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INTERNATIONAL JOURNAL OF BUSINESS FROM M. P. BIRLA INSTITUTE OF MANAGEMENT
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Phone: 4277 2000

E-mail: dharana@mpbim.com

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Director
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Block-FA, Sector-III, Salt Lake City, Kolkata-700097
Mail: bvbhavan@gmail.com

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Editorial

Dharana, an International Journal of Business from M P Birla Institute of Management, dedicated to fostering scholarly dialogue on management, economics, and social transformation, continues to uphold its legacy of publishing thought-provoking research and insightful perspectives. With a commitment to academic rigor and practical relevance, Dharana serves as a platform for both distinguished scholars and emerging voices to contribute to the evolving landscape of business and society.

The current issue of Dharana presents a diverse array of research articles that address pressing contemporary challenges and opportunities. These include an in-depth examination of the conditional process of viral marketing, exploring how message antecedents, brand mediators, and consumer engagement collectively influence purchase intention and word-of-mouth. Another significant contribution delves into the valuation and trading of carbon credits, proposing a fintech driven framework for sustainable markets, an area of growing importance in the global pursuit of environmental responsibility. Further, readers will find insightful analyses on the factors influencing poverty reduction in India, behavioural biases in personal finance management among undergraduate students, the effect of yoga on trigunas among management educators and senior citizens, and the implications of India's DPDP Act 2023 on stakeholder theory, power, responsibility, and compliance.

The Student Corner in this issue highlights the role of awareness in advancing financial literacy and inclusion among young graduates, and the impact of age diversity on team collaboration and performance in multi-generational workplaces. It also reflects how MBA education, with its emphasis on analytical thinking and interdisciplinary learning, can make an impactful contribution to the field of research by nurturing inquiry-driven minds and evidence-based problem solvers. The invited articles section features two compelling works: one advocating for effective intellectual property protection for India's traditional wisdom, and another exploring the Mahabharata as a management guide for millennials, a unique blend of ancient wisdom and modern leadership.

The book reviews offer critical perspectives on "Right Kind of Wrong" by Amy Edmondson, which investigates the science of failing well, and "The Difficulty of Being Good" by Gurcharan Das, which examines the nuanced art of dharma in contemporary life.

The articles featured in this issue are not only academically robust but also deeply relevant to the current socio-economic and technological milieu. They address themes that are central to the future of business and society digital transformation, sustainability, behavioural economics, workplace diversity, and the integration of traditional wisdom with modern practices. By engaging with these topics, Dharana reaffirms its position as a vital forum for advancing knowledge and shaping informed discourse on the most consequential issues of our time.

From Chairman's Desk

Dharana, an International Journal of Business of M P Birla Institute of Management, continues to exemplify the institution's commitment to rigorous scholarship, ethical leadership, and socially responsive management education. As the official research voice of the Institute, the journal provides a discerning platform for academics, practitioners, and students to engage with ideas that shape contemporary business practice and public policy. Each new issue is both a renewal of this legacy and an invitation to reflect more deeply on the responsibilities of business in a rapidly changing world.

This edition of Dharana is particularly noteworthy for the breadth and relevance of its themes. The research articles traverse critical domains such as viral marketing and consumer engagement, fintech-enabled carbon credit markets, pathways to poverty reduction in India, behavioural biases in personal finance, the impact of yoga on personality traits among educators and senior citizens, and the evolving stakeholder landscape under India's Digital Personal Data Protection (DPDP) Act 2023. Complementing these are student articles that explore financial literacy and inclusion among young graduates, and the influence of age diversity on collaboration and performance in multi-generational workplaces. The invited articles on intellectual property protection for India's traditional wisdom and the Mahabharata as a management guide for millennials, along with reviews of important works on failure, ethics, and dharma, add further depth and perspective to this issue.

The themes covered in this edition are not only academically robust but also acutely aligned with the contemporary realities confronting business and society. The focus on carbon markets, digital privacy, financial inclusion, and behavioural decision-making underscores the journal's engagement with sustainability, technology, and social equity. Equally, the integration of yoga, Indian knowledge systems, and classical texts such as the Mahabharata into the discourse on management reflects an inclusive vision of scholarship that values indigenous wisdom alongside global best practices. By encouraging such interdisciplinary inquiry, Dharana reinforces the role of research as a catalyst for responsible innovation and long-term value creation.

At M P Birla Institute of Management, there is a continued emphasis on nurturing a research culture that aspires to insight, integrity, and impact. The contributions in this issue exemplify how faculty, students, and invited experts can together illuminate complex challenges and propose pathways that are both analytically sound and ethically grounded. It is especially encouraging to see MBA students embracing research not as a peripheral requirement, but as a central pathway for advancing knowledge, informing practice, and shaping policy discourse in the field of management.

