more efficiently. AI models, for example, predict product demand and evaluate consumer preferences to design better marketing campaigns. This approach has made Coca-Cola more competitive and efficient in the market. It demonstrates how traditional business processes can benefit from artificial intelligence.

Conclusion

The study emphasises AI's ability to change things by sparking new business ideas and shaking up established industries. AI has helped startups solve challenging problems in retail, agriculture, healthcare, and finance. Startups are using AI's automation, data analysis, and predictive modelling skills to make things run more smoothly, offer more personalised solutions, and open up whole new markets. At the same time, AI is changing traditional industries by automating tasks, lowering costs, and making decision-making better through real-time data analysis and optimisation of operations (Kaplan and Haenlein, 2020). Despite AI's great potential, the study demonstrates how challenging it can be to use because of unequal access to resources, lax regulations, and ethical dilemmas.

To ensure that everyone benefits equally from AI, a strong governance framework is necessary to prevent AI abuse and promote responsible use and also carefully consider concerns like algorithmic bias, job loss, and data privacy. Additionally, startups struggle to get the data, processing power, and AI expertise to compete with larger, more established businesses (O'Neil, 2016; Rosa & Bechler, 2024).

Future Trajectory of AI in Business

AI will become more prevalent in business and transform industries as it advances because it has the potential to spur further innovation in fields such as personalized healthcare, self-driving cars, and AI-powered services in various industries. As artificial intelligence (AI) technologies like machine

learning, computer vision, and natural language processing advance, startups should push themselves to explore the possibilities.

However, businesses should provide training for workers, develop simple AI systems, and encourage cooperation among regulators, businesses, and tech experts for the changes (Ford, 2015; Doshi-Velez & Kim, 2017).

The increasing use of AI in traditional fields indicates a fundamental shift in business models. Companies that start using AI early on will probably be able to compete better. On the other hand, companies that don't want to change may have a hard time staying in business. AI-as-a-service (AIaaS) platforms are likely to grow in importance. They make it easier for small businesses and new businesses to use AI tools even if they don't have many AI experts on staff (Lee et al., 2019).

10. Call to Action

In summary, AI changes some fundamental characteristics of industries, both emerging and mature industries (Bessen et al., 2018). There's work to do to develop AI so that it can one day reach its full potential, having most of the benefits and few of the downsides, but research and responsible development should be accompanied by preparation for disruption. To address these ethical challenges, AI cannot be developed in isolation; it requires businesses, policymakers, and technologists to work together to ensure that the benefits of artificial intelligence reach everyone and develop appropriate regulations. If companies and startups want to remain competitive, they have to adapt fast. This requires remaining current with updates within AI as well and integrating new technology into their operations.

Finally, the global AI landscape should be welcoming to everyone by giving startups the tools, talent, and support they need to do well in an economy driven by AI. We should promote teamwork, creativity, and responsible AI development if we want to build a fair, innovative, and long-lasting future.

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THE INFLUENCE OF DEMOGRAPHIC FACTORS ON EMOTIONAL INTELLIGENCE: WITH SPECIAL REFERENCE TO FACULTY MEMBERS OF PROFESSIONAL EDUCATION

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Abstract

In the 21st century, Education plays an immense role in shaping an individual's physical and mental growth. With the different policies and norms passed by the government it is quite challenging for the faculty members to adapt. Faculty members are an integral part of the institutions, doing various tasks to influence the future of the students . Thereby it is necessary to understand the emotions to achieve the ultimate goal. Emotional Intelligence is an emerging topic of education research as emotional relationship between the faculty members and the students are the important aspect in the overall process of learning. The paper investigates demographic variables and their relationship with emotional intelligence of faculty members in higher education institutions in Jaipur. The mode of collection of the data was through questionnaire. The study is based on primary data. The sample consisted of faculty members from various colleges and universities of Jaipur. The study included 223 faculty members selected using convenience sampling. The Quick Emotional Intelligence Self Assessment developed by Paul Mohapel structured questionnaire was used in this study. Emotional intelligence, as defined by Mohapel, is the capacity to identify, comprehend, manage, and affect both one's own emotions and those of others. This selfassessment tool enables individuals to analyze their emotional intelligence and identify areas for improvement.This tool seeks to enhance comprehension of emotional intelligence and its significance for professional and personal achievement. Paul Mohapel classified the parameters in to four a) Emotional Awareness b) Emotional Management c) Social Emotional Awareness d) Relationship Management.The questionnaires were filled by personally meeting the faculty members and by online mode also. A total of 223 completed surveys were received, yielding an 55% response rate The study concludes that the academicians need to focus more on managing their inner self. The analysis of the acquired data reveals that emotional intelligence is crucial in the education sector. The study provides an empirical analysis of the relationship between various demographic variables and their influence on the emotional intelligence of faculty members in the education sector.

Keywords: Academicians, Professional Education, Emotional Intelligence and Demographic Factors

Introduction

The rules of service are shifting. We are being assessed by a new standard: not just our intelligence, training, and competence, but also how effectively we can manage ourselves and comprehend the sentiments of others. This criterion is increasingly used to determine who will be employed and who will not, who will be fired and who will be kept, who will be passed over and who will be promoted(Goleman, D, et al 2002).). The recent dynamic changes in the education system have resulted in the use of several strategic instruments. The entire world was profoundly impacted by the COVID-19 pandemic, and the education sector was no exception. The sudden disruption left

countless students stranded mid-academic year, forcing schools, colleges, and universities to rapidly adapt. With physical classrooms closed under strict lockdowns, online education became the primary mode of instruction. While digital learning was not a novel concept, the pandemic accelerated its adoption across all levels of education. In parallel, India introduced the National Education Policy (NEP) 2020—a comprehensive reform aimed at transforming the country's education system. The timing of NEP 2020 aligned with the urgent need for innovative and flexible learning models. Together, the pandemic and the NEP ushered in a new era of blended, inclusive, and technology-driven education, supported by platforms such as Byju's, Vedantu, and Google Classroom. These developments signaled a fundamental shift in how learning is delivered and accessed, marking the beginning of a more resilient and future-ready educational framework.

The faculty members had to adopt new teaching techniques to keep the student glued to the screen.As these learning apps have lots of information and students can easily assess these data have put a lot of pressure in the faculty members to make the subject interesting. The role of emotions is necessary as to build a healthy relationship between the faculty members and the students. As to build up the relationship it is necessary for the faculty members to understand the emotions of the students to make the learning interesting. Learning is a continuous process and to address it the faculty members have to always update themselves and learning interesting and worthy. With the lockdown being eased again the online mode of learning is shifting towards offline learning so it is again the emotions which would be playing a pivotal role.

Over the last two decades, the climate for universities throughout the world has changed dramatically.Globalisation and commercialization of higher education, combined with significantly reduced government funding and rapidly evolving technology, have put pressure on universities to become more competitive, accountable through journal quality assurance mechanisms and research performance metrics, and more business-like and market driven These changes have changed the job demand in the academic area also which includes more workload,more expectations from the students ,large administration work and the pressure to publish good research papers.The biggest challenge faced by any Universities or Educational Institutions today is to retain the skilled faculty members.The awareness of workplace emotion is now pacing up.With these changes and more workload the level of job performance and satisfaction is the prevailing question.People are now realizing that to grow in the career ladder not only the technical expertise or the intellectual excellence but upgradation in the skill set. Intrinsic traits like endurance, determination, confidence, and adaptability have gained new meaning. Emotional Intelligence (EI) is essential for the educational system as it improves both teaching and learning experiences. It significance lies on enhancing Student-Teacher Relationships: Educators with elevated emotional intelligence has a superior capacity to comprehend their students' emotions, establishing a nurturing and sympathetic classroom atmosphere. This fosters trust, promotes communication, and strengthens studentteacher relationships.Improving learning environment where a classroom setup prioritizes emotional intelligence which often fosters a more positive and tranquil atmosphere, facilitating enhanced concentration, collaboration, and learning. Students are more inclined to engage and contribute actively when they feel emotionally secure.

Emotional Intelligence assists both students and educators in managing disagreements constructively. By acknowledging and comprehending emotions, students may more effectively

settle conflicts amicably and appreciate other viewpoints.

The current study will concentrate on the role of emotional intelligence and it's influence on the demographic factor of faculty members of professional education in Rajasthan. The conceptualizations of these variables selected for present research are described in the following section.

Concept of Emotional Intelligence

The phrase "Emotional Intelligence" was initially used by Michael Beldoch in 1964 in an article entitled "Sensitivity to Expression of Emotional Meaning in Three Modes of Communication." The notion achieved significant prominence due to the contributions of Peter Salovey and John D. Mayer in 1990, who clearly defined it and established a framework for its examination.

Subsequently, Daniel Goleman popularized the phrase in the mid-1990s with his successful book "Emotional Intelligence: Why It Can Matter More Than IQ" (1995), integrating the notion into mainstream discourse in psychology, education, and business.

Emotional Intelligence is defined as one's capacity to control and monitor one's own emotions, recognize different types of emotions in others, discriminate between their feelings and those of others, and use direct information to make decisions (Salovey, P. & Mayer, J. D. (1997). To better comprehend the impact of emotions on one's professional and personal achievements, one should look to Goleman's model of emotional intelligence. By including emotional and social abilities into the conventional idea of intelligence, it highlights the importance of these elements in leadership, decision-making, relationships, and general health.Self- awareness, Self-regulation, Motivation, Empathy, and Social skills are the five pillars that make up Goleman's model of emotional intelligence. Together, these factors aid people in overcoming emotional obstacles and developing meaningful relationships.

The Emotional Intelligence Handbook Paul Mohapel (2015) the year cited developed the Self-Assessment, a tool that facilitates the evaluation of emotional intelligence (EI) for individuals. Emotional intelligence, as defined by Mohapel, is the capacity to identify, comprehend, manage, and affect one's own emotions and those of others. This self- assessment tool enables individuals to examine their emotional intelligence and identify areas for potential development.This tool seeks to enhance comprehension of emotional intelligence and its significance for professional and personal achievement. Individuals may get a deeper comprehension of how their emotional competencies influence their leadership abilities, interpersonal interactions, decision-making processes, and overall success by completing the assessment. Paul Mohapel categorized the parameters into four segments:

a) Emotional Awareness

The first factor of Emotional Intelligence is knowing oneself i.e self awareness or emotional awareness. When individuals are more aware of themselves they can control their emotions. This also means that individuals can identify the emotions and have better reactions to the emotions. The emotions like fear,anger happy can be easily controlled over the situation. It is as simple as to get noted,analysed and get corrected. It is more about how people deal it more empathically and try to understand, the reasons of criticism and taking it positively .These are the negativity and causes dissatisfaction in the job hence job performance also is not of the standard, (Goleman 1998)

Therefore it becomes important to understand the factors of EI which enhances the adaptability in workplace.

b) Emotional Management

A person is said to be high in emotional management when he can stay in a situation without judgement. The person try to adapt with the ideas of the others. This factor of Emotional Intelligence in an individual makes him a good listener and he can better handle the challenges. The person with these qualities are less in chitchatting or spreading negativity rather are more helpful and try to solve problems of the others.

c) Social Emotional Awareness

The capacity to control the emotions that surface during social interactions is known as social emotional management. This entails not just controlling one's own emotions but also being aware of and reacting suitably to those of others. It is an ability that aids people in navigating intricate social situations, including those that arise in teams, groups, or social events.

Strong empathy, the capacity to identify and comprehend the feelings of others, and the ability to modify one's behaviour accordingly are all necessary in this domain. Social emotional management, for example, might enable someone to provide support or modify their tone of voice to reflect the other person's emotional condition if they are clearly agitated at work. Since people must successfully arbitrate and handle conflicts that develop within organisations, it also entails conflict resolution.

d) Relationship Management

Relationship Management is the capacity to establish, preserve, and navigate wholesome, sustaining connections with others. It utilises all of the other emotional intelligence categories, including social emotional management, emotional awareness, and emotional management. Communication abilities, conflict resolution skills, and the capacity to build mutual respect and trust are all part of relationship management.

Review of Literature

Anurag Mishra (2024) examined he impact of emotional intelligence on workers' job happiness. The main objective of this study was to find out if emotionally intelligent people are more likely to be satisfied with their jobs. The work environment has a big impact on employees' emotional intelligence.When workers are conscious of and in control of their emotions, they work more effectively and efficiently. According to pertinent research, emotional intelligence helps workers be more emotionally intelligent and increases their job happiness.An employee's feelings at work motivate them to comprehend how to handle current circumstances and maintain job contentment. Employees who understand one another better are able to recognize one another's needs, which increases job satisfaction.This also adheres to emotional intelligence methods like empathy and connection development. The relationship between work satisfaction and emotional intelligence (EI) has been examined in this article. Better levels of emotional intelligence have been linked to better levels of job satisfaction at work, according to the study.

Maria Angeles et al. (2021) evaluated the interplay between emotional factors and the levels of teacher happiness, aiming to elucidate their combined influence on significant teacher job attitudes,

namely job satisfaction and turnover intention.The study employed a cross-sectional design, thereby constraining the interpretations of the associations observed.The sample comprised solely educators from primary and secondary levels of education.The variables were evaluated through self-report instruments.The findings indicate that teachers who experience elevated levels of happiness and perceive themselves as emotionally intelligent may possess a greater capacity to navigate future challenges and demands associated with their profession. This, in turn, could lead to more favorable attitudes towards their jobs and careers.

Dewie Tri Wijayati et al. (2020) attempted in their research;" Emotional Intelligence,Work Family conflict and Job satisfaction on Junior High School Teacher's Performance " to compare the effectiveness of female instructors with that of male teachers.The test was carried out utilizing AMOS and SEM analytical methods.The research was quantitative and explanatory in nature. The study found that emotional intelligence, work satisfaction, and devotion were strongly correlated..The findings show that women are more emotionally intelligent than males, yet there was no correlation between job performance, commitment, or job happiness.

Seri S B et al (2019), the study seeks to provide a comprehensive evaluation of existing studies on emotional intelligence in women.The study focuses on two primary themes: (i) it found that women's emotional intelligence is low, and (ii) it identified that emotional traits such as empathy, social responsibility, and selfawareness are high.Although there are research that provide proof, there are less studies that examine the underlying reasons.

Musa Sribaibu et al (2019), the study analyzed the level of teacher's effectiveness among secondary school teachers.The study also determines the differences in teacher's effectiveness among secondary school teachers with respect to gender ,type of experience. As maximum number of senior secondary teachers reported to have average effectiveness after which it was recommended that teachers should be provided with frequent training relevant to their specializations.On the part of the teachers they should inculcate the habit of learning.

Xiaobo Xu et al (2019), explored in his study the relation between Emotional Intelligence and creativity.In the present study a meta analysis of 96 correlations were studied.The current meta-analysis demonstrated a fairly favorable correlation between emotional intelligence and creativity.Moreover, the emotional intelligence and creative metrics, along with participants' gender, work level, and cultural background, all reduced this link.

Mingwei Li, et al (2018), the study aimed to empirically test the influence of demographic factors and emotional intelligence, which are regarded as influential factors, on the career adaptability of university students.CHAID method, which is a decision tree application was used for analyzing the population. The results of the study demonstrates that emotional intelligence levels of university students are important in their career adaptability.It is identified that female students have better EI than the male students.Another important result is that gender variable is important in classifying the student in terms of their career adaptabilities regardless whether their emotional intelligence is high or low.

Hussin J.H et al (2017), have explored the effect of demographic variables like age,education,job tenure and marital status on the level of Emotional Intelligence which improves the organization performance among the genders.Results of the research provided the evidence that female employees are more emotionally male and female employees and Emotional Intelligence.With the

increase in education the levels of Emotional Intelligence also improves.

Anjali R et al. (2017),conducted a study on Emotional Intelligence Practice for Effective Organisations.The research examines the demographic characteristics that influence emotional intelligence and their impact on it.The study revealed that there is a substantial difference between age and social skills, but no difference between age and self awareness, self regulation, motivation, or empathy.Emotional Intelligence is higher in elderly workers than younger employees, regardless of gender.

Singh J (2017) performed study on the Emotional Intelligence of Teachers and Educators in connection to certain demographic characteristics.Colleges and universities often expect academically successful individuals to have greater levels of emotional intelligence abilities. Teachers must be taught in Emotional Intelligence in order to manage their own and others' emotions and aid pupils.The study indicated that gender and experience had no differential impact on teacher educators' Emotional Intelligence, but substantial variations were detected in Emotional Intelligence of teacher educators in demographic variables and marital status.

Nurhafizah Zainal et al (2017), The researcher aims to assess the level of emotional intelligence among participants in the Malaysian service industry.The variations in emotional intelligence levels were analyzed in relation to demographic parameters like gender, age, and marital status.The document advised service organizations on the selection and recruitment of prospective employees who had high qualifications. The study's findings indicate that emotional intelligence enhances with age, as individuals develop more expertise in managing and regulating their emotions via maturation.Service organizations are advised to consider age in their recruiting and selection processes.Elevated levels of emotional intelligence.Acquiring emotional intelligence skills necessitates personal engagement.

Zeeshan Ahmed et al (2016) , the study examines the phenomena of emotional intelligence among public and private higher educational institutional teachers of Pakistan.It provides an insight of the level of emotional intelligence among university teacher based on their education and gender.The research provides a base in exploring and identifying the emotional intelligence impact associated with teacher's academic ,personal and future career success which helps the higher educational institutions to develop wonderful ideas and strategies to enhance EI among University teachers.

Dr J.D Singh (2015), explored Emotional Intelligence of Teachers Educators in relation to certain Demographical Variables. It is expected that academically successful people had higher levels of emotional competencies.Emotional Intelligence predicts success in all walks of life and hence it has gained paramount importance in all fields.Emotional Intelligence is as relevant for teacher educators as it is for the teachers and learners.

Al Kahtani, A. (2013) The idea behind this paper discusses the concept and the yardsticks of emotional intelligence, the many components of EI, and the effect of EI on employee performance. It also defines work performance, discusses the aim of performance evaluation, performance appraisal methodologies, and employee performance measurement. Finally, this concept paper presents a theoretical framework for higher education institutions in the Kingdom of Saudi Arabia. The study identified many ideas of Emotional Intelligence and Employee Job Performance and

divided the performance into two parts: task and contextual.However, a validated measure for assessing performance is absent.

Research Gap

The following gaps were identified :

I) Based on the literature study conducted earlier, it was determined that the majority of the research examined school teachers' emotional intelligence and job effectiveness.

ii) Likewise, less research has been conducted on faculty members in professional education.

iii) Research on demographic traits and their correlation with emotional intelligence (EI) has predominantly focused on individual variables, such as age and gender, with inconclusive findings.

The Aim of the study is of as follows

1. To understand the factors of EI among the academicians of professional education.

2. To study the impact of demographic variables on factors of EI on academicians of professional education

Method of the Study

The study's design encompasses research methodologies and quantitative techniques. The populations and sampling techniques have been modified in accordance with the study's nature.Research design encompasses the organization of research and the methodology employed to direct that study (Kerlinger, F. N. (1977).The research employs descriptive designs and utilizes survey methodologies for data collection. This study is inherently qualitative in nature. A sample of 400 academicians from various colleges and institutions in Jaipur was utilized for the study. The poll included academicians from many areas, such as dentistry, fashion design, management, and engineering.The surveys were disseminated both online and offline.A total of 223 completed surveys were received, yielding an 55% response rate.

This research seeks to provide valuable insights that enhance faculty members' professional development and performance results through a systematic approach to data collection and stringent statistical analysis. To ensure the quality and reliability of the results, the current research employs a systematic analytical strategy for data collection and analysis. This strategy aims to provide policymakers and educational administrators with valuable insights to assist the formulation of policies that enhance faculty members' work performance and emotional intelligence.

Research Methodology

To measure Emotional Intelligence, the "Quick Emotional Intelligence Self-Assessment" developed by Paul Mohapel was adopted due to its popularity and high citation score. This scale has been utilized in previous studies by Kevin C. Bastian , Gary T. Henry, Yi Pan, and Diana Lys (2016); Nigar Johar, Neelam Ehsan, and Muhammad Alamgir Khan (2019).The scale has four parameters Emotional Awareness, Emotional Management, Social Emotional Awareness and Relationship Management

Statistical Method

Statistical methods such as mean, standard deviation, and independent sample t-tests were used to

analyze the data. The collected data are analyzed with the help of SPSS-21statistical software.This study is based on comparative analysis of the emotional intelligence of academicians. The study will help to understand the impact of demographic variables on emotional intelligence. The study is primary in nature.

Data Interpretation

The data interpretation highlights a noticeable shift from the patterns observed in previous literature. Earlier studies primarily focused on school teachers, leaving a significant gap in understanding the emotional intelligence and job performance of faculty members in professional education. The current findings therefore provide valuable insights into a population that has been largely underexplored. Additionally, while past research has often examined demographic factors such as age and gender individually, the results have remained inconclusive regarding their relationship with emotional intelligence. In contrast, the present data allow for a more integrated examination of these demographic traits, offering a clearer understanding of how they interact with emotional intelligence within a professional education context. This interpretation not only addresses existing research gaps but also contributes to a more comprehensive understanding of EI among faculty members

Objective I

To understand the factors of EI among the academicians of professional education.

The four parameters are;

a) Emotional Awareness (EA)

Code	Item Description	Mean	Std Deviation	Never	Rarely	Sometimes	Often	Always
EA_1	My emotions are unequivocal at all times.	3.87	0.874	4	13	41	117	48
EA_2	Emotions significantly influence my existence.	3.95	0.733	0	8	43	126	47
EA_3	My emotions influence those in my vicinity.	3.89	0.837	1	15	40	118	49
EA_4	I find it effortless to articulate my emotions.	3.75	0.845	1	18	50	117	36
EA_5	My emotions are often influenced by external occurrences.	3.88	0.819	0	15	46	115	47
EA_6	I can readily perceive when I am about to become irritated.	3.78	0.831	2	13	56	113	39
EA_7	I openly express my genuine emotions to people.	3.77	0.797	1	15	52	122	33
EA_8	I find it easy to describe my feelings.	4.13	0.802	2	3	39	100	79
EA_9	Even in moments of distress, I remain cognizant 4.10 of my circumstances.	0.743	0	7	31	118	67	
EA_10	I am able to stand apart from my thoughts and feelings and examine them	0.721	0	2	41	112	67	0.721

Table1: Descriptive Statistics Analysis for Emotional Awareness

As shown in Table 1,the data reflects a generally **high level of emotional awareness** among respondents. The majority of participants demonstrate a strong level of emotional awareness, with mean scores ranging from 3.75 to 4.13 across all items. This indicates a generally high ability to recognize and understand one's emotional states.The highest Scoring Item EA_8("I find it easy to describe my feelings") received the highest mean (4.13), showing that many participants are

articulate about their emotional experiences. Second Highest Scoring Items EA_9 and EA_10 (4.10 and 4.10), suggested participants are capable of remaining aware even when upset and are able to observe their emotions objectively—a key component of mindfulness.EA_4 ("I find it easy to put words to my feelings") had the lowest mean (3.75), pointing to a relative difficulty in verbal emotional expression for some individuals, despite high awareness.Emotional Influence EA_3 and EA_5 (mean ~3.88–3.89) reflect an awareness that moods can affect others and be influenced by external events, indicating emotional interconnectedness.

Self-regulation Signals High scores in EA_6 ("I can easily sense when I'm going to be angry") and EA_7 ("I readily tell others my true feelings") show good internal monitoring and openness in expression.Standard Deviation (Variability)Most items show moderate variability (SD ≈ 0.73–0.87), implying that while the general trend is toward high emotional awareness, some participants differ significantly, particularly in how clearly they feel emotions and how openly they express them.

The data suggests that the group is strong in emotional self-awareness, especially in recognizing emotions, staying present during emotional states, and articulating feelings. However, there is slightly more variation in comfort with emotional expression, such as putting emotions into words, which may be an area for growth in communication focused emotional intelligence training.

b) Emotional Management

Code	Item Description	Mean	Std Deviation	Never	Rarely	Sometimes	Often	Always
EM_1	I accept responsibility for my reactions	3.95	0.72	2	13	44	117	48
EM_2	I find it easy to make goals and stick to them.	4.02	0.727	0	8	43	126	47
EM_3	I am emotionally balanced person.	4.02	0.727	4	15	40	116	49
EM_4	I am very patient person.	3.90	0.798	0	18	53	117	36
EM_5	I can accept critical comments from others without getting angry.	4.04	1.99	0	15	46	115	48
EM_6	I maintain my composure even during stressful time.	3.99	0.73	0	15	57	113	39
EM_7	If an issue does not affect me directly ,I don't let it bother me.	3.91	0.77	1	15	52	122	34
EM_8	I can restrain myself when I feel anger towards someone.	3.88	0.722	4	3	39	100	79
EM_9	I control urges to overindulge in things that could damage my well being	3.79	0.789	0	31	118	67	8
EM_10	I direct my energy into creative work or hobbies	4.00	0.778	1	41	112	67	4

Table 2: Descriptive Statistics Analysis for Emotional Management

According to Table2, the data analyzed that a majority of respondents (over 70%) consistently report "Often" or "Always" for all items, indicating strong emotional management skills.

Items like EM_2 (Goal-setting), EM_3 (Emotional balance), and EM_5 (Handling criticism) scored particularly high, with means ≥ 4.00.The following items EM_2: "I find it easy to make goals and stick with them" – Mean: 4.02.

EM_5: "I can accept critical comments without becoming angry" – Mean: 4.04.

EM_10: "I direct my energy into creative work or hobbies" – Mean: 4.00. These suggest strong

resilience, goal orientation, and constructive coping mechanisms indicate a higher Emotional Management.However with low score EM_9: "I control urges to overindulge" – Mean: 3.79 still indicate slightly lower self-restraint in some situations, possibly tied to stress or temptation management.

Standard deviations range from 0.720 to 0.798, suggesting responses were relatively consistent and not widely dispersed, reflecting a solid shared emotional management competency among the group.

Faculty members have robust emotional regulation skills, especially in receiving feedback, striving towards objectives, and directing emotions constructively. Nonetheless, impulse regulation and emotional detachment are domains that may gain from targeted emotional intelligence training. Assisting teachers with mindfulness, stress management, and effective expression strategies may improve general well-being and efficacy in academic positions.

To conclude the respondents generally demonstrate a high degree of emotional intelligence, self-regulation, and personal responsibility. These traits are essential for managing stress, maintaining positive relationships, and achieving personal and professional goals. While all items performed well, areas like impulse control (EM_9) might benefit from targeted development or support.

c) Social Emotional Awareness

Code	Item Description	Mean	Std Deviation	Never	Rarely	Sometimes	Often	Always
SEA_1	I can easily recognize when someone is upset, even if they don't say anything.	3.86	0.79	2	13	44	117	48
SEA_2	I notice subtle changes in people's tone of voice or facial expressions.	3.86	0.81	0	8	43	126	47
SEA_3	I understand how my actions may emotionally affect others.	3.80	0.87	4	15	40	116	49
SEA_4	I can identify my own feelings even when I am experiencing mixed emotions.	3.78	0.81	0	18	53	117	36
SEA_5	I pay attention to how group dynamics change during discussions	4.00	0.78	0	15	46	115	48
SEA_6	I can sense when someone needs support or encouragement.	3.97	0.77	0	15	57	113	39
SEA_7	I understand the reasons behind my emotional reactions in different situations.	4.14	0.65	1	15	52	122	34
SEA_8	I am aware of cultural and personal differences in how people express emotions	4.01	0.73	4	3	39	100	79
SEA_9	I reflect on my emotions to understand them better.	3.88	0.73	0	31	118	67	8
SEA_10	I can judge how others are likely to feel in a given situation.	4.05	0.73	1	41	112	67	4

Table 3: Descriptive Statistics Analysis for Social Emotional Awareness

As per Table 3,the overall mean scores across the SEA items are consistently above 3.75, indicating a high level of socialemotional awareness among respondents. Most items hover around or above

the "Often" frequency, suggesting that faculty members frequently practice SEA behaviors. EA_7 (Mean = 4.14, SD = 0.65): "I am sensitive to others' moods and feelings."This item has the highest mean and lowest standard deviation, indicating strong agreement and consistency among respondents.SEA_10 (Mean = 4.05): "I try to understand how others feel by imagining myself in their place."SEA_5 & SEA_8 (Means = 4.00 and 4.01): Also reflect strong interpersonal awareness and empathy.This population demonstrates strong social-emotional awareness, particularly in empathy, emotional recognition, and adaptability. Slight improvements could be made in areas involving emotionally difficult communication, but overall, the results reflect a well-developed emotional intelligence profile.Standard deviations are generally low (ranging from ~0.65 to 0.87), showing that most responses are clustered around the mean—this group is fairly consistent in how they perceive and report their emotional awareness.

The data reveals a population that is that they are highly empathetic and socially aware.The faculty members are consistently sensitive to others' emotions and comfortable understanding and reacting to emotional cues.Though the result indicated that the faculty members are slightly less confident in delivering emotionally difficult messages, which may be a developmental area.

d) Relationship Management

Code	Item Description	Mean	Std Deviation	Never	Rarely	Sometimes	Often	Always
RM_1	I am able to maintain positive relationships even during stressful situations	4.04	0.713	0	4	40	122	58
RM_2	I listen actively to others and make them feel valued in conversations	3.99	0.771	0	8	44	114	58
RM_3	I handle conflicts calmly and work toward solutions that benefit everyone.	3.98	0.745	0	5	48	115	56
RM_4	I can motivate others when they are feeling discouraged or demotivated	3.99	0.720	1	5	40	129	49
RM_5	I often respond impulsively during disagreements.	3.98	0.758	1	7	43	124	51
RM_6	I adapt my communication style based on the needs of the people I interact with	3.94	0.744	0	7	50	119	48
RM_7	I work well in a team by encouraging cooperation and mutual respect	4.01	0.762	2	4	40	122	56
RM_8	I tend to ignore when someone feels excluded	3.79	0.845	0	13	69	94	48
RM_9	I give constructive feedback without hurting the other person's feelings.	3.78	0.901	2	18	56	100	48
RM_10	I show appreciation for others' efforts and celebrate their achievements.	3.82	0.783	0	10	62	110	42

Table 4: Descriptive Statistics Analysis for Relationship Management

According to Table 4, the data respondents generally rated themselves highly across all relationship management items, with most selecting "Often" or "Always." Mean scores for all items ranged from **3.78 to 4.04**, indicating a strong perceived ability to manage relationships effectively.**RM_1 (Showing affection)** and **RM_4 (Motivating others)** had the highest mean scores (**4.04 and 3.99**, respectively), suggesting these are key strengths among participants.**RM_7 (Sociable and fun)** also stood out with a high average and a high percentage of "Always" responses.The following points highlights the **a**reas with slight variability:**RM_8 (Helping people)** and **RM_9 (Dependability)** had

slightly lower mean scores (**3.79 and 3.78**) and higher standard deviations, indicating more varied responses.

This suggests room for growth in consistency or self-perceived reliability. Low percentages of "Never" and "Rarely" responses across all items reflect a consistent and confident self-view in managing relationships.In summary, the group demonstrates strong relationship management capabilities, especially in showing support and motivation, with minor areas where further development could enhance overall interpersonal effectiveness.

Faculty members have robust and consistent relationship management skills, especially in conveying warmth, friendliness, and inspiring others. Nonetheless, there exists an opportunity to improve the consistency of helpful actions, reliability, and emotional de-escalation abilities, maybe via specialized emotional intelligence training or peer mentorship. The moderate standard deviations indicate the possible advantage of personalized development programs to enhance overall team relational performance.

Objective II To study the impact of demographic variables on factors of EI on academicians of professional education

Gender, Age and Experience are the first factors considered in analysis.

Gender	Frequency	Percent	Cumulative Percent
Female	114	51	44.7
Male	109	48.7	100.0
Total	223	100	

Table 5: Distribution of Respondent on the basis of Gender

Table 5 suggests that the female academicians contribute 51 % and male academicians contribute to 48.8%. The data shows a fairly balanced gender distribution. Out of the total of 223 participants, 51% are female (114 individuals), while 48.7% are male (109 individuals). This indicates that females slightly outnumber males, but the difference is minimal. The cumulative percent for females is 44.7%, meaning that by the time females are counted, they make up just under half of the total, and the cumulative percent for males is 100%, signifying that males and females together account for the entire dataset. Overall, the gender distribution is quite even, with a small bias toward females.

Work Experience

Table 6 explores the work experience of the academicians impact the emotional intelligence for which three broad categories are chosen less than 5 years 5 to 10 years and above 10 years.The cumulative percentage of the respondents below the experience of 5 years is 37.6%.The respondents with experience between 5 to 10 years have 34.08% value and the respondents whose experience is more than 10 years have the cumulative value of 28.25%..

Experience	Frequency	Percent	Cumulative Percent
Less than 5 years	84	37.67%	37.67 %
5 to 10 years	76	34.08%	71.75 %
Above 10 years	63	28.25%	100%
Total	223	100	

Table 6: Frequency and Percentage Distribution of Respondents by Teaching Experience

Results & Findings

Experience	N	Emotional Intelligence	
		Mean	SD
Less than 5 years	84	.294	.743
5 to 10 years	76	.348	.858
Above 10 years	63	.392	.625
Total	223		

Experience	N	Emotional Intelligence	
		Mean	SD
Male	114	.321	.823
Female	109	.385	.89
Total	223		

Table 7 : Distribution on the basis of the years of work experience

The distribution of teaching experience among the respondents shows a fairly balanced representation across the three experience categories, with a slight predominance of early-career faculty. The largest group consists of those with less than five years of experience (N = 84), accounting for 37.67% of the sample. This is followed by faculty with 5 to 10 years of experience (N = 76), representing 34.08% of respondents. Those with more than ten years of experience constitute the smallest group (N = 63), making up 28.25% of the total sample. The cumulative percentages indicate a progressive distribution, with over 70% of the participants having ten years or less of experience. Overall, the data suggest that the sample is slightly skewed toward faculty who are relatively newer to the profession, while still maintaining considerable representation from mid-career and senior faculty members. The category of faculty members with 5 to 10 years of experience represents a substantial portion of the sample, accounting for 34.08% of the respondents (N = 76). This group typically reflects mid-career professionals who have moved beyond the initial learning phase of their roles but have not yet reached long-term seniority. Their presence in the dataset indicates a strong cohort of individuals who have gained considerable practical exposure and stability in their professional environment. The cumulative percentage of 71.75% at this level shows that when combined with early-career faculty, a large majority of the sample (over two-thirds) consists of individuals with ten years or less of experience. This suggests that the workforce in this context leans toward newer and mid-level faculty rather than highly senior members. As a result, this segment may offer valuable insights into how emotional intelligence and job performance develop during the transitional phase between early and advanced career stages. What about the 5 to 10 years gaps? In this paragraph the changes has been incorporated.

Conclusion

Analysis of the obtained data indicates that emotional intelligence is significant in the education industry. The study offers an empirical examination of the correlation between several demographic characteristics and their impact on the emotional intelligence values of faculty members in the education sector. The results indicated considerable disparities in emotional intelligence levels about the selected demographic factors for the research. The study presents several significant findings. It first establishes that female employees have more emotional intelligence than their male

counterparts. The resultant findings align with prior research which showed that a disparity exists in the mean scores of male and female employees, with females achieving higher scores. It was also hypothesized that females achieve higher scores on the emotional intelligence measure. In recent decades, women have progressively entered the academic profession, assuming essential positions as instructors, researchers, and academic leaders. They have exhibited their proficiency and worth within academic institutions. Initially, they encountered cultural prejudices and gender preconceptions, particularly in male-dominated sectors; nevertheless, progressive acceptance has developed over time, although with lingering residues of these

biases. This difficulty is sometimes termed the "glass ceiling," denoting the unseen obstacles that impede women's progression into top academic and administrative positions. These obstacles are most apparent in inequalities concerning promotions, leadership positions, and fair acknowledgment. The results of this study may assist educational institutions and policymakers in enhancing transparency and inclusivity in the recruiting, tenure, and promotion processes for female faculty members.

The trend in teacher job experience indicates that those with 21–30 years of service may participate less frequently in collaborative contacts with colleagues and students. This diminished participation may restrict possibilities for feedback, leading to decreased self-awareness about interpersonal skills. Thus, this may provide difficulties in regulating elements of emotional intelligence, which are essential for leadership, mentorship, and classroom efficacy in academic environments.

The study's results revealed substantial disparities in emotional intelligence (EI) scores among the various demographic characteristics analyzed. In the Indian academic scene, characterized by increasing competition, shifting expectations, and swift institutional transformation, effective diversity management has become imperative. The study analyzed factors of diversity encompassing gender, age, educational credentials, teaching experience. As India's educational institutions endeavor to conform to global norms and tackle intricate social demands, it is evident that academic credentials and subject proficiency alone are inadequate for sustained success. Emotional intelligence, especially the capacity to comprehend and regulate one's emotions, is a vital skill for faculty members. As demands for classroom performance, student engagement, research production, and institutional service escalate, Emotional Intelligence (EI) assists educators in managing workplace pressures, facilitating meaningful collaboration, and cultivating inclusive learning environments. Moreover, insights from neuroscience about emotional processing can augment faculty members' comprehension of their emotional reactions, increase relationships with students and colleagues, and foster the cultivation of empathic and emotionally intelligent academic communities.

Limitations

1. The study has been conducted in a span of two months which may have biased results.
2. The colleges for the study were randomly selected.
3. The inclusions of more demographic variable in the study could have yielded better results.

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BIBLIOMETRIC ANALYSIS OF RISK FOR PORTFOLIO CREATION

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Abstract:
Due to the limited availability of comprehensive summaries within the existing literature, this systematic review and bibliometric analysis aim to provide both quantitative and qualitative insights into the evolving domain of risk in portfolio creation. Portfolio construction seeks to identify an optimal combination of securities and other investment instruments to maximize returns while minimizing overall risk. This study offers an extensive evaluation of the literature on risk analysis in portfolio creation using bibliometric techniques. It incorporates a mapping of 1,274 research articles indexed in the Scopus database and published between 2000 and 2024. The review examines emerging trends across subject areas, contributing countries, influential institutions, and highly cited publications that have significantly shaped scientific progress in this field. Based on the top 50 research papers-each employing various risk measures for portfolio development-the findings are organized into eight major categories: publication year, subject area, document type, country, authors, and keywords. The results of this study provide valuable guidance for academic scholars, regulators, and policymakers in understanding the fundamental aspects of risk in portfolio creation and in identifying critical areas that warrant further research.

Keywords: Portfolio Creation, Cluster analysis, Bibliometric Analysis, Systematic literature review.