Gratitude is due to all authors, reviewers, and the editorial team whose sustained efforts make this publication possible. Their dedication ensures that Dharana remains a trusted forum for meaningful scholarship and reflective practice. As this issue reaches its readers, there is confidence that the ideas contained within will not only inform and inspire, but also encourage deeper engagement with the pressing questions of our times.

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Examining the Conditional Process of Viral Marketing: The Role of Message Antecedents, Brand Mediators, and Consumer Engagement on Purchase Intention and Word-of-Mouth

S. Sathyanarayana[1*] and Pallavi R.[2]

Abstract

Aim: This study investigates how viral marketing message factors influence purchase intention and word-of-mouth, examining the mediating roles of brand-related outcomes and the moderating effect of consumer engagement.

Methodology: Data were collected from 504 respondents using a pre-tested survey. CFA was conducted to validate the measurement model, followed by SEM to test hypothesized relationships. PROCESS Macro Model 8 was applied to examine the moderated mediation effects of consumer engagement.

Key Findings: All proposed hypotheses were supported. Message antecedents (emotional appeal, message valence, storytelling quality, and novelty & creativity) positively influenced purchase intention and word-of-mouth. Brand-related mediators (engaging participants, brand awareness, brand image) significantly mediated these relationships. Consumer engagement moderated both direct and indirect effects, strengthening the impact of antecedents on outcomes.

Managerial Implications: Marketers should design viral campaigns that combine emotional appeal, message valence, storytelling, and creativity to maximize purchase intention and word-of-mouth. Focusing on building brand awareness, engaging participants, and enhancing brand image amplifies campaign effectiveness. Encouraging higher consumer engagement through interactive content and personalized experiences further strengthens both direct and mediated effects, making campaigns more impactful and shareable.

Originality and Contributions: This study integrates multiple viral marketing antecedents with brand-related mediators and consumer engagement in a conditional-process (Model 8) framework,

S. Sathyanarayana[1]* and Pallavi R.[2]

[1]Professor, M P Birla Institute of Management, Race Course Road, Bengaluru- 560001, India; principal@mpbim.com; ORCID ID: https://orcid.org/0000-0002-1552-9762

[2]Assistant Professor, M P Birla Institute of Management, Race Course Road, Bengaluru- 560001, India; pallavi.ramesh.32@gmail.com; ORCID ID: https://orcid.org/0009-0005-1769-535X

providing a comprehensive understanding of purchase intention and word-of-mouth. It offers both theoretical and practical insights by demonstrating how engagement amplifies the effectiveness of creative and emotionally appealing messages.

Keywords: Viral marketing. Social Media platforms, Novelty and Creativity, Message Valence, e-Word-of-Mouth, Brand Awareness

JEL Classification: M31, M37, D83, C38

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Introduction

Viral marketing in 2025 has evolved into a sophisticated strategy that blends creativity, technology, and consumer psychology to achieve unprecedented reach and engagement. Brands are increasingly leveraging short-form video content, particularly on platforms like TikTok, to capture the fleeting attention of audiences. Studies indicate that such content is more likely to go viral due to its concise and engaging nature (Singh, 2025). Moreover, the integration of artificial intelligence in content creation has enabled brands to produce highly personalized and relevant campaigns, enhancing their chances of virality (Theodorakopoulos, 2025). Consumer behaviour plays a pivotal role in the success of viral marketing campaigns. Research highlights that Generation Z consumers are significantly influenced by viral marketing messages, which can shape their attitudes and purchasing intentions (Singh, 2025). Additionally, the Fear of Missing Out (FOMO) has been identified as a critical factor that drives consumer engagement and decision-making in the context of viral campaigns (Qosidah et al., 2025). However, the landscape is not without its challenges. A study by Sprout Social (2025) reveals that a third of consumers find it embarrassing when brands jump on viral trends without genuine relevance, indicating the importance of authenticity in viral marketing. Furthermore, the saturation of content has led to a phenomenon termed the "sea of beige," where platforms' algorithms promote uniform content, potentially stifling creativity (Theodorakopoulos, 2025). Therefore, while viral marketing in 2025 offers immense opportunities for brand visibility and engagement, it requires a nuanced approach that combines innovative content creation, understanding of consumer psychology, and a commitment to authenticity to navigate the complexities of the digital landscape (Sathyanarayana S, 2024).