Introduction

(Sharpe, 1964) A key component of financial management is portfolio creation, which is the thoughtful selection and distribution of assets to meet predetermined investment goals. The assessment and control of risk, which can originate from a number of factors such as market volatility, credit default, liquidity restrictions, and operational failures, is an essential part of this process. (Rolney Baptestone, 2018) A growing number of investors and scholars are using bibliometric analysis to help them negotiate the complexity of risk in portfolio development. (F., J., J., & R., 2019) Portfolio management is the ongoing activity of keeping an eye on and adjusting a portfolio to keep it in accordance with an investor's goals and risk tolerance. This entails tasks like portfolio rebalancing, market condition monitoring, and appropriate adjustment making. (Markowitz, 1952)

Finding the best asset allocation within a portfolio to maximise return for a given degree of risk is the main goal of portfolio optimisation, a subset of portfolio management. (J.C., A., E., & D.V., 2019) To find the most effective portfolio combinations, this frequently entails applying optimisation techniques and mathematical models (Lehar, 2005)

The principles of portfolio formation, management, and optimisation are all interrelated and dependent on one another. (Nurhidayah Bahar, 2022) The choices made at the portfolio building stage will have a big influence on how the portfolio is managed and optimised later on. Due to reasons including rising market volatility, the globalisation of the financial system, and the invention of new financial instruments, the field of risk management in portfolio formation has

advanced significantly in recent decades. (Naveen Donthu, 2022) More advanced methods of risk assessment and management have been required as a result of these advances. Researchers also look into how portfolio creation and management involve risk management, diversification, and performance evaluation (Bogentoft, 2001). Only a small number of literature reviews on various aspects of portfolio construction have been published in the past 20 years prior to this review. The articles mostly pertain to a particular theme. None of them seeks to cover the whole range of portfolio creation. (J. & A., 2022) Furthermore, the researcher was unable to locate any studies that examined the conceptual and intellectual framework underlying this new field of study. (Khalili-Damghani, 2014)These disparities forced researcher to integrate quantitative & qualitative approaches in order to gather body of existing knowledge and offer a research roadmap. (Ou, 2005)This is the first complete evaluation of the literature combined with bibliometric analysis on portfolio development. (Jacobson, 2012)This review summarises the most recent advancements in the subject with the goal of eventually assisting academicians, educators, practitioners, and policymakers.

The following research questions were developed and has served as the study's compass in order to comprehend the connection between risk and portfolio building.

Research Questions:

RQ1. What are current publication trends in portfolio creation in terms of time, journal, disciplines, authors, affiliated countries, type of study & economy?

RQ2. What are the top 50 risk measure analysis?

RQ3. What are the intellectual structure of risk of portfolio creation research?

RQ4. What are the recent research trends in this domain?

RQ5. What are the gaps and areas for future research?

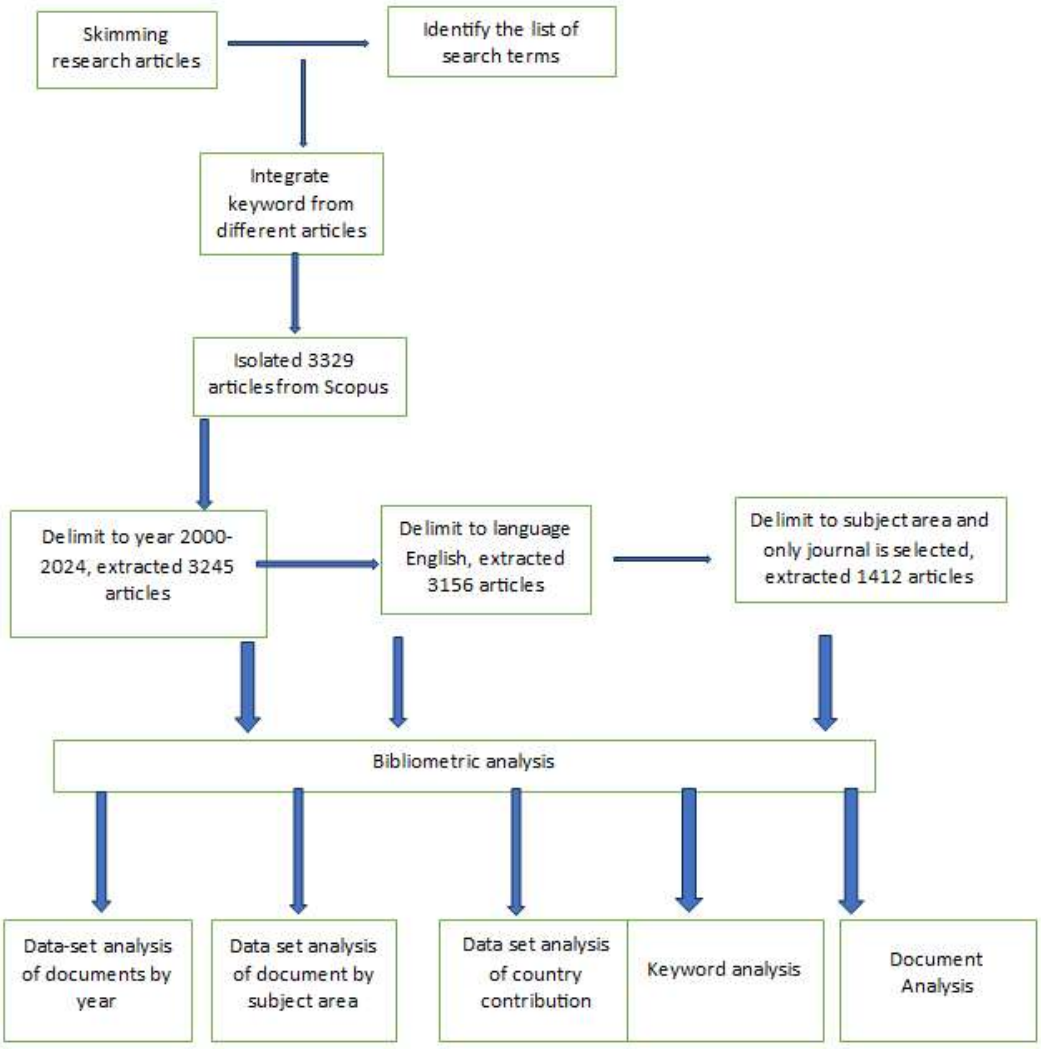
(Kirti Goyal, 2020)To answer these questions, researcher analyzed publication patterns of relevant research over time, identify most prominent journals and examine the contribution of authors from different countries and institutions. (W., S., M.U., A.A.S., & S., 2020) Also, researcher examine top 50 cited paper for most commonly used risk measure and assess their relative importance in portfolio creation. Researcher employ documents by their subject area, clustering analysis, co-citation analysis & network analysis and explore the evolution of research themes over time.

By identifying understudied areas and emerging trends, researcher highlight potential avenues for future research & contribute to the advancement of the field. (M., M., & M., 2019)

The structure of this study is as follows: The study's contextualisation was explained in the introduction, which also highlighted previous research on the topic under examination. It also highlighted the significance of the current work, the research issue, and the gap in the field. In 2022, H. Kent Baker The literature review presents the proposal of the single case study and the methodological methods that will direct data collection and analysis. It also brings the theoretical underpinnings, conceptualising axis, risk, portfolio construction, and research technique. In 2016, O., M., and S. The results' analysis and interpretation will be covered, along with academic and practical contributions. The conclusion of the work lists its limitations and makes recommendations for future research directions.

Model of Bibliometric Analysis

Figure 1: Steps of Bibliometric Analysis



Research Methodology:

Data and Methodology

Firstly, bibliometric analysis comes up with the overcome the solution of the problem as many researches are conducted on the same research area through different dimensions. Bibliometric analysis is a measure by many statistical tools and evaluation of articles, books, journal etc. In the past few years, there has been tremendous interest in bibliometric measures used everywhere from arts to science. However, in the core field of finance within commerce, there are not many bibliometric studies. Particularly, there are lot of paper related to portfolio creation with different types of risk

measure technique. This paper focuses on developing trend determining subject area, country, most cited, institutions which has major influence on advancement of scientific knowledge. The initial step in bibliometric analysis involves gathering data to compile a database of pertinent documents. Then, through brainstorming researcher identify list of search terms includes “Portfolio Creation”, “Risk measure”, “Portfolio management”, “Portfolio optimization”, “portfolio selection”. And CONJUCTIONS AND, OR is used for best optimal documents. (Ghasemzadeh & Archer, 2000). After that, some articles were scrutinized by applying keywords, subject area, type and years to eliminate irrelevant document. And finally, 1302 documents from Scopus are found to study which is one of the largest databases to study in any field.

***Recommended keyword framework*: (N., 2010)**

Table 1: Steps of Bibliometric Analysis

Stages	Keyword use
1	Portfolio AND
2	Creation OR Management OR Optimization OR Selection AND
3	Risk measure OR
4	Risk measures

Results of Bibliometric Analysis:

Documents by year:

Figure 2 depicts the growth in publications related to portfolio creation in the Scopus database from 2000 to 2024. The number of articles has significantly increased, rising from just 18 in 2000 to 70 in 2024. Notably, research on portfolio creation has experienced a sharp rise since 2020. This surge can be largely attributed to global financial crisis that emerged in 2019, marked by substantial losses, rising household debt, and a liquidity crunch triggered by the COVID-19 pandemic. This macroeconomic shock served as a "teachable moment" for community, emphasizing the need for policies that promote sound risk management practices in portfolio creation. Following the 2008 financial crisis, various countries introduced national financial education strategies as a policy measure to mitigate its long-term impact on investors. Since 2020, publications on portfolio creation have more than doubled, reflecting increased interest in the subject.

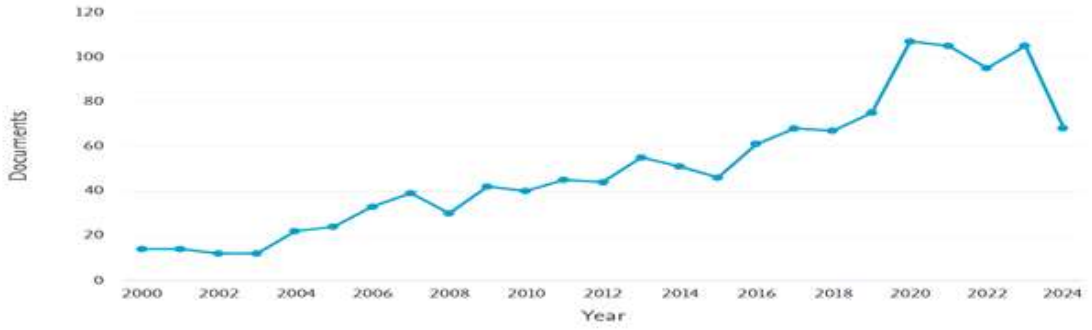


Figure 2: Yearly publication trend of 1302 papers published between 2000 and 2024, retrieved from Scopus

Document type:

Figure 3 presents the distribution of various document types in research related to the risks of portfolio creation. Among the 1,412 papers analyzed, the majority (96.4%) are research articles, while review papers account for only 2.2%, and conference papers make up just 0.9%. This indicates that very few studies originate from sources such as errata or editorial publications.

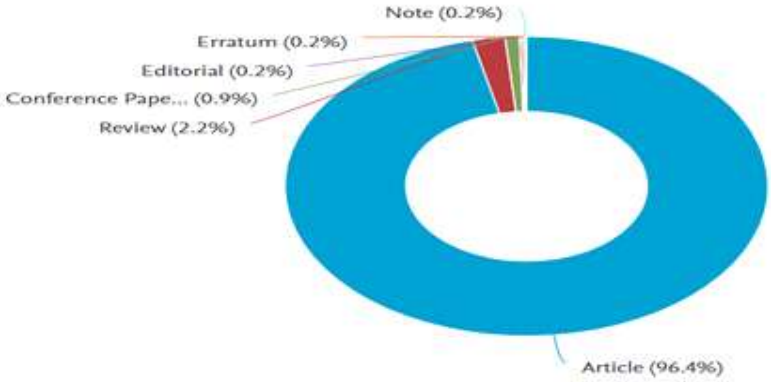


Figure 3: Details of document type

Documents by subject area:

Top 10 subjects are sorted according to publication in different years presented below fig 4. As maximum paper published in economics about 40.5%, in Business & Management 24%, in Decision Science 8.8%, in Mathematics 8.7%, in social science 7%, in Computer Science 3.2%, in Environmental 2%, in Engineering 1.8%, in Energy 1.3%, in Agricultural 0.8%, Others 2%. Except economics, average percentage of all subject is around 5.

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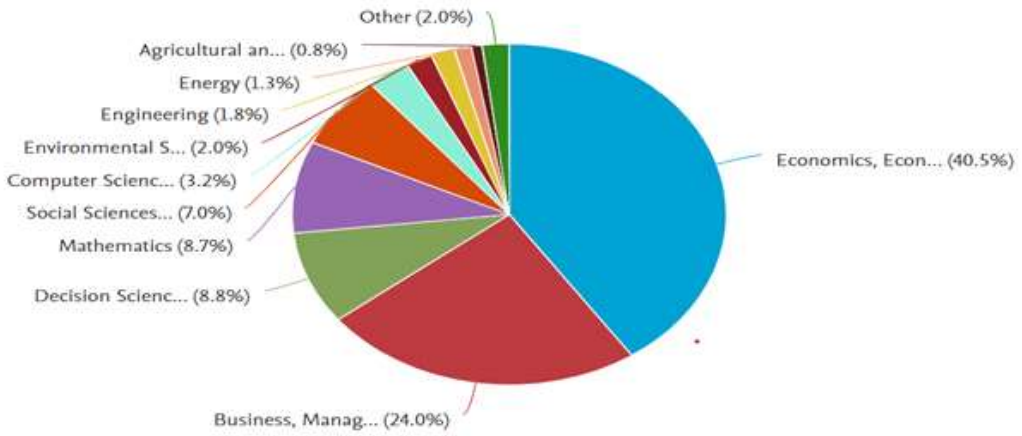
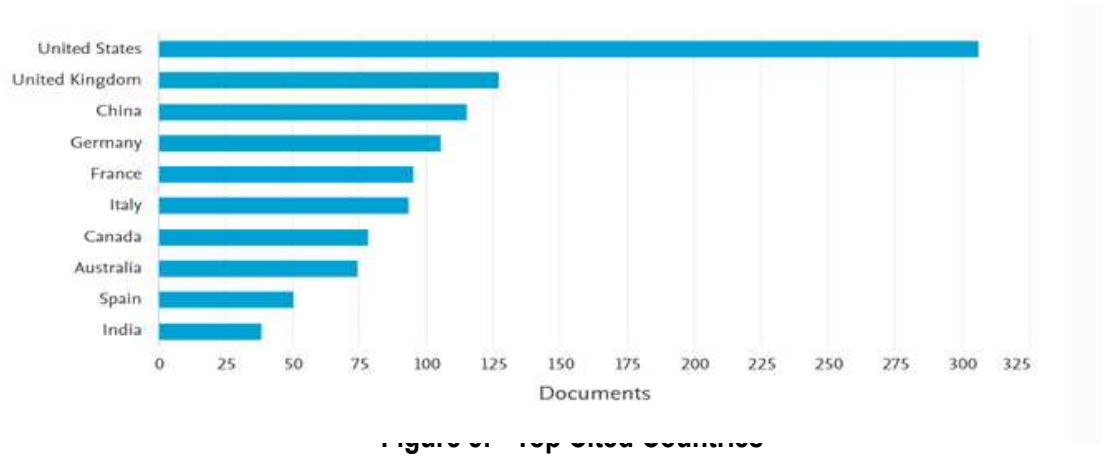


Figure 4: Key Disciplines Of Portfolio Creation Research Across 1302 Papers

Document by country or territory:

Fig 5 portrays the top countries contributing to analysis of risk for Portfolio Creation with leading three being the United States (310 articles), United Kingdom (126 articles) and China (120 articles). Furthermore, Germany, France, Italy, Canada, Australia, Spain, India are other cited countries having articles 110, 95, 93, 77, 74, 50, 35 respectively. Fig. 7 shows top most authors having publication in this field. Fig. 8 chart shows some author having maximum number of publications presented in chart form.



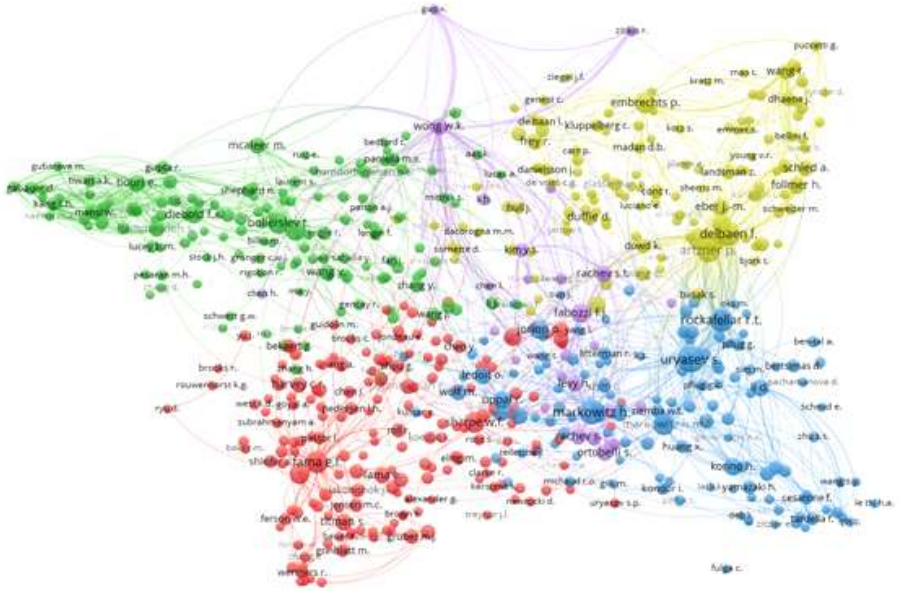


Figure 6: Co-Authorship

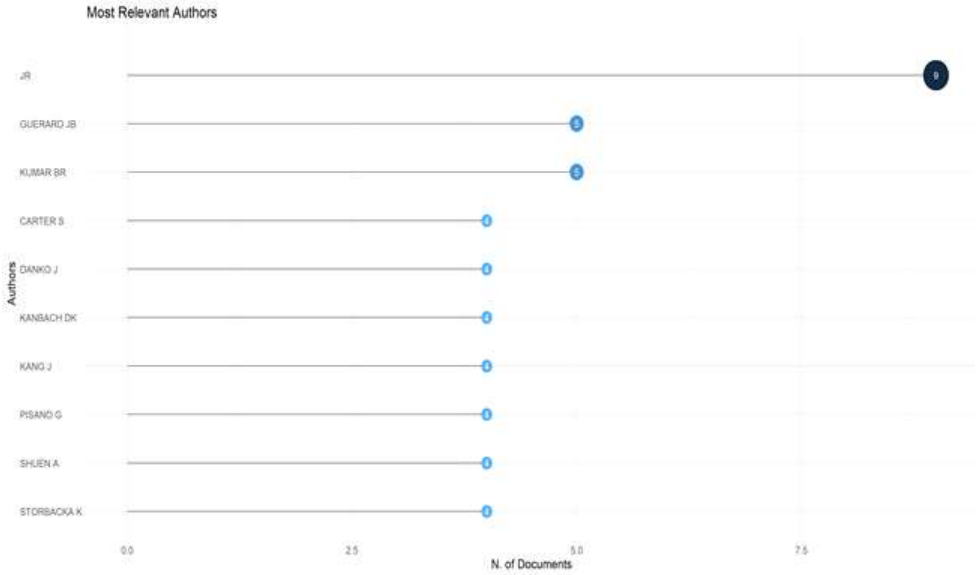


Figure 7: Most Relevant Author Chart

Keyword Analysis:

Keywords are sorted according to number of times occurred. Keyword analysis is important to analyze the frequent uses of these words and how much study is done on this topic. The research publications' themes are reflected in the author's keywords. To investigate the most common topics in

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risk of portfolio development, keyword analysis was done using the VOS Viewer. In 3329 papers, 1412 keywords were found in total.

Table 2 shows the top keywords used in risk of portfolio creation from 2000 to 2024. “Portfolio optimization” is the most frequently used keyword, with most occurrence which indicates that this word alone is used as a termed concept in the literature. The other three most frequently used keywords are Risk management, portfolio selection, and portfolio management. A significant finding from the analysis is that there is no unanimity on the conceptualization of portfolio creation and that a lack of standardized meaning compels authors to most use these terms portfolio optimization, risk management, portfolio selection, portfolio management, value at risk, risk assessment, investments, conditional value at risk. (G.J., From Markowitz to modern risk management, 2009). Measure keyword use in various study related to risk and portfolio creation are given in the table below.

Table 2: Most Commonly Used Keywords In Research Papers

S.No.	Keywords
1	Portfolio Optimization
2	Risk Management
3	Portfolio Selection
4	Portfolio Management
5	Value-at Risk
6	Risk assessment
7	Investments
8	Conditional Value at Risk

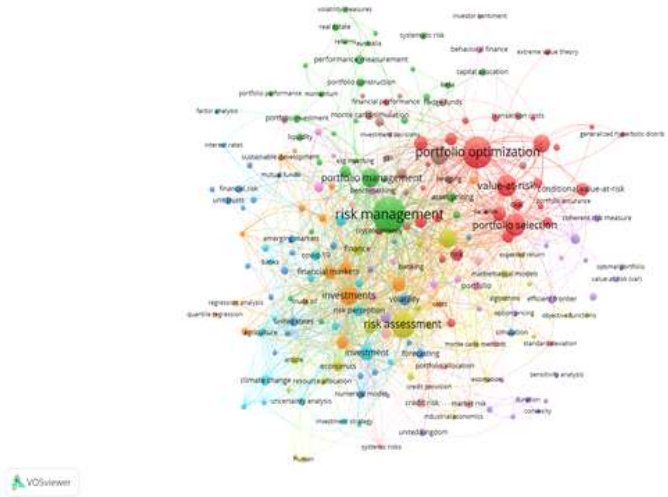

Figure 8: Network analysis of keywords occurrence of risk (Source- Extracted from Vos viewer)

Figure 9 illustrates that portfolio optimization and risk management are closely associated with terms

such as portfolio management, selection, investments, and risk. Additionally, as shown in Figure 8, risk management is linked to concepts like risk assessment and financial markets. With more individuals taking control of their financial well-being after retirement, there has been a noticeable shift from safe investments to riskier ones. Emerging themes in this field include portfolio construction, portfolio performance, portfolio investment, and investment decision-making.

Citation of documents:

Only one out of five highly cited papers is among the top five papers based on citation analysis, according to a comparison of the top ten papers based on citation count and PageRank measure. According to citation analysis, the following four works rank farther up: Conditional autoregressive value at risk using regression quantiles, 2004. These publications were among the most important main research that addressed the risk of portfolio management analysis as the subject developed throughout time.

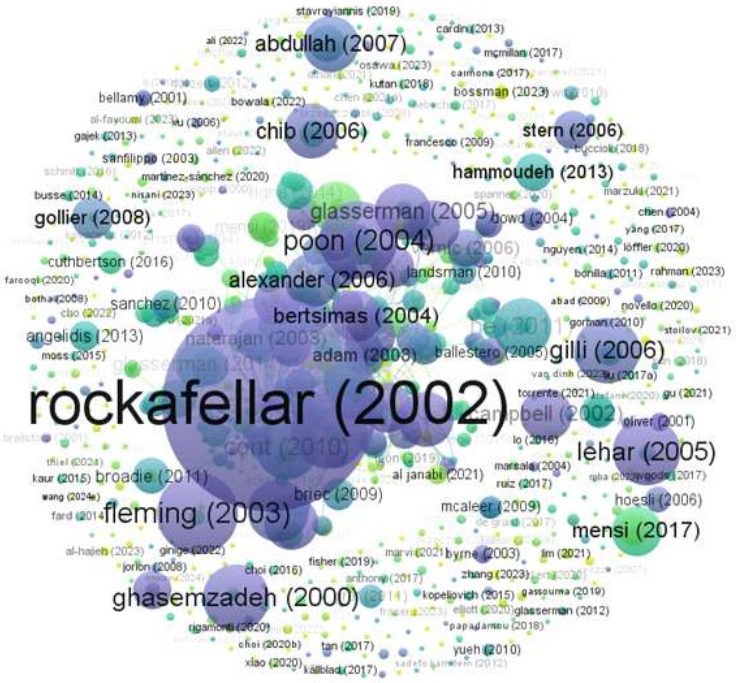

Figure 9: Citation of documents (Source- Extracted from Vos viewer)

Clustering by coupling

After analysing all journals, articles, countries, and citations, a cluster analysis can be performed, with the first cluster including portfolio selection, portfolio optimization and artificial intelligence. Second cluster includes risk assessments, optimization, investment. Third cluster includes risk assessment, financial data processing, coherent risk measure. Fourth cluster includes investments, optimization, administrative data processing. By this analysis, researcher can understand centrality and impact of research paper within their network.

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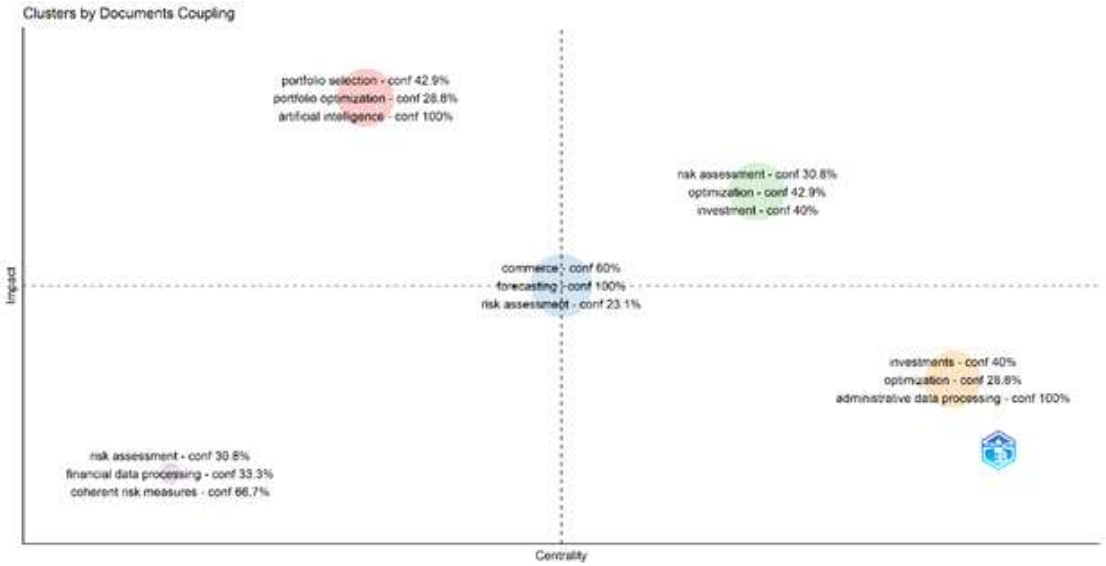
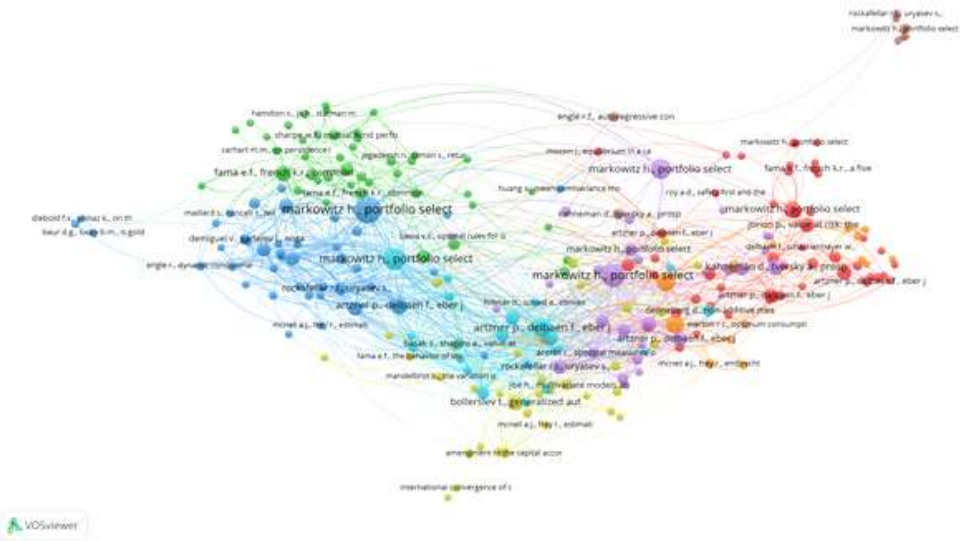


Figure 10: Cluster Analysis Of Top Articles (Source- Extracted from Vos viewer)

Co-citation of References:

Figure 11: Co-citation Analysis Of References Used (Source- Extracted from Vos viewer)



Rank Analysis:

Table 3 - Top 50 research paper publication based on global citation for most commonly used risk measure (Kirti Goyal, 2020) . Before this review, only a limited number of literature review studies had been published on various aspects of portfolio creation over the past two decades. Table 3 presents a list of these reviews, most of which focus on specific themes. However, none of these studies provide

za comprehensive overview of portfolio creation as a whole. Moreover, we could not identify any research that explores the underlying conceptual and intellectual structure within this evolving field. These gaps motivated us to adopt a combination of quantitative & qualitative methods to synthesize existing literature and outline a research roadmap. This study offers a comprehensive viewpoint on the topic as it is the first to combine bibliometric analysis and a systematic literature assessment on portfolio development. It highlights the latest advancements in the field with the goal of benefiting practitioners, policymakers, educators, and researchers.

Table 3: Existing Review Study

Rank	Year	Author	Risk Measure
1	2002	Rockafellar R.T.; Uryasev S.	Value at risk, Conditional value at risk
2	2014	Diebold F.X.; Yilmaz K.	Variance (F.X. & K., 2014)
3	2004	Engle R.F.; Manganelli S.	Value at risk, Conditional autoregressive value at risk (R.F. & S., Conditional autoregressive value at risk by regression quantiles, 2004)
4	2009	Berger A.N.; Klapper L.F.; Turk-Ariss R.	Regressing measures of loan risk, bank risk, and bank equity capital (A.N., L.F., & R., 2009)
5	2009	Rao S.; Goldsby T.J.	Typology (S. & T.J., 2009)
6	2003	Van Mieghem J.A.	Single and multiple risk-neutral decision, Hedging (J.A., 2003)
7	2003	Fleming J.; Kirby C.; Ostdiek B.	Conditional Covariance Matrix (J., C., & B., 2003)
8	2004	Poon S.-H.; Rockinger M.; Tawn J.	Multivariate approach (S.-H., M., & J., 2004)
9	2006	Rockafellar R.T.; Uryasev S.; Zabarankin M.	Standard Deviation (R.T., S., & M., Generalized deviations in risk analysis, 2006)
10	2006	Madden T.J.; Fehle F.; Fournier S.	Fama-French Method (T.J., F., & S., 2006)
11	2005	Lehar, Alfred	Dynamic and Correlation (A. L. , 2005)
12	2000	Ghasemzadeh F.; Archer N.P.	Project analysis and Selection system (F. & N.P., 2000)
13	2006	Gilli, Manfred, Këllezi, Evis	Extreme value theory, Statistical Modeling (M. & E., 2006)
14	2007	Leten, Bart, Belderbos, Rene , Van Looy, Bart	Binomial regression (B., R., & B., 2007)
15	2010	Cont, Rama, Deguest, Romain, Scandolo, Giacomo	Conditional value-at -risk (R., R., & G., Robustness and sensitivity analysis of risk measurement procedures, 2010)

16	2006	Cont, Rama	Coherent risk measure, convex risk measure (R. C. , Model uncertainty and its impact on the pricing of derivative instruments, 2006)
17	2002	Alexander, Gordon J., Baptista, Alexandre M.	Mean-value at risk (G.J., Economic implications of using a mean-VaR model for portfolio selection: A comparison with mean-variance analysis, 2002)
18	2011	He, Xue Dong, Zhou, Xun Yu	S shaped utility function and probability weighting, large loss aversion degree (X.D. & X.Y., 2011)
19	2007	Abdullah, Fikriyah , Hassan, Taufiq, Mohamad, Shamsher	Sharpe index and adjusted Sharpe index, Jensen Alpha, Timing and selectivity ability (F., T., & S., 2007)
20	2005	Glasserman, Paul , Li, Jingyi	Monte Carlo simulation (P. & J., Importance sampling for portfolio credit risk, 2005)
21	2011	Dawson, Richard J. , Ball, Tom , Werritty, Jonathan , Werritty, Alan, Hall, Jim W. , Roche, Nicolas	Spatial planning (R.J., et al., 2011)
22	2005	Chekhlov, Alexei , Uryasev, Stanislav , Zabarankin, Michael	Conditional Drawdown (A., S., & M., 2005)
26	2000	Jarrow, Robert A., Turnbull, Stuart M.	Martingale probability, Natural Probability (R.A. & S.M., 2000)
27	2005	Kalkbrener, Michael	Capital Allocation (M. K. , 2005)
28	2006	Cressy, Robert	Inverse Gaussian (R. C. , 2006)
29	2002	Campbell, Rachel, Koedijk, Kees, Kofman, Paul	quantile correlation, tail-adjusted mean-variance covariance matrix (R., K., & P., 2002)
30	2019	Buehler, H., Gonon, L., Teichmann, J. , Wood, B.	Machine Learning, Convex risk measure (H., L., J., & B., 2019)
31	2004	Bertsimas, Dimitris, Lauprete, Geoffrey J. , Samarov, Alexander	Standard deviation, VaR, Lower partial moments, and Coherent risk measures (D., G.J., & A., 2004)
32	2004	Biglova, Almira, Ortobelli, Sergio, Rachev, Svetlozar , Stoyanov, Stoyan .	Sharpe Ratio (A. B. , S., S., & S., 2004)
33	2004	Scaillet, O.	Non-Parametric (O. S. , 2004)
34	2017	Mensi, Walid (55607222100); Hammoudeh, Shawkat , Al-Jarrah, Idries Mohammad Wanas, Sensoy, Ahmet, Kang, Sang Hoon	time-varying equi correlations and risk spillovers (W., S., I.M.W., A., & S.H., 2017)

35	2007	Barczak, Gloria, Sultan, Fareena, Hultink, Erik Jan	Web based tools and software (G., F., & E.J., 2007)
36	2000	Neftci, Salih N.	Central limit theorem, Value at risk (S.N., 2000)
37	2005	Zhang, Xueqing	Literature review, Case studies and Interview with experts (X. Z. , 2005)
38	2000	Cai, Xiaoqiang, Teo, Kok-Lay, Yang, Xiaoqi ; Zhou, Xun Yu	I8 function (X., K.-L., X., & X.Y., 2000)
39	2014	Glasserman, Paul ; Xu, Xingbo	Relative entropy, Monte Carlo simulation (P. & X., Robust risk measurement and model risk, 2014)
40	2012	Pflug, Georg Ch., Pichler, Alois, Wozabal, David	Markowitz portfolio selection model , Conditional Value-at-Risk (G.C., A., & D., 2012)
41	2020	Elsayed, Ahmed H. ; Nasreen, Samia, Tiwari, Aviral Kumar	Optimal weights and Hedge ratios (A.H., S., & A.K., 2020)
42	2000	Jensen G.R.; Johnson R.R.; Mercer J.M.	Markowitz optimization (G.R., R.R., & J.M., 2000)
43	2008	Quaranta A.G.; Zaffaroni A.	Conditional value at risk (A.G. & A., 2008)
44	2002	Frey R.; McNeil A.J.	Non-coherence of value-at-risk (R. & A.J., 2002)
45	2008	Natarajan K.; Pachamanova D.; Sim M.	Asymmetry-Robust VaR (K., D., & M., 2008)
46	2008	Gollier C.	Correlation (C., 2008)
47	2003	Mansini R.; Ogryczak W.; Speranza M.G.	Markowitz model, mean variance (R., W., & M.G., 2003)
48	2008	Adam A.; Houkari M.; Laurent J.-P.	Moment-based, distortion & spectral (A., M., & J.-P., 2008)
49	2022	Sawik T.	Multi-portfolio approach and scenario-based stochastic MIP (T. S. , 2022)
50	2006	Jianakoplos N.A.; Bernasek A.	Observation and Survey (N.A. & A., 2006)

Conclusion

A large and varied corpus of research on risk management and portfolio construction is shown by the bibliometric analysis. Significant progress has been achieved in integrating both conventional and innovative risk indicators during the last 20 years, and new approaches are always being developed. The paper emphasises how advances in computer methods and a better comprehension of financial markets are driving the growing complexity of risk management in portfolio theory. The multidisciplinary methods and worldwide scope of study point to a future trajectory where risk analysis in portfolio construction will advance by using various data sources and machine learning

methodologies.

Result and discussion:

1. Trend in Publications Over Time

The bibliometric analysis reveals a steady growth in the number of publications related to portfolio creation and risk analysis over the past two decades, with a particularly sharp increase in the years following 2010. The surge in publications from 2010 to 2024 can be attributed to several factors, including increased globalization of financial markets, the evolution of more advanced financial theories & the growing complexity of risk management techniques.

The overall trend suggests that the importance of risk analysis in portfolio creation has been progressively recognized, with a substantial academic interest in understanding and quantifying various forms of financial risks.

2. Subject Areas

The research articles in the study predominantly belong to the Finance and Economics disciplines, reflecting the centrality of these fields in portfolio creation and risk analysis. However, significant contributions were also observed from fields like Mathematics/Statistics, Operations Research, and Computer Science/Artificial Intelligence. This interdisciplinary collaboration highlights the increasing reliance on quantitative techniques, statistical models, and technological innovations in optimizing portfolios and analysing risks.

3. Type of Publications

The majority of the 1274 publications analysed were journal articles, followed by conference papers and working papers. Journal articles were the dominant type of publication, suggesting that peer-reviewed research with rigorous methodologies remains the primary vehicle for disseminating knowledge in the field.

4. Country Distribution

The United States emerged as the leading country in terms of published articles, followed by China, United Kingdom, and India. This aligns with the global financial dominance of the US and the rapid growth of financial research institutions in China and India. The distribution of publications across different countries reflects the global interest in optimizing investment portfolios and mitigating associated risks.

5. Author Contributions and Collaborations

The top authors in the field of portfolio creation and risk analysis were identified based on publication frequency and citation impact. Many of these authors have significantly influenced the development of portfolio optimization models, risk assessment metrics, and quantitative risk management.