In the rapidly evolving digital landscape of 2025, viral marketing has emerged as a potent strategy for influencing consumer behaviour and driving purchase intentions. Despite its widespread adoption, the intricate mechanisms through which viral marketing impacts consumer decisions remain underexplored. Existing literature indicates that emotional responses, such as anxiety and love, can significantly enhance the virality of content, thereby influencing consumer engagement

and subsequent purchase intentions (Yu, 2025; Amra & Elma, 2025). Furthermore, consumer behaviour has been identified as a critical mediating factor in this relationship, with studies highlighting its role in translating viral marketing exposure into actual purchase decisions (Fitriani et al., 2025; Bhowmik & Pandit, 2025). Additionally, brand awareness has been recognized as a significant antecedent that, when combined with viral marketing efforts, can further amplify purchase intentions (Bhowmik & Pandit, 2025). However, the interplay between these variables' emotional responses, consumer behaviour, and brand awareness remains insufficiently understood. This gap in the literature necessitates a comprehensive investigation to delineate the pathways through which viral marketing influences consumer purchase intentions, accounting for the mediating roles of emotional responses, consumer behaviour, and brand awareness. Such an understanding is crucial for marketers aiming to design effective viral campaigns that resonate with consumers and drive purchasing decisions.

The importance of this study lies in its focus on understanding how viral marketing influences consumer purchase intentions in the contemporary digital landscape, where social media and online platforms dominate consumer interactions. Despite the widespread use of viral marketing, the mechanisms through which it affects consumer behaviour, including the mediating role of consumer behaviour and emotional responses, remain underexplored. Emotional responses, such as anxiety, excitement, or love, have been shown to significantly affect content virality and, consequently, consumer engagement and purchase decisions (Yu, 2025; Amra & Elma, 2025). Moreover, consumer behaviour mediates the relationship between exposure to viral marketing and actual purchase intentions, highlighting its critical role in translating marketing efforts into measurable outcomes (Fitriani et al., 2025; Bhowmik & Pandit, 2025). Brand awareness, as an antecedent, further strengthens the impact of viral marketing campaigns, suggesting that the combination of strategic messaging and brand recognition can significantly amplify purchase intentions (Bhowmik & Pandit, 2025). Given these gaps, this study aims to provide a comprehensive framework to understand the pathways through which viral marketing affects consumer behaviour and purchase decisions.

The paper is structured as follows: Part 2 presents a detailed literature review covering viral marketing, consumer behaviour, emotional responses, and brand awareness to establish the theoretical foundation. Part 3 outlines the research methodology, including the design, sampling, and analytical procedures. Part 4 discusses the results and their implications for both theory and practice. Finally, Part 5 concludes the study with key insights, practical recommendations for marketers, and directions for future research.

Literature Review and Hypotheses Development

The theoretical foundation of this study on viral marketing integrates multiple perspectives to explain how and why viral content influences consumer behaviour and purchase intentions. The Diffusion of Innovations Theory (Rogers, 2003) provides insights into how viral marketing content spreads rapidly among users through

early adopters and opinion leaders, highlighting the role of social networks in content dissemination. Complementing this, Social Exchange Theory (Homans, 1958; Blau, 1964) and the Theory of Planned Behaviour (Ajzen, 1991) emphasize the role of perceived benefits, social norms, and behavioural intentions in motivating consumers to engage with and share viral content. The Uses and Gratifications Theory (Katz et al., 1974) further explains that consumers actively seek out content that fulfills needs for entertainment, social connection, or self-expression, which can enhance engagement with viral campaigns. Additionally, Emotional Contagion Theory (Hatfield et al., 1994) emphasises the importance of emotional appeals such as excitement, awe, or love in driving virality and influencing consumer purchase intentions, as supported by empirical studies highlighting the role of emotions in content sharing (Yu, 2025; Amra & Elma, 2025). Finally, research on consumer behaviour as a mediating factor confirms that the interplay between viral marketing, emotional engagement, and brand awareness significantly affects purchase decisions (Fitriani et al., 2025; Bhowmik & Pandit, 2025). Together, these theories provide a comprehensive framework for understanding the mechanisms through which viral marketing campaigns impact consumer behaviour and purchase intentions.

Emotional Appeal with Brand Awareness, Brand Image, and Audience Involvement

Emotional appeal plays a pivotal role in shaping consumer perceptions and responses to marketing content, particularly in the context of viral marketing. Research indicates that emotionally engaging content, whether evoking excitement, love, humour, or awe, significantly enhances consumers' attention, retention, and sharing behaviours (Yu, 2025; Amra & Elma, 2025). Emotional appeal is theorised to positively influence brand awareness, as content that resonates emotionally is more likely to be remembered and recognized by consumers, thereby increasing the likelihood of brand recall and visibility (Bhowmik & Pandit, 2025). Similarly, emotional appeal is expected to impact brand image, as repeated exposure to content that triggers positive emotions contributes to favorable associations with the brand, enhancing its perceived credibility