6. Keywords and Key Themes

The keywords identified in the bibliometric analysis provide valuable insight into the most relevant and evolving topics in portfolio creation and risk analysis. (T., S., H., & Y., 2023)These keywords include:

- Portfolio Optimization
- Risk Management

- Value at Risk (VaR)
- Conditional Value at Risk (CVaR)
- Expected Shortfall
- Monte Carlo Simulation
- Machine Learning
- Financial Risk

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A STUDY OF THE SPENDING PATTERN OF CORPORATE SOCIAL RESPONSIBILITY FUNDS IN UTTARAKHAND

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Abstract

Corporate Social Responsibility is the ancient concept in India. In unorganized form the traces can be seen in the form of charity, daan, seva, zakat. These practices were done as religious acts.

Later it become like that we should give back to the society what we have extracted from it. There after the charity in different form transformed into providing medical facility to society, concessional education and subsidized accommodation to the employees. From last few years the Indian economy is trying to align the corporate social responsibility expenditures to the SDGs with the aim of peace and prosperity for persons and the globe".- while talking climate change and working to preserve oceans and forests. This paper is an effort to understand and evaluate the need and shift in spending patterns of companies with respect to the CSR expenditure.

Keywords: Sustainable Development Goals, Corporate Social Responsibility

Introduction

Corporate Social Responsibility

The thought of social responsibility is not new, the act of business for the welfare of society can be traced back from centuries. The concept of asylums in ancient roman laws which was a place for the poor and old people and a place for the mentally ill and orphans. (carroll 2008). In India, religious practices such as daan, seva, and zakat have shaped the relationship between the wealthy and the poor for centuries. Religious institutions have historically been the primary recipients of donations, a trend that persists today. In the 19th century, pioneering industrialists founded trusts and endowed institutions, which were often managed by members of their business families (Deo, 2015).

Kings, businesses, and landowners in ancient India recognized the value and significance of social duty. Everyone thinks that, the more you give, the more you receive (Xia et al. 2018). Every person's life and society will be enhanced by the collective growth of the economy (Narwal and Sharma 2008). The idea of Daan and dharm is available in every granth in all religions in varied forms and these are the basis of the person's helping the poor in the country. Indians have long practised and valued social responsibility, even in pre-written periods (Singh & Kaur. 2016). In Ancient India, Corporate Social Responsibility (CSR) was rooted in a philanthropic perspective. The country's rich cultural and religious heritage promoted values such as charity, community welfare, and sustainable development. These beliefs inspired individuals and communities to actively contribute to social upliftment and environmental preservation efforts. (Avotra et al. 2021) Deep-rooted community values in Indian society have long encouraged a tradition of generosity. This has motivated people to support initiatives in areas such as rural development, environmental sustainability, and education. (Yadav 2020).

CSR in India has evolved from a voluntary, philanthropic endeavor to a legally mandated obligation for qualifying companies (Gatti et al., 2019). The transformation began with the Companies Act of 2013, which introduced a legal framework that required certain companies to allocate a portion of their profits toward CSR initiatives. This legislative shift marked a significant transition, turning CSR from a goodwill gesture into a structured and accountable corporate practice (Pillai, 2017)

The historical trajectory of CSR shows a clear shift from voluntary philanthropy to a more structured and regulated approach, positioning CSR as a significant force for positive change in India's business landscape (Bergman et al., 2020; and Bharti, 2022).

The evolution of CSR in India reflects a broader trend toward prioritizing sustainable, impactful and outcome-oriented projects (Bihari and Shajahan, 2023). The increasing emphasis on environmental, social, and governance (ESG) criteria is steering CSR practices toward longterm sustainability and social wellbeing (Robinson and McIntosh, 2022). CSR and sustainability terms are related but not the same. CSR is a shorter-term reporting initiative, whereas sustainability focuses on the future growth and survival of the business, while supporting environmental, social and economic elements reported on in CSR (Bansal and DesJardine, 2014).

India is a very diverse country with states having a different set of socio economic problems where they need support from the industry Health care, education, rural development projects, environmental sustainability, livelihood enhancement projects, vocational skills, eradicating hunger and malnutrition, sanitation, training to promote sports, special education, art and culture, and women's empowerment are among the top 15 development sectors as far as CSE spending is concerned. Deforestation, pollution, deterioration of the land, depletion of resources like water, minerals, sand, and rocks, loss of biodiversity, and diminished ecosystem resilience are also some of India's major environmental problems (Economic Review, 2021)

Different sectors face unique challenges and opportunities in implementing CSR initiatives (Lindgreen et al., 2009). For instance, the education sector struggles with issues such as access to quality education and disparities in educational resources (CRY India, 2024). In contrast, the healthcare sector contends with infrastructural deficits and the need for improved medical services in underserved areas (Sheikh et al., 2015). An important challenge in agricultural initiatives is the lack of transparency in funding Current reporting mechanisms do not effectively categorise agricultural CSR activities. Unlike healthcare and education, which have clear allocations, agriculture-related initiatives are harder to track. This limits the assessment of their impact.

Examining CSR through a sector-specific lens enables researchers to understand these distinct challenges and evaluate the effectiveness of CSR activities in addressing them (Pang et al., 2011; and Jumde, 2021). This approach highlights the varying impacts of CSR efforts, across different sectors, from enhancing educational outcomes to improving healthcare access.

Understanding the disparities in CSR spending across sectors is critical for several reasons. Identifying which sectors receive more funding can reveal whether resources are distributed equitably. This insight is valuable for guiding policy recommendations and ensuring balanced support across different areas, particularly highlighting those that may be underfunded but are essential for comprehensive social development. Moreover, assessing the effectiveness of CSR initiatives requires recognizing sector-specific outcomes. Different sectors have unique metrics for measuring

success. For example, evaluating the success of a healthcare program involves different criteria, compared to assessing an environmental project (Carroll, 2021). Understanding these distinctions is crucial for accurate impact assessment and refining CSR strategies to enhance their effectiveness (Maroun, 2020)

The dissemination of CSR spending's have been highly unequal across geographical areas as well as across social concerns. More than 80% of the spendings goes to less than half of the India's states with less than 20% left for remaining states. Maharashtra has maintained the top position throughout in the matter of receiving maximum contribution of CSR. Major CSR funds are going for education and healthcare followed by rural development, poverty alleviation and environment sustainability. The contribution of the private sector was found to be higher than the public sector. (Patel, M. B., & Vanpariya, B.(2024)

Each state in India has its peculiar topography, demographic and socio-economic characteristics and this results in different challenges in terms of development. Identification of the requirements of each state in terms of the developmental needs is very significant. Uttarakhand being a hilly state has its own challenges.

The rural hill regions of Uttarakhand are currently at a turning point—trying to balance the pressures of modernization with the need to protect their natural beauty and ecological richness. Although the state is celebrated for its scenic landscapes and vast natural resources, it remains economically underdeveloped. Agriculture continues to be the backbone of rural livelihoods, yet it struggles due to limited fertile land and low crop yields.

The major challenges being faced by the state of Uttarakhand are

- Social challenges such as lack of quality healthcare, education, and gender disparities.
- Water scarcity and management challenges due to the terrain and climate change.
- Migration caused by limited livelihood options in agriculture and other sectors.
- Poor infrastructure, dispersed settlements, and difficulty in service delivery.
- Environmental degradation and increased risk of natural disasters

With minimal industrial growth, the economic gap between the hilly regions and urban centers has widened, contributing to a rising trend of migration. This has led to the creation of “ghost villages”—silent reminders of the people who left in search of better prospects. (Verma & Sharma,2025).

The hilly districts in Uttarakhand lagged behind in receiving Corporate social responsibility (CSR) funds, in comparison to the districts based in plain areas. The corporate houses preferred spending money in plains, not in hilly areas. A discussion on use of Corporate social responsibility (CSR) funds in Uttarakhand took place in a joint workshop organized by the Department of Planning in collaboration with the Center for Public Policy and Good Governance (CPPGG) and the United Nations Development Program (UNDP). It was disclosed during the workshop that corporate houses are more inclined to spend in plain districts of Haridwar, Dehradun and Udham Singh Nagar, not in hilly districts.

By investing in hilly regions with high migration rates, companies can generate job opportunities,

enhance infrastructure, and stimulate economic progress. For instance, initiatives like local sourcing programs and vocational training can significantly improve local employment prospects. Focus of the vocational training programs should be on Tourism and Hospitality as there are lots of opportunities In Uttarakhand for the youth to get employed in this area. This initiative will equip individuals with the necessary tools to secure meaningful employment locally, achieved through partnerships with educational institutions and scholarships. (Rana and Bisht 2023).

A majority of the CSR funds in Uttarakhand are being spent on livelihood. Livelihood's perspectives offer an important lens for looking at complex rural development questions. But the sustainability of livelihood projects is a challenge. For continued relevance and application, livelihood perspectives must address the questions across the four themes: knowledge, politics, scale, and dynamics. Innovative thinking and practical experimentation are necessary for livelihood perspectives to meet these challenges, and there is an urgent need to rethink, retool, and reengage. Most of the livelihood projects are agriculture based but they lack a linkage to the supply chains. (Bhatta & Bhavani, 2023)

Given the challenging geography and the scale of these problems, it's clear that development strategies must be tailored to the specific needs of hill communities. The stark regional imbalance highlights the necessity for localized policies that are capable of addressing the unique difficulties faced by Uttarakhand's mountainous districts.

CSR activities can be directed in the right direction if the sectors for growth are rightly targeted. This is the reason why a study of the spending pattern of CSR in Uttarakhand needs to be analysed as the money should be spent in the right direction.

Research Gap:

S. No.	Area of Focus	Existing Literature Insight	Identified Research Gap	Proposed Focus for Future Research
1	**Regional Distribution of CSR Funds**	Studies highlight that CSR spending in India is concentrated in industrialized states such as Maharashtra, Gujarat, and Karnataka (Patel & Vanpariya, 2024).	Limited research on **regional disparities** in CSR allocation, particularly between plain and hilly regions like Uttarakhand.	Examine **spatial patterns of CSR spending** to understand why hill districts receive lower CSR investments.
2	**Sector-Specific CSR Effectiveness**	Literature identifies education, health, and livelihood as primary CSR sectors (Lindgreen et al., 2009; CRY India, 2024; Sheikh et al., 2015).	Lack of **comparative studies** assessing **sectoral effectiveness** and sustainability of CSR initiatives.	Evaluate **impact differences** of CSR across key sectors—education, healthcare, livelihood, and environment.
3	**CSR and Livelihood Sustainability**	Livelihood-based CSR projects exist but lack continuity and supply-chain integration (Bhatta & Bhavani, 2023).	Insufficient empirical work on **long-term sustainability** and **economic linkage** of livelihood-oriented CSR projects.	Investigate how CSR can create **sustainable livelihood models** through local entrepreneurship and value chain development.
4	**CSR and Migration in Hill States**	Migration from hilly areas is rising due to limited local opportunities (Verma & Sharma, 2025).	Scarce studies explore the **relationship between CSR, skill development, and migration reduction** in mountainous regions.	Analyze how **CSR-funded vocational programs** (e.g., tourism and hospitality) can reduce migration in Uttarakhand.
5	**CSR Policy Implementation Frameworks**	The Companies Act (2013) institutionalized CSR nationally (Gatti et al., 2019; Pillai, 2017).	Lack of **state-specific frameworks** aligning CSR with local development needs and ecological constraints.	Develop **localized CSR policy models** tailored to Uttarakhand's topography, resources, and community priorities.

Research Methodology

1. Research Design:

The study follows a descriptive research design, aimed at analysing and interpreting the spending trends of CSR funds in the state of Uttarakhand over a defined period. It seeks to evaluate how corporate priorities have shifted across various sectors such as education, health, sanitation,

environment, and cultural preservation.

2. Data Source:

The study is based on secondary data obtained from Dynamic CSR Reports published annually. These reports provide company-wise and sector-wise CSR expenditure data under the framework of the Companies Act 2013.

3. Study Period:

The analysis spans nine financial years, from 2014–15 to 2022–23.

4. Area of Study:

The study is focused specifically on Uttarakhand, capturing CSR spending patterns of companies operating within or contributing to projects in the state.

5. Data Presentation:

CSR expenditure data across different categories were extracted and then converted into visual graphs (line charts). These categories include:

- Education, Livelihood, and Differently Abled
- Sports
- Environment, Animal Welfare, and Resource Conservation
- Health, Nutrition, Sanitation, and Safe Drinking Water
- Gender Equality and Empowerment
- Heritage, Art, and Culture

6. Data Analysis:

The paper uses trend analysis to identify:

- Areas with increasing or decreasing CSR investment
- Fluctuations in fund allocations
- Emerging sectors of corporate interest over time

The trend lines included in each graph helped visualize growth or decline, and the authors have offered interpretative commentary on possible causes behind the observed patterns.

7. Limitation of Study:

Although not explicitly mentioned, the methodology inherently relies on the availability and accuracy of secondary data. It also limits itself to Uttarakhand, making findings more region-specific rather than generalizable across India.

Data of CSR funds Spending pattens in different Areas from 204-15 to 2022 -23 in Uttarakhand

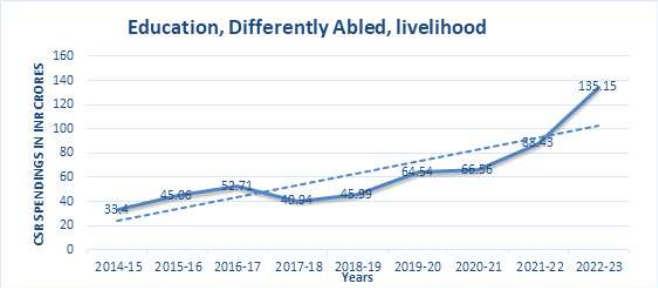

Figure-1 (Source: Image created by author based on data of dynamic CSR report)

The image shows a line graph representing the CSR (Corporate Social Responsibility) spending on education, differently-abled individuals, and livelihood initiatives over the years 2014-15 to 2022-23, in Uttarakhand.

Trend Line: The dotted line shows the overall positive trend despite minor variations over some years.

Key Observations:

: From 2014-15 (₹33.4 crores) to 2022-23 (₹135.15 crores), there is a noticeable growth trend in CSR spending. Spending decreased in 2017-18 (₹40.94 crores) compared to the previous year, but it picked up again from 2018-19 onwards. The spending saw a rapid rise from ₹88.43 crores in 2021-22 to ₹135.15 crores in 2022-23, indicating a strong recent focus on these social sectors.

- Possible Reasons for Trends:
- Focus on Education and Skill Development: Education and livelihood generation are foundational CSR themes in India. Many corporates partnered with government schemes such as Skill India Mission, Digital India, and Beti Bachao Beti Padhao, contributing to rising CSR allocations.
- Inclusion of Differently Abled Initiatives: Post-2016, there was growing attention toward inclusive growth, resulting in more CSR projects supporting accessibility, vocational training, and employment for the differently abled.

This graph highlights an industry's increasing commitment to social welfare initiatives focused on education, disability support, and livelihood development.

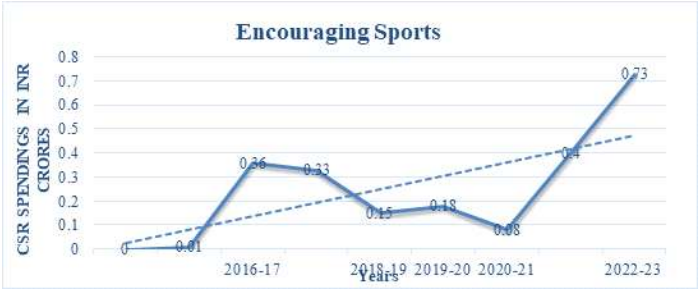

Figure-2 (Source: Image created by author based on data of dynamic CSR report)

The image shows a line graph representing CSR (Corporate Social Responsibility) spending on encouraging sports from 2014-15 to 2022-23, in Uttarakhand.

Trend Line: The dotted trend line indicates an overall upward trajectory despite fluctuations.

Key Observations:

Initial Low Spending: CSR spending started at ₹0 crores in 2014-15 and ₹0.01 crores in 2015-16. Significant Rise (2016-17): A sharp increase to ₹0.26 crores in 2016-17 and further to ₹0.33 crores in 2017-18. There was a decline to ₹0.15 crores in 2018-19, followed by minor variations, with the lowest point being ₹0.08 crores in 2020-21. A dramatic rise from ₹0.04 crores in 2021-22 to ₹0.73 crores in 2022-23, indicating renewed investment in promoting sports.

Possible Reasons for Trends:

- Introduction and Stabilization of CSR Policy (Post-2014):. The initial years likely involved companies understanding compliance requirements, leading to gradual increases after 2016.
- Increased Focus on Sports Development Initiatives: The rise in 2016–17 and 2017–18 may be linked to national programs such as "Khelo India" (launched in 2016), which encouraged corporate partnerships to fund sports infrastructure and training.
- Economic and Pandemic Effects (2018–19 to 2020–21): The decline could be attributed to:
- Shifting CSR priorities toward education, health, and COVID-19 relief efforts during the pandemic years.
- Budget constraints due to economic slowdown and reduced profits during the lockdown period.
- Post-Pandemic Recovery and Renewed Focus (2021–22 onwards):The sharp rise to ₹0.73 crore reflects: Resumption of sporting events and CSR projects post-COVID. Renewed national interest in sports following India's strong performances in Tokyo Olympics (2021) and Commonwealth Games (2022). Corporate alignment with the government's Fit India Movement and broader wellness initiatives.
- The graph highlights a growing focus on promoting sports as a CSR priority, with substantial spending increases in recent years.

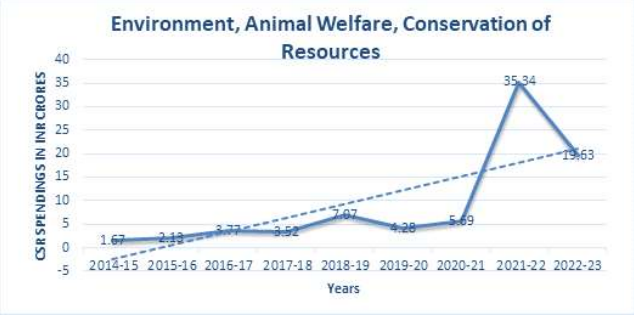

Figure-3 (Source: Image created by author based on data of dynamic CSR report)

Trend Overview:

The CSR spending shows a gradual increase from 2014-15 to 2018-19, with minor fluctuations. There is a slight dip in 2019-20, followed by a steady rise in 2020-21. A sharp spike occurs in 2021-22, reaching a peak at ₹35.34 crores. The spending then declines significantly in 2022-23 to ₹19.63 crores, though it remains above the previous years' levels.

Trend Line:

- The dotted trend line shows an overall upward trajectory in CSR spending over the years.

Notable Observations:

- 2018-19 saw a significant increase in spending (₹7.07 crores), but it dipped slightly in the following year (₹4.28 crores).
- 2021-22 saw an extraordinary spike, suggesting a one-time large allocation, possibly due to regulatory changes or a major initiative.
- The spending in 2022-23 (₹19.63 crores) remains higher than in previous years despite the drop from 2021-22.

Possible Reasons for Trends:

- The steady growth could be attributed to increasing CSR commitments. The peak in 2021-22 might be due to increased corporate focus on sustainability or new government mandates. The drop in 2022-23 might suggest normalization after an exceptional increase the previous year.

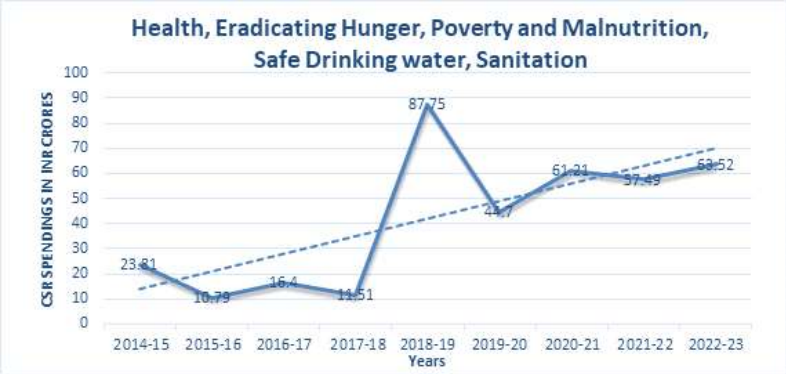

Figure-4 (Source: Image created by author based on data of dynamic CSR report)

The image is a line graph that illustrates CSR (Corporate Social Responsibility) spending in INR crores over the years for Health, Eradicating Hunger, Poverty and Malnutrition, Safe Drinking Water, and Sanitation.

Trend Line:

- The CSR spending has fluctuated significantly over the years but shows an overall increasing trend, as indicated by the dotted trend line. There are notable peaks and dips, suggesting variations in corporate allocations toward these causes.

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Key Observations:

- 2014-15: Spending started at ₹23.81 crores.2015-16 to 2017-18: Decline in spending occurred, reaching ₹11.51 crores in 2017-18 after minor fluctuations.2018-19: A major spike to ₹87.75 crores, the highest spending observed in the dataset. This suggests a significant push in CSR funds for health and sanitation initiatives.2019-20: Sharp decline to ₹44.7 crores, indicating a correction or normalization after the previous year's peak.
- 2020-21 to 2022-23: The spending remained relatively stable, with values between ₹57.49 crores and ₹63.52 crores, showing a steady commitment.

Possible Reasons for trends:

- The 2018-19 peak (₹87.75 crores) suggests a major CSR initiative, is due to increased focus on healthcare, sanitation programs, or government mandates. The decline in 2019-20 could indicate a reallocation of CSR funds or project completion. From 2020-21 onward, the spending stabilizes around ₹57-63 crores, indicating a more consistent CSR commitment to health and sanitation.

The graph indicates a long-term increase in CSR spending in health-related areas despite fluctuations. The peak in 2018-19 suggests a significant one-time investment, and the stabilization in recent years shows a continued focus on these essential social causes.

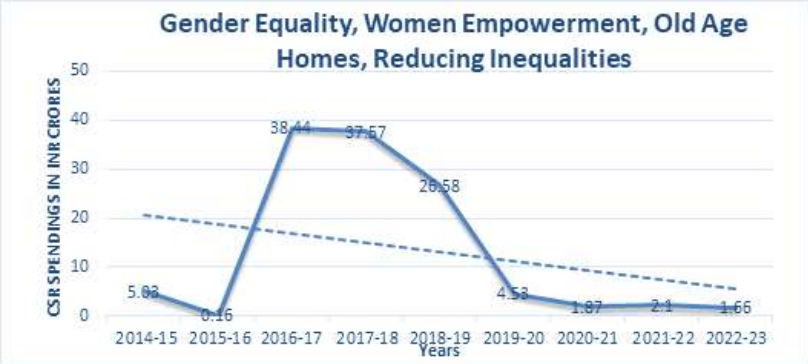

Figure-5 (Source: Image created by author based on data of dynamic CSR report)

The graph illustrates the trend of Corporate Social Responsibility (CSR) spending in India on Gender Equality, Women Empowerment, Old Age Homes, and Reducing Inequalities from 2014-15 to 2022-23 in INR crores.

Trend Analysis:

- The trend follows a rise and sharp decline pattern.
- After a peak in 2016-17 and 2017-18, there has been a steady decline, indicating reduced corporate allocations towards these social causes in recent years.
- The dashed trendline suggests an overall downward trajectory in CSR funding for these sectors.

Key Observations:

Initial Decline (2014-15 to 2015-16): CSR spending dropped significantly from ₹5.03 crores in 2014-15 to just ₹0.16 crores in 2015-16. Sharp Rise (2015-16 to 2016-17): Spending saw a increase, peaking at ₹38.44 crores in 2016-17. Slight Decline (2016-17 to 2017-18): A minor drop to ₹37.57 crores occurred. Significant Decline (2017-18 to 2019-20): Spending saw a steady fall to ₹26.58 crores (2018-19) and then a sharp drop to ₹4.53 crores (2019-20). Near Minimal Spending (2020-21 to 2022-23): Spending remained very low, fluctuating between ₹1.87 crores (2020-21) and ₹1.56 crores (2022-23).

Possible reasons for Trends:

- The peak in 2016-17 may be due to government initiatives, policy changes, or increased corporate focus on these causes.
- The decline post 2018-19 could indicate corporate priorities shifting, economic factors, or changes in government policies regarding CSR allocations.
- The very low spending post-2019 suggests that businesses may have redirected funds to other sectors, such as health, education, or COVID-19 relief efforts.

Figure-6 (Source: Image created by author based on data of dynamic CSR report)

The graph illustrates the trend of Corporate Social Responsibility spending in India on Heritage, Art, and Culture from 2014-15 to 2022-23, measured in INR crores.

Trend Analysis:

- The overall dashed trendline suggests an upward trajectory in CSR spending on Heritage, Art, and Culture.
- The early years (2014-2017) show negligible funding.
- The later years (2018-2023) indicate increasing corporate interest, with a significant boost post-2021.

Key Observations:

Minimal Spending (2014-15 to 2016-17): CSR spending was quite low, starting at ₹0.57 crores in 2014-15 and even dropping to ₹0 in 2015-16. Slow increase began in 2016-17 (₹0.37 crores). Gradual Growth (2017-18 to 2019-20) A moderate rise occurred, reaching ₹2.46 crores in 2017-

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18. A small dip followed in 2018-19 (₹0.97 crores) before recovering to ₹2.38 crores in 2019-20. Fluctuations (2020-21 to 2021-22): Spending dropped to ₹0.76 crores in 2020-21. A significant rise to ₹5.17 crores in 2021-22. Major Surge (2022-23): CSR spending saw a huge spike to ₹17.22 crores, the highest in the observed period.

Possible reasons for Trends:

- The sharp rise in 2022-23 suggests renewed corporate focus on preserving cultural heritage, promoting arts, and supporting traditional crafts.
- The dip in 2020-21 may be attributed to companies diverting CSR funds towards COVID-19 relief efforts.
- Government initiatives or policy incentives could have encouraged more CSR contributions in 2021-22 and 2022-23.

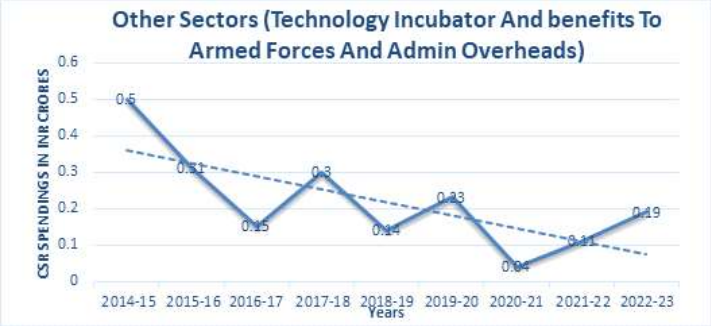

Figure-7 (Source: Image created by author based on data of dynamic CSR report)

Trend Line: The dotted line represents a trend line that clearly indicates a gradual decline in CSR spending over the years in these "other sectors."This suggests a reduced corporate focus or priority on areas such as technology incubation, armed forces benefits, and administrative overheads.

Key Interpretations:

2014-15 had the highest CSR spending at ₹0.5 crores.There is a significant drop in 2016-17 to ₹0.15 crores, followed by a short recovery in 2017-18 to ₹0.3 crores.The lowest spending occurred in 2020-21, at ₹0.04 crores, possibly influenced by the COVID-19 pandemic, where CSR funds might have been diverted to health-related causes.A slight upward recovery is seen in 2021-22 and 2022-23, reaching ₹0.19 crores by the end. Volatility: The spending pattern is not consistent, showing fluctuations year-over-year, indicating a lack of long-term strategic commitment to these sectors.

Possible reason for Trends:

The declining and inconsistent CSR investments may reflect:

- Shift in corporate priorities (e.g., more towards healthcare, education, or environment).
- Perception that these sectors offer less visible impact or ROI in CSR terms.
- Need for policy incentives to rejuvenate corporate interest in these underfunded areas.

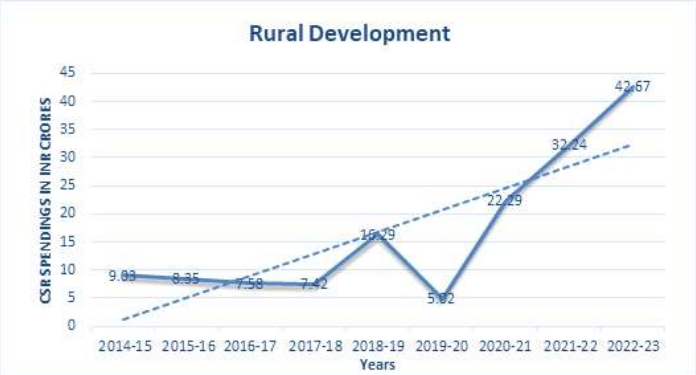

Figure-8 (Source: Image created by author based on data of dynamic CSR report)

Trend Line:

- A dotted trend line is included in the graph.
- It indicates an overall upward trend in CSR spendings for rural development over the 9 years despite short-term fluctuations.

Observations:

Initial Decline (2014-15 to 2017-18): Spending gradually decreased from ₹9.03 Cr to ₹7.42 Cr. Sudden Spike (2018-19): Jumped significantly to ₹16.79 Cr, indicating a sharp rise in rural development CSR initiatives. Sharp Drop (2019-20): Plummeted to ₹5.02 Cr — likely due to budget redirection or external shocks (e.g., COVID-19 onset). Consistent Increase (2020-21 to 2022-23): Rapid and consistent growth from ₹22.29 Cr to ₹42.67 Cr, highlighting renewed and increasing focus on rural development.

Possible reason for Trends:

- The graph suggests a growing long-term commitment towards rural development under CSR.
- While there were early declines and one major drop in 2019-20, the post-2020 period shows strong and accelerating investment, potentially driven by increased awareness, regulatory encouragement, or pandemic recovery strategies.

Findings

1.Significant growth Areas

Certain sectors have experienced consistent growth or a sharp increase in CSR spending, indicating a strategic focus shift:

Education, Differently Abled, and Livelihood:

- Consistent increase in spending, reaching ₹135.15 crore in 2022-23.
- Indicates long-term commitment to education and livelihood initiatives.

Rural Development:

- Slow growth initially but saw a major jump post-2020-21, reaching ₹42.67 crore in 2022-23.
- Suggests a strong push for rural infrastructure and social welfare in recent years.

Heritage, Art, and Culture:

- Spending remained low until 2020-21 but surged to ₹17.22 crore in 2022-23.
- Shows growing interest in preserving cultural heritage.

Health, Hunger Eradication, and Sanitation:

- Large peak in 2018-19 (₹87.75 crore), followed by a slight drop but remains stable at ₹59.52 crore in 2022-23.
- Indicates continued corporate focus on healthcare and sanitation

2. Sectors with Declining or Fluctuating Spending

Some sectors gained initial attention but later saw a decline or inconsistency:

Gender Equality, Women Empowerment, and Reducing Inequalities:

- Sharp peak at ₹38.44 crore in 2016-17, followed by a steep decline to ₹1.66 crore in 2022-23.
- Suggests a reduced corporate focus on gender-based initiatives over time.

Environment, Animal Welfare, and Conservation:

- Spending peaked at ₹35.34 crore in 2021-22 but dropped to ₹19.63 crore in 2022-23.
- Indicates inconsistent prioritization of environmental initiatives.

Encouraging Sports:

- Remains a low-funded category, peaking at ₹0.73 crore in 2022-23.
- Indicates that sports development is not a major CSR priority.

Technology Incubators & Armed Forces Benefits:

- Highest spending in 2014-15 (₹0.5 crore) but has mostly declined or fluctuated.
- Suggests minimal long-term interest from corporates in this area.

Suggestions

The analysis of CSR spending patterns reveals a clear shift in corporate priorities, highlighting significant growth in sectors such as education, livelihood development, rural infrastructure, cultural preservation, and public health. These trends suggest an increasing corporate commitment to long-term, community-centric development initiatives with broad social impact. At the same time, the notable decline or fluctuation in areas such as gender equality, environmental sustainability, sports promotion, and technology incubation indicates uneven attention toward other critical development domains. This imbalance underscores the need for a more holistic, strategically aligned CSR approach that not only strengthens high-performing sectors but also revitalizes underfunded ones. By promoting evidence-based planning, multi-year interventions, and collaborative partnerships, CSR efforts can become more equitable, sustainable, and impactful, ultimately contributing to inclusive socio-economic development and long-term societal well-being.

Conclusions

In the end the authors concluded the findings with following words:

Our time-series analysis of Corporate Social Responsibility (CSR) spending patterns reveals notable

trends that reflect both continuity and shifts in corporate priorities. Core development sectors such as education, healthcare, and rural development continue to dominate CSR allocations, indicating a sustained corporate commitment to foundational social needs and national development agendas. These sectors are widely regarded as high-impact areas, often yielding measurable outcomes in community welfare, which explains their continued prominence. In contrast, there has been a marked decline in CSR funding directed toward environmental sustainability, gender equality, and sports-related initiatives. This downward trend may stem from changing corporate perceptions regarding the visibility, scalability, or strategic value of investments in these areas, although it raises important concerns about neglecting long-term societal needs such as climate resilience, social equity, and youth empowerment. On the other hand, heritage and cultural preservation have gained considerable traction, suggesting a shift in corporate focus toward nation-building, cultural identity, and tourism-linked development. The increasing support for such initiatives highlights a broader understanding of CSR beyond traditional welfare models, encompassing intangible socio-cultural assets. These dynamic patterns emphasize the need for longitudinal, sector-specific studies to better understand how CSR priorities evolve over time and to guide more balanced and inclusive policy and corporate strategies.

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EFFECTIVENESS OF THE HUMAN RESOURCE INFORMATION SYSTEM USED BY LARGE SCALE MANUFACTURING ORGANIZATIONS IN SOUTH EAST RAJASTHAN

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Abstract

Human Resource Information System (HRIS) software has become essential for managing HR operations in large-scale organizations across India. It has gained significant adoption, particularly in sectors like IT/ITES, manufacturing, and services. The HR software market in Asia Pacific, including India, was valued at USD 3.46 billion in 2023 and is expected to grow to USD 8.73 billion by 2030. In Rajasthan, many large-scale manufacturing enterprises are increasingly adopting HRIS solutions to improve HR management processes. This study examines the effectiveness of HRIS in large-scale manufacturing organizations in the region. Findings reveal that employees across demographics view HRIS as highly effective in enhancing efficiency, accuracy, flexibility, and consistency in HR functions. ANOVA results confirm significant differences in effectiveness among organizations ($p < 0.05$), with Post-Hoc Bonferroni tests identifying variability in adoption outcomes. The aim of this paper is to examine how effective Human Resource Information Systems (HRIS) used by large-scale manufacturing organizations in South-East Rajasthan.

Keywords: HRIS, Manufacturing Organization, ICT tools, SAP

Introduction

Human Resource Management (HRM) operations in large manufacturing organizations are also managed with the help of other ICT tools, but the dedicated HR software applications have significantly changed the way of managing HR data and communication. The HRIS is also a SHRM tool, which has helped redesign many HR processes and tasks over the years. HRIS has used SHRM in a variety of ways to enable HR practitioners to transition from traditional HRM to transformational HRM..In Rajasthan, HRIS software is gaining significant traction, particularly in large-scale manufacturing and industrial sectors. Many organizations in the state are embracing HRIS solutions to streamline their HR operations and improve efficiency. With Rajasthan's diverse manufacturing industries, HRIS systems are being used to handle range of HR functions, including payroll processing, maintaining employee records, recruitment activities, and monitoring performance. This shift towards technology in managing human resources is reflective of a broader trend in India, where organizations are increasingly recognizing the benefits of automation and data-driven insights.

In recent years, Rajasthan has seen a rise in the adoption of cloud-based HRIS, as more organizations seek scalable, cost-effective solutions. As companies in Rajasthan adopt modern HRIS systems, they are not only improving operational efficiency but also enhancing employee experience by offering self-service portals, real-time updates, and performance tracking tools. This technological shift is helping businesses address challenges related to workforce management and optimize HR processes. As Rajasthan continues to grow as a manufacturing hub, the role of HRIS will

likely expand further, contributing to the state's economic development and improving HR practices in a range of sectors.

This in-depth study has considered various employees's attributes and HRIS functions. The various factors and areas of HR have been considered for understanding the HRIS in the organization.

Review of Literature

Khrais, L. T., Shidwan, O. S., Alafandi, A., & Alsaeed, N. Y. (2021). Indicated that HRIS contributes significantly to organizational success through improved decision-making, better communication, and more strategic use of employee data. Panda, A.K., & Verma, R.(2022). The research highlights that organizations implementing HRIS experience improved employee satisfaction, faster information processing, and stronger alignment between HR functions and organizational goals. However, the success of HRIS implementation largely depends on proper training, management support, and continuous system evaluation. Therefore, organizations must view HRIS not merely as a technological investment but as a strategic asset that drives overall performance, competitiveness, and long-term growth. Hamid, Johannes, Yacob, and Edward (2023) studied the effectiveness of HRIS by linking it to employee satisfaction and system usage. They found that HRIS Success depends not only on adopting the technology but also on how employees understand and use the system. User-friendly design, reliability, and accessibility were shown to enhance satisfaction, which in turn improves efficiency, transparency, and decision-making. The study concludes that employee satisfaction and system usage are key mediators in determining HRIS effectiveness.

Kumar and Jagadeesan (2024) emphasized that HRIS success in the IT sector depends not only on technology but also on employee competencies, with training and motivation enhancing organizational performance. Najmi and Porwal (2025) further highlighted digital literacy as a crucial factor for HRIS adoption in India, with variations influenced by age and geography. Similarly, Kumar, Tiwari, and Devka (2025) found in the service sector that HRIS improves productivity and efficiency when employees perceive tangible benefits such as workload reduction and transparency. Yona and Meilani (2024) reinforced this by arguing that investment in technology alone is insufficient; digital literacy, user engagement, and perceived benefits are equally important, particularly in emerging economies and large manufacturing sectors. Panjaitan (2023) added that HRIS effectiveness also requires change management, continuous support, and skill development. Together, these studies suggest that workforce readiness and training are as critical as technological infrastructure in determining HRIS outcomes. Sharma, Chetan & et.al (2023). It shows that Human Resource Information Systems play a role in promoting business growth and making it easier for employees to perform their tasks. Ibrahim, A. M., & Ali, H. (2023). The results show that management support plays a vital role in the successful implementation of HRIS. Strong backing from top-level executives and managers helps create a supportive environment, ensures proper allocation of resources, and encourages employees to adopt and effectively use the system, thereby increasing the likelihood of successful implementation and providing significant benefits to the organization. Satispi, E. & et.al (2023). The study indicates that HRM reform within organizations is essential if the country aims to establish a world-class system.

HRIS in Manufacturing Companies in South-East Rajasthan

Several leading manufacturing companies in South-East Rajasthan have adopted modern HRIS

solutions to manage their human resources effectively. Chambal Fertilizers and Chemicals Ltd. and DCM Shriram Ltd. use SAP HANA to automate HR processes, with DCM Shriram also employing facial recognition for attendance tracking. JK Cement and Mangalam Cement rely on SAP ERP systems, with Mangalam additionally using biometric attendance and some LAMP applications for legacy functions. Shriram Rayons is transitioning from SAP to PeopleStrong, a cloud-based HRIS offering advanced features like analytics, employee self-service, and talent management. ACC Limited manages HR through SAP with a specialized leave management module (SAP ACCENT), while Wonder Cement uses Darwinbox for payroll, performance, recruitment, and HR analytics. In the textile sector, Sangam India Ltd. stands out with massive production capacity and advanced setups, reflecting the integration of technology in both operations and HR practices. Together, these organizations illustrate the growing reliance on digital HR solutions to enhance efficiency, compliance, and workforce management.

Research Methodology

- Research Methods: Descriptive Study
- Objective: To study the effectiveness of the HRIS used in manufacturing organization in South-East Rajasthan.
- Sample Size: Total employees interviewed 620
- Sampling Technique: Simple random sampling has been used for collecting information from the employees of the selected manufacturing organization.
- Data Collection and Questionnaire design: Data was gathered through a structured, close-ended questionnaire designed using a Likert scale.

Data Analysis

Among the total respondents, 16.77% strongly agree, 75.16% agree, 6.77% are neutral, 0.97% disagree, and 0.32% strongly disagree that HRIS is highly efficient in managing information. This indicates that the majority of employees believe HRIS effectively handles information management.

Regarding the safety and security of the HRIS, 17.74% strongly agree, 78.23% agree, 2.42% are neutral, 1.13% disagree, and 0.48% strongly disagree that HRIS is a secure system for storing information. This suggests that most employees consider HRIS a safe platform where only authorized users can access the system according to their rights.

In terms of maintenance and repair, 15.65% strongly agree, 75.97% agree, 7.58% are neutral, 0.48% disagree, and 0.32% strongly disagree that HRIS is easy to maintain and repair when problems arise. This reflects that most employees find HRIS simple to maintain and fix when necessary, highlighting its strong maintainability.

Regarding flexibility, 15.81% strongly agree, 74.35% agree, 6.61% are neutral, 1.94% disagree, and 1.29% strongly disagree that it is easy to modify and update records within HRIS. This shows that the majority of employees feel HRIS allows for easy modification and record adjustments.

In terms of accuracy, 19.19% strongly agree, 71.94% agree, 6.29% are neutral, 1.45% disagree, and 1.13% strongly disagree that HRIS generates accurate results and reports. This indicates that most employees trust HRIS for producing reliable and precise reports.

Finally, when it comes to consistency, 17.10% strongly agree, 74.84% agree, 7.26% are neutral, 0.48% disagree, and 0.32% strongly disagree that HRIS consistently performs well in managing information. This suggests that most employees find HRIS consistently effective in its performance.

Table 1: HRIS is very effectively used

HRIS is very effectively used to manage the HR functions		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		GT	%
		F	%	F	%	F	%	F	%	F	%		
Gender	MALE	99	17.43	319	56.16	53	9.33	76	13.38	21	3.70	568	100
	FEMALE	11	21.15	26	50.00	5	9.62	8	15.38	2	3.85	52	100
	Total	**110**	**17.74**	**345**	**55.65**	**58**	**9.35**	**84**	**13.55**	**23**	**3.71**	**620**	**100**
Age	**20-35**	32	23.02	55	39.57	21	15.11	24	17.27	7	5.04	139	100
	35-50	57	15.62	229	62.74	25	6.85	43	11.78	11	3.01	365	100
	50 & Above	21	18.10	61	52.59	12	10.34	17	14.66	5	4.31	116	100
	Total	**110**	**17.74**	**345**	**55.65**	**58**	**9.35**	**84**	**13.55**	**23**	**3.71**	**620**	**100**
Experience	**0-5**	9	26.47	17	50.00	2	5.88	5	14.71	1	2.94	34	100
	5-15	79	16.88	270	57.69	45	9.62	61	13.03	13	2.78	468	100
	15 & more	22	18.64	58	49.15	11	9.32	18	15.25	9	7.63	118	100
	Total	**110**	**17.74**	**345**	**55.65**	**58**	**9.35**	**84**	**13.55**	**23**	**3.71**	**620**	**100**
Education	**Non-Graduate**	7	9.72	14	19.44	17	23.61	23	31.94	11	15.28	72	100
	Graduates	103	18.80	331	60.40	41	7.48	61	11.13	12	2.19	548	100
	Total	**110**	**17.74**	**345**	**55.65**	**58**	**9.35**	**84**	**13.55**	**23**	**3.71**	**620**	**100**
GT		**440**	**17.74**	**1380**	**55.65**	**232**	**9.35**	**336**	**13.55**	**92**	**3.71**	**2480**	**100**

In the above table no.1 it indicates that out of the total respondents, 568 were male and 52 were female. Over 70% of both male and female respondents agreed that the Human Resource Information System (HRIS) is effectively managing HR operations. Additionally, the majority of respondents were above 35 years of age, with over 72% of them acknowledging the effectiveness of HRIS. Most employees surveyed had more than 5 years of experience and were well-educated, and more than 72% of them also agreed that HRIS is managing HR functions efficiently. Overall, the findings reflect a strong consensus across gender, age, experience, and education level about the effectiveness of HRIS in HR management.

HYPOTHESIS OF RESEARCH

Hypothesis

H0: There is no significant difference between effectiveness of using HRIS in manufacturing organization in South East Region of Rajasthan.

H1: There is significant difference between effectiveness of using HRIS in manufacturing organization in South East Region of Rajasthan.

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ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	44.0268	7	6.28954	31.5659	2.00792E-37	2.02453
Within Groups	121.942	612	0.19925			
Total	165.969	619				

Table 2: ANOVA

ORGANIZATION 1	ORGANIZATION 2	T-TEST P-VALUE	SIGNIFICANT
CFCL	DCM	0.92506	No
CFCL	JK CEMENT	0.113424	No
CFCL	MANGALAM CEMENT	1.81E-08	Yes
CFCL	ACC CEMENT	3.46E-06	Yes
CFCL	SHRIRAM RAYONS	2.26E-14	Yes
CFCL	WONDER CEMENT	5.43E-07	Yes
CFCL	SANGAM INDIA LTD.	0.008607	No
DCM	JK CEMENT	0.065144	No
DCM	MANGALAM CEMENT	1.46E-10	Yes
DCM	ACC CEMENT	1.85E-07	Yes
DCM	SHRIRAM RAYONS	1.34E-16	Yes
DCM	WONDER CEMENT	1.27E-08	Yes
DCM	SANGAM INDIA LTD.	0.002714	No
JK CEMENT	MANGALAM CEMENT	3.49E-05	Yes
JK CEMENT	ACC CEMENT	0.001228	Yes
JK CEMENT	SHRIRAM RAYONS	1.13E-11	Yes
JK CEMENT	WONDER CEMENT	0.000642	Yes
JK CEMENT	SANGAM INDIA LTD.	0.373801	No
MANGALAM CEMENT	ACC CEMENT	0.862368	No
MANGALAM CEMENT	SHRIRAM RAYONS	4.25E-08	Yes
MANGALAM CEMENT	WONDER CEMENT	0.295148	No
MANGALAM CEMENT	SANGAM INDIA LTD.	0.000521	Yes
ACC CEMENT	SHRIRAM RAYONS	3.18E-07	Yes
ACC CEMENT	WONDER CEMENT	0.602043	No
ACC CEMENT	SANGAM INDIA LTD.	0.006602	No
SHRIRAM RAYONS	WONDER CEMENT	4.11E-09	Yes
SHRIRAM RAYONS	SANGAM INDIA LTD.	5.95E-13	Yes
WONDER CEMENT	SANGAM INDIA LTD.	0.006796	No

Table 3: Post-Hoc Test Bonferroni correction

Interpretation: As it is shown in table no.2 the p value is less than .05, therefore the null hypothesis is rejected. This shows that there is significant difference between effectiveness of using HRIS in manufacturing organization in South East Region of Rajasthan.

Conclusion

In conclusion, the comprehensive analysis of the data clearly demonstrates the growing importance and effectiveness of Human Resource Information Systems (HRIS) in the manufacturing organizations of South-East Rajasthan. The study provides strong empirical evidence that HRIS is widely perceived as a valuable tool by employees across different demographics and organizational backgrounds.

Based on the data analysis, it is evident that the majority of employees across various organizations in the South-East Region of Rajasthan find HRIS to be highly effective in managing HR functions. A significant percentage of both male and female employees, as well as those across different age groups, experience the benefits of HRIS in terms of efficiency, safety, ease of maintenance, flexibility, accuracy, and consistency in information management. The findings reveal that employees with more experience and higher educational qualifications are particularly inclined to recognize the value HRIS brings to HR operations.

The ANOVA results as shown in table no.2 indicate a significant difference between the effectiveness of HRIS across different manufacturing organizations in the region, as shown by the p-value being less than 0.05. This leads to the rejection of the null hypothesis (H0), supporting the alternative hypothesis (H1) that there is a significant difference in the effectiveness of HRIS usage. The Post-Hoc Bonferroni tests further highlight the specific organizations where these differences are most notable, emphasizing the varying levels of HRIS effectiveness across different companies.

Overall, the study confirms that HRIS plays a crucial role in enhancing HR operations in the manufacturing sector of South-East Rajasthan, contributing to improved efficiency, security, and performance consistency in managing employee information. The results suggest that continued adoption and optimization of HRIS will likely further improve organizational effectiveness in the region.

Discussion and Contributions

According to this study HRIS adoption has led to noticeable gains in efficiency, accuracy, flexibility, and security of HR functions, while also highlighting that employee demographics such as education and experience strongly influence perceptions of system effectiveness (Panda, A.K., & Verma, R.,2022).. More experienced and highly qualified employees tend to value HRIS more, recognizing its benefits in workload management and compliance. The results of ANOVA and Post-Hoc tests as shown in table no 2. and table no.3 respectively, further indicate that the effectiveness of HRIS varies across organizations, suggesting that factors like training, organizational culture, and system customization significantly shape outcomes. These insights reaffirm that HRIS success is not purely technology-driven but depends equally on human and organizational readiness. Beyond this, the study contributes to the literature by providing region-specific evidence from South-East Rajasthan, offering comparative insights across different HRIS platforms, and emphasizing employee perceptions as a critical determinant of HRIS success. Practically, the findings guide HR managers

and policymakers to focus on training, digital literacy, and employee self-efficacy in order to maximize benefits. Theoretically, the research strengthens socio-technical and strategic HRM perspectives by positioning HRIS as both a technological tool and a strategic enabler. Overall, the study bridges academic understanding and practical application, while also opening avenues for future research on the long-term impact of HRIS on employee satisfaction, organizational performance, and regional growth.

From a managerial perspective, these insights stress the importance of investing in structured training programs, fostering digital literacy across all employee groups, and promoting transparent communication during HRIS implementation to build trust and reduce resistance. HR managers must also ensure that HRIS platforms are customized to fit organizational needs rather than relying solely on generic solutions, as lack of alignment can reduce effectiveness. For policymakers, the study highlights the need to promote digital skill development at the regional level and support manufacturing organizations through incentives for HR technology adoption. Such initiatives can help bridge digital divides, encourage innovation, and strengthen overall workforce management in Rajasthan.

Overall, this study not only validates prior findings but also adds regional insights, showing that HRIS success is socio-technical in nature—dependent on both technology and human factors. By integrating these findings with the broader literature, the research provides practical guidance for HR managers and policymakers, while also opening new directions for examining the long-term strategic value of HRIS in organizational transformation and regional economic development.

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ARTIFICIAL INTELLIGENCE TO OVERCOME CHALLENGES IN ACHIEVING SUSTAINABLE GOALS IN INDIA

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Abstract

India faces severe, systemic impediments-including persistent poverty, hunger, significant healthcare deficits, gender inequality, and underdeveloped infrastructure—in its commitment to the United Nations Sustainable Development Goals (SDGs). This systematic review investigates the capacity of Artificial Intelligence (AI) to provide transformative, data-driven solutions capable of overcoming these deep-rooted barriers. By synthesizing recent academic literature, policy reports, and case studies, this review demonstrates that AI-powered tools, such as predictive analytics, automation, and machine learning, can dramatically enhance efficiency, scalability, and decision-making across vital development sectors. Specifically, we find that AI applications in areas such as targeted welfare distribution, precision agriculture, telemedicine, bias-mitigated recruitment, and smart urban infrastructure possess substantial potential to accelerate India's progress toward its SDG targets. The primary conclusion is that while AI offers immense opportunities for rapid development, its implementation must be strictly guided by ethical and equitable principles, supported by robust policy frameworks and intense cross-sector collaboration, to ensure growth is both sustainable and inclusive. This paper contributes a synthesized, thematic perspective on the practical and ethical role of AI in advancing India's SDG journey.

Keywords: Artificial Intelligence, Sustainable Development Goals, India, AI for Social Good, Systematic Review

Introduction

The United Nations Sustainable Development Goals (SDGs), established in 2015, constitute a comprehensive and ambitious global blueprint for addressing humanity's most pressing challenges, encompassing poverty, health, hunger, gender parity, and robust infrastructure. For a nation as vast, populous, and diverse as India, the pursuit of these 17 goals is profoundly complicated by stark regional disparities, resource constraints, and the relentless pace of urbanization. Traditional development methodologies have often proved inadequate in bridging these deep and complex gaps, creating an urgent necessity for integrating advanced technologies like Artificial Intelligence (AI) to significantly accelerate progress (NITI Aayog, 2021).

AI has rapidly emerged as an exceptionally powerful tool, possessing the capability to fundamentally transform how decisions are made, optimize resource allocation, and deliver highly scalable solutions across nearly all public and private sectors. AI-driven mechanisms—including predictive analytics, automation, and sophisticated machine learning algorithms—can substantially improve policy execution, enhance the efficiency of service delivery, and actively foster inclusive economic growth (Vinuesa et al., 2020). From the fight against poverty and the quest for agricultural efficiency to the necessity of improved healthcare access and the promotion of gender equality, AI offers data-driven insights and innovative applications that are poised to help India achieve its SDG targets more

effectively and efficiently.

This paper functions as a systematic review, critically examining the demonstrated and potential role of AI in overcoming the primary barriers to achieving the SDGs in India. It synthesizes evidence regarding how AI can strengthen governance, significantly enhance food security, revolutionize healthcare provision, actively promote gender inclusion, and accelerate industrial infrastructure development. Furthermore, this review critically addresses the necessary ethical considerations and essential policy frameworks required to ensure the deployment of AI is both equitable and sustainable. By responsibly harnessing AI-driven innovations, India can dramatically accelerate its path toward sustainable development, securing a more inclusive and technology-empowered future.

Foundations of Sustainable Development

The Concept of Sustainable Development

Sustainable development represents a model of progress that ensures economic and social advancement while simultaneously preserving the environment for both present and future needs. Sometimes referred to as ecological development, its core philosophy is the principle that essential natural resources—such as air, water, and arable land—are a shared inheritance belonging equally to all generations. If the current generation exploits these finite resources without proper consideration for their renewal and conservation, future generations will inevitably be deprived, leading to profound and unfair societal consequences. To maintain long-term environmental integrity and economic stability, nations must adopt robust sustainable policies that incentivize responsible resource utilization, accelerate the adoption of renewable energy sources, and mandate substantial waste reduction. A key strategy involves prioritizing the reuse and recycling of materials to minimize overall environmental impact. Governments, businesses, and private citizens must commit to a collective growth model where expansion does not come at the expense of irreversible environmental degradation, thereby ensuring a habitable planet for those who follow.

Key Elements and Principles

Achieving global sustainable development mandates a holistic approach that effectively balances economic prosperity, rigorous environmental protection, and fundamental social well-being. All nations, regardless of their developmental status, must adopt responsible, forward-looking policies. Fundamental principles essential for a sustainable future include:

- **Population and Resource Management:** Population growth must be managed to prevent unsustainable strain on finite natural resources. Resource exploitation needs to be carefully controlled to ensure a balance between current consumption and long-term conservation.
- **Ecological Prioritization:** The renovation and conservation of natural ecosystems must be prioritized to actively maintain ecological balance.
- **Social and Ethical Governance:** Promoting peace, tolerance, and responsible governance is crucial for stability. Universal moral and ethical values should be integrated into public policies to foster an equitable society.
- **Global Cooperation:** Strengthening international cooperation is essential for collectively addressing environmental and developmental challenges.

For developing nations like India, the pursuit of sustainable development presents distinctive and challenging hurdles. Critical recommendations for these nations include:

- **Efficient Resource Use:** Managing population growth through effective public awareness

and policies , and utilizing resources efficiently to meet public needs without causing excessive depletion.

- **Agricultural Sustainability:** Adopting sustainable agricultural practices to secure food supplies while simultaneously protecting biodiversity. It is vital to avoid unsustainable agricultural and technological systems that could harm the natural environment.
- **Human Capital Development:** Prioritizing complete literacy and quality education, as knowledge is universally recognized as a core driver of sustainability.

Methodology

This paper utilizes a systematic review methodology to critically synthesize existing literature, official case studies, and pertinent policy reports concerning the application of AI in achieving the SDGs within India. The comprehensive literature search was executed using major academic databases (including Scopus and Google Scholar) and institutional repositories (such as NITI Aayog, the World Bank, and various UN publications). Search terms were systematically combined and included: "Artificial Intelligence," "Sustainable Development Goals," "India," "AI for Social Good," and specific SDGs (e.g., "No Poverty," "Zero Hunger"). The inclusion criteria specifically prioritized peer-reviewed scholarly articles, official government reports, and rigorous case studies published within the highly relevant timeframe of 2018 to 2024 to ensure the findings are current and relevant. The extracted findings were then subjected to thematic analysis to pinpoint recurring key challenges, identify successful AI solutions, and determine critical success factors across various developmental sectors.

India's Progress on Sustainable Development Goals

India's journey toward achieving the SDGs by the 2030 deadline has been characterized by mixed performance and significant regional variation. The SDG India Index, regularly released by NITI Aayog (2023), serves as the official mechanism for evaluating states and union territories across all 17 goals.

Status and Disparities

While states like Kerala, Himachal Pradesh, and Tamil Nadu have consistently demonstrated strong performance, particularly excelling in areas such as healthcare, education, poverty alleviation, and hunger eradication, others continue to face immense difficulty. The Index uses a comprehensive scale of 0 to 100, where a score of 100 signifies full SDG achievement.

- **Front Runners (Highest Performers):** In the latest available index, Himachal Pradesh and Kerala are frequently leading (e.g., scores of 74 or 69 in different index iterations) , followed closely by strong performers like Tamil Nadu (72 or 66) and Chandigarh (70 or 68). States like Andhra Pradesh, Goa, and Gujarat typically score between 65–69, indicating strong progress.
- **Aspirants and Low Performers:** In stark contrast, states such as Bihar (52 or 49), Uttar Pradesh (54), and Jharkhand (55) remain trapped in the aspirant and low-performing categories. These scores, typically below 55, underscore the profound need for more targeted policy measures, improved governance, and greatly enhanced resource allocation to close the developmental chasm.

India's overall global ranking continues to be a point of concern, highlighting the essential need for innovative, scalable, and disruptive solutions—such as those offered by AI—to bridge these

persistent developmental gaps. NITI Aayog actively monitors and develops evidence-based policies to ensure state-level development agendas align with the UN's SDG framework. Achieving the 2030 targets requires a consolidated, multi-pronged strategy that involves governmental focus, private sector investment, and broad community-led efforts (NITI Aayog, 2023).

AI as a Solution to India's SDG Challenges

Artificial Intelligence has emerged as a profoundly transformative technology that is uniquely positioned to directly tackle India's most significant developmental challenges in achieving the SDGs. Leveraging data-driven insights, automation, and powerful predictive analytics, AI can effectively dismantle core development barriers. Key examples include global platforms like Google's TensorFlow and IBM Watson, alongside national initiatives such as NITI Aayog's 'AI for Social Good' and the 'IndiaAI' mission (IndiaAI, 2023; NITI Aayog, 2021).

Addressing Poverty (SDG 1: No Poverty)

The primary obstacle in poverty eradication efforts is the notoriously inefficient targeting and distribution of welfare schemes. AI offers a solution through predictive modeling and smart governance.

- **AI Solution:** Tools like IBM Watson and platforms under the IndiaAI mission can analyze vast socio-economic datasets to precisely identify poverty hotspots, guaranteeing that subsidies and welfare schemes reach the intended, most deserving beneficiaries (Dhar, 2020). For job creation, AI-powered platforms like Apna.co and LinkedIn AI use machine learning to accurately match job seekers from marginalized communities with relevant opportunities. Furthermore, AI-based fintech solutions (e.g., Paytm's credit algorithms and SatSure) utilize alternative data for credit scoring, thereby facilitating microloans and genuine financial inclusion for the underprivileged (World Bank, 2021).
- **Case Study:** The Indian government's successful integration of the Aadhaar digital identity system with AI-driven analytics for Direct Benefit Transfer (DBT) has been instrumental in reducing financial leakages and significantly improving the efficiency of fund distribution (Ministry of Electronics and IT, 2022).

Ensuring Food Security (SDG 2: Zero Hunger)

Food security is critically threatened by inefficiencies in the supply chain and the growing volatility caused by climate change.

- **AI Solution:** AI-based supply chain management tools, such as IBM Food Trust, minimize food wastage and optimize distribution by providing real-time tracking and accurate demand forecasting (Tripathi et al., 2022). For farmers, AI-driven precision agriculture platforms like AgNext and TensorFlow for Agriculture provide crucial insights on crop health, soil analysis, and weather patterns, enabling necessary climate adaptation and yield improvement. Furthermore, AI-based systems (e.g., KrishiAI) assess soil moisture levels to prescribe optimal irrigation schedules, conserving precious water resources while boosting crop health.
- **Case Study:** The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) utilized an AI-based climate forecasting model to provide timely advice to farmers, resulting in an estimated 30% reduction in crop losses.

Improving Healthcare Access (SDG 3: Good Health and Well-being)

A major challenge is the profound disparity in healthcare access between India's urban and rural populations.

- **AI Solution:** AI-powered telemedicine platforms (e.g., Apollo Telemedicine and Ada Health) bridge the distance gap by offering remote consultations and automated diagnostics to underserved populations (Wahl et al., 2018). AI-driven predictive analytics from systems like Google's DeepMind or Microsoft Healthcare AI analyze health trends to proactively detect potential disease outbreaks, enabling early, life-saving interventions and reducing the strain on hospitals. Furthermore, personalized preventive healthcare is increasingly supported by AI-enabled wearable devices (e.g., GOQii and Fitbit) that track vital statistics and actively encourage proactive wellness management.
- **Case Study:** A NITI Aayog-led AI healthcare pilot, in collaboration with Apollo Hospitals, demonstrated a significant 50% improvement in the early-stage detection of diabetic retinopathy, directly enhancing health outcomes in rural areas (NITI Aayog, 2021).

Promoting Gender Equality (SDG 5: Gender Equality)

The consistently low female labor force participation rate in India is exacerbated by pervasive gender biases in hiring and limited access to professional skill development.

- **AI Solution:** AI-powered EdTech platforms (e.g., Coursera and Byju's) deliver personalized online learning programs, enabling women to flexibly upskill and successfully re-enter the workforce (UNDP, 2022). To combat hiring bias, AI-based recruitment tools (e.g., Pymetrics and HireVue) use algorithms specifically designed to focus on genuine skills and qualifications, thereby circumventing demographic discrimination. For personal safety, AI-driven applications like MySafetipin and Nirbhaya AI utilize real-time data and predictive policing models to monitor high-risk zones, substantially enhancing security for women.
- **Case Study:** The Delhi Police have publicly reported that their use of an AI-based facial recognition system has improved the efficiency of criminal identification, a measure that contributes directly to enhanced public safety, particularly for women (The Indian Express, 2023).

Enhancing Infrastructure and Innovation (SDG 9: Industry, Innovation, and Infrastructure)

Industrial growth is often hampered by slow infrastructure development and insufficient investment in research and development (R&D). AI provides optimization for infrastructure management and urban planning.

- **AI Solution:** Initiatives like Google AI for Smart Cities and IBM's Smart Infrastructure solutions analyze complex traffic patterns, optimize public transit schedules, and fundamentally improve overall urban livability (Yigitcanlar et al., 2020). In the manufacturing sector, AI-driven robotics and sophisticated process automation (e.g., Siemens MindSphere) significantly boost operational efficiency and help attract crucial foreign investment. Furthermore, advanced AI research platforms, such as DeepMind's AlphaFold, are rapidly accelerating scientific discovery, potentially reducing R&D timelines and associated costs.
- **Case Study:** The Bengaluru Smart City project successfully integrated AI for dynamic traffic management and continuous air quality monitoring, leading to a documented reduction in

road congestion and measurable improvements in urban service efficiency (Bengaluru Smart City Ltd., 2022).

Conclusion and Future Directions

This systematic review unequivocally confirms that Artificial Intelligence holds profound and significant potential to address India's complex, multifaceted challenges in achieving the Sustainable Development Goals. By capably processing vast quantities of data, automating historically complex processes, and enabling predictive insights, AI offers an unprecedented means to accelerate progress across vital areas, including poverty reduction, food security, healthcare access, gender equality, and infrastructure development. The empirical evidence from various national and global case studies demonstrates that the strategic integration of AI into governance and public service delivery yields tangible improvements in efficiency, inclusivity, and long-term sustainability.

However, realizing AI's full potential for genuine social good necessitates a carefully planned and responsible approach. Ethical considerations—specifically concerning data privacy, the mitigation of algorithmic bias, and the development of widespread digital literacy—must remain at the forefront of every AI deployment strategy. It is absolutely imperative to strengthen policy frameworks, actively foster multi-stakeholder collaboration among government, industry, and academia, and guarantee equitable access to this technology for all citizens. By embracing AI-powered solutions with responsibility and a focus on inclusivity, India can not only effectively overcome its current development hurdles but also establish itself as a crucial global leader in harnessing technology for sustainable and equitable progress.

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TURN THE SHIP AROUND!

L. David Marquet
Penguin Random House, UK

Turn the Ship Around! is a powerful and practice-oriented leadership book that challenges conventional notions of authority, control, and decision-making. Drawing on his experience as commander of the USS Santa Fe, Captain L. David Marquet narrates how a struggling nuclear submarine was transformed into one of the highest-performing units in the U.S. Navy. The book's enduring value lies in its clear demonstration that exceptional performance is achieved not by tightening control, but by creating leaders at every level of the organization.

At the outset, Marquet candidly acknowledges his own leadership failure when he attempted to lead through traditional command-and-control methods. Despite having a highly trained crew, performance suffered because people were conditioned to wait for orders rather than think independently. This realization became the turning point for a radical leadership shift—moving authority to the point where information resides. Instead of issuing instructions, Marquet introduced mechanisms that compelled officers and sailors to think, assess risks, and take responsibility for their actions.

One of the most influential practices described is the use of “intent-based leadership,” where individuals state what they intend to do rather than asking for permission. This simple linguistic change had a profound effect: it transferred ownership of decisions while still preserving accountability and safety. Over time, this approach replaced passive compliance with active engagement. The narrative shows that when people are trusted, they rise to the occasion, becoming more alert, thoughtful, and invested in outcomes.

A central insight of the book is that empowerment without competence is dangerous. Marquet therefore placed strong emphasis on building technical mastery and professional confidence. Mistakes were not treated as failures to be punished, but as opportunities to learn and strengthen systems. By encouraging deliberate action, reflection, and continuous learning, the crew developed deep competence, enabling them to make sound decisions even under pressure. This learning-oriented culture reduced repeat errors and increased operational reliability.

Equally important is the role of clarity. Rather than relying on rigid procedures and constant supervision, Marquet articulated clear guiding principles that helped sailors understand not just what to do, but why they were doing it. These principles acted as decision filters in complex and ambiguous situations, such as navigating congested international waters or managing high-risk operations. With shared understanding and clear purpose, the crew could act independently while remaining aligned with the organization's mission.

The effectiveness of this leadership transformation is demonstrated through tangible outcomes. Operational readiness improved, inspection results strengthened, retention increased, and morale rose significantly. Data and examples presented later in the book show measurable gains in qualifications, safety, and performance. Importantly, the culture of excellence endured even after

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Marquet left command, reinforcing his argument that true leadership success is measured by what continues in the leader's absence.

In its concluding reflections, the book distinguishes between empowerment and emancipation. Empowerment still implies permission granted by those at the top, whereas emancipation redesigns the system so that responsibility, authority, and accountability are inherently distributed. Marquet urges leaders to resist blind obedience, encourage questioning, and dismantle structures that suppress initiative. Leadership, he argues, is less about directing people and more about designing environments where people can think and lead.

Written in a clear, narrative-driven style, Turn the Ship Around! seamlessly connects military experience with universal leadership challenges. Its lessons are highly relevant to businesses, educational institutions, and public organizations grappling with disengagement, over-centralization, and slow decision-making. The book convincingly shows that when leaders focus on control, competence, and clarity, they unlock human potential at scale.

Overall, Turn the Ship Around! is an insightful, practical, and inspiring work that redefines leadership for complex, modern organizations. It offers a compelling blueprint for building resilient systems, empowered teams, and a lasting culture of leadership at every level.

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PROMPT ENGINEERING

Eric C. Richardson
BPB Publications
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With the increasing use of Artificial Intelligence, the need to effectively communicate with it is becoming necessary. Prompt engineering has thus emerged for communicating with increasingly sophisticated AI, evolving from early, rigid command structures to a specialized discipline with advanced techniques for guiding large language models (LLMs).

Prompt Engineering is the art and science of constructing precise, effective inputs or prompts to guide LLMs such as ChatGPT, Gemini, and Claude toward generating the most accurate and useful outputs. It is not just about asking a question but involves understanding the underlying architecture of AI to structure instructions that minimize ambiguities and maximize creativity or technical accuracy.

Eric C. Richardson, the author, has experience of over twenty five years in the high technology industry. He specializes in Enterprise & Business Technology and Leadership and has worked for companies such as Microsoft and Nabisco as well as several small startups. He has a blend of Computer Science and Management as his education background, giving him the precise expertise to provide an understanding of the procedures to harness the power of atificial intelligence.

The book is structured into 19 comprehensive chapters that move from foundational theory to advanced practical application.

The first chapter gives a concise introduction to AI/ML history, basic concepts of the different methods used to process data for model training including, supervised, unsupervised learning, neural networks, and why modern generative models behave the way they do. The evolving transformative technologies of the domain are introduced in a structured manner. It is useful for readers from non-ML backgrounds, and following a practical rather than mathematical approach helps instructors and practitioners to get real context.

In the next chapter, Evolution of Machine Learning, the background technologies that converged to lead to modern AI and ML are dealt with. The advances in statistical analysis, on which ML is built are covered. Further discussed are, neural networks and their relation with human biology followed by the fruition of deep learning.

Chapter 3 explores the evolution of generative models. The author has started with the definitions and types of models, moving on to the historical development of generative models, and then introduced the generative adversarial networks or GANs. The chapter conveys that the advent of advanced mathematical frameworks and computing methods catalyzed the development of generative models.

Rise of GPT and Transformer-based Models, is the next chapter. It reviews the evolution and importance of transformer based models, particularly in prompt engineering. It analyses the key phases from the Input to the tokenization process to the way data works through Transform Encoder and Transform Decoder, thus creating a base for exploring the realm of prompt engineering.

Chapter 5 is about Transformer-based Models in Prompt Engineering. It covers how AI interacts with Transformers, and how critical the transformers are in design of prompts. Prompt Engineering methodologies are discussed and transformer based models are examined by comparing them with classic prompt engineering models. The chapter provides a comprehensive study of role of transformer based models in prompt engineering while discussing some useful case studies.

An exhaustive analysis of transformer architecture is done in Chapter 6. It has historical and theoretical take on the evolution of transformer architecture and GPT models, and some applications such as NLP, creative writing & art, and customer service automation are discussed. Understanding the mechanisms of the transformative models helps readers appreciate how prompts influence model outputs.

Chapter 7 introduces the prompt ecosystem, including users, AI models, tools, and workflows. It explains how prompts act as the interface between humans and AI systems and highlights the importance of clear instructions, context, and task definition. It explores the elements that constitute a prompt, and describes structures of prompts, dividing them into informative, interrogative, and directive categories. This chapter explains the foundations of the prompt environment and demonstrates its important role in AI and ML discussing both, its technical and creative aspects.

In Prompt Types In-depth, chapter 8, the author explores different types of prompts, including Open-ended prompts, Close-ended prompts, Exploratory prompts, Multi-modal prompts, Contextual prompts, Procedural prompts, and Adaptive prompts while addressing the prompts' creative potential, precision, clarity, discovery, diversity of data inputs, enhanced accuracy of responses, sequencing and dynamic interactions. The author discusses when to use which prompt types and also the challenges and considerations of these prompts. Examples are provided to effectively demonstrate how each prompt type influences AI responses and how prompt selection depends on the desired output.

The next chapter, Understanding Tokens, explains how words and sentences are broken into tokens and how token limits affect prompt design, context length, and AI responses. Some examples of tokens have been reviewed and critical guidelines to be considered when creating custom prompts have been discussed. The author provides comprehensive insights into token operations and their limitations.

Chapter 10, Efficiency in Prompt Engineering, thoroughly inspects why creation of efficient prompts is necessary for AI and ML application and discusses strategies to create efficient prompts that produce accurate responses with minimal computational cost. The author builds on the fundamentals of previous chapters to enable the readers to consider the system architecture of AI systems into account when designing prompts. The chapter includes guidelines for structuring prompts, reducing ambiguity, and maximizing clarity.

In Critical Role of Syntax, chapter 11, Richardson explains how syntax, punctuation, and formatting influence the performance of prompts. Typical syntactical errors and how to prevent committing these errors has been aptly described. The chapter discusses conversational model and language techniques to enable users to make the most of model's efficacy. Structured instructions, lists, and well-organized prompts can significantly improve the quality of AI responses, the author conveys.

The author provides an all-inclusive guide to developing effective AI system prompts in Techniques

and Strategies for Prompt Engineering. He has commenced with best practices in prompt crafting, this is followed by a description of advanced prompt engineering techniques and how few-shot learning and zero-shot learning, the key innovations in AI, particularly in the use of LLMs enable AI models to process prompts without requiring extensive prior examples. The chapter also addresses the issues of prompt tuning and optimization methods for enhanced prompt effectiveness. Real world examples depict the practical applications of these techniques.

The thirteenth chapter is on Challenges of Quality Prompts. In this, the author explains the nitty-gritties of creating effective prompts and the potential limitations that one might come across in the process. Refinement techniques and the approach to gauge the success of the AI model as well as the prompt are then discussed.

In tools and platforms for prompt engineering, various tools and frameworks used for prompt engineering are explored. The chapter discusses AI development environments, prompts testing frameworks, and interfaces that support experimentation with LLMs. The last section of the chapter caters to the process of integration of prompt engineering tools into current workflows.

Chapter 15 is on Ethics in Artificial Intelligence. In this the author discusses the significant ethical issues that come up during the development of AI/ML techniques. He brings about different facets of ethics with AI, including how to recognize bias, how to mitigate bias, privacy, and impact on society. The important dimension of regulatory and governance structures to monitor AI development and usage has also been effectively touched upon by the author.

Finances of Prompts and Cost Management as the name indicates, examines the financials involved in the design and application of prompts in AI systems. The author discusses how prompt designs affect their processing costs in AI, methods that help control and minimize these costs with the help of case studies.

In Future Directions and challenges of AI and ML, the author provides a glimpse of the future of the rapidly advancing technology in AI. He conveys that prompt engineering is set to evolve rapidly. The recent challenges and developments in the AI/ML domains and their integration with other parallel technologies such as IoT and quantum computing are also discussed.

Chapter 18, Legal Framework for Artificial Intelligence brings to the fore, and deeply examines legal aspects such as data protection, copyright issues, and regulatory frameworks governing AI technologies. The chapter emphasizes the need for compliance with emerging AI regulations. A comprehensive overview of the current national and international regulations that govern the AI domain, IPR and Patent is provided.

The last chapter is titled Practical Examples of Chatbots and AI Systems. It covers some of the latest chatbots and AI systems that are visible in the conversational AI domain. Discussion includes, chatGPT, and Gemini. The author takes the reader from simple to complex prompts with ready to use examples and guides the reader to create a simple chatbot within chatGPT. At the end of the chapter the user gets the satisfaction of having learned and practiced an important upcoming field of the AI/ML field.

Richardson sets the stage by defining what prompt engineering actually is, a bridge between human intent and machine response. The key insight offered here is that AI isn't a mind-reader, it is a pattern

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matcher. The black box of LLMs is deciphered, and the importance of precision in language is effectively established. He provides a broad overview of prompt engineering, beginning with foundational AI concepts and progressing toward advanced prompting techniques and real-world applications. The book is particularly valuable for beginners and practitioners who want to understand both the technical background of LLMs and the practical skills needed to interact effectively with them. By combining theoretical explanations, practical strategies, and discussions on ethics, legal issues, and cost management, the book offers a balanced and holistic perspective on the emerging field of prompt engineering.

Vision:

To be globally responsive and socially conscious, committed to innovation and creativity by developing and disseminating knowledge and practice for learning and resource use optimization. And to emerge as an organization with an optimal blend of value based growth and future preparedness, leading to prosperity of the society and nation at large.

Mission:

"We stand committed with a spirit of enterprise, will to succeed, zeal to grow and objective-achievement orientation through value based education for community at large by creating an environment of intellectual stimulus, scientific orientation and social responsibility".

Goals:

- To develop a comprehensive worldview in the students with respect for all forms of life and foster an environment where people work together and are motivated to succeed.
- To inculcate the zeal for individual excellence and yet reinforce the importance of team work.
- To support a proper harnessing of latent talents and to encourage the students to take initiatives.
- To provide an environment, in which the students and the faculty are driven by the spirit of enquiry in their quest for knowledge.
- To Enhance logical, creative and analytical skills.

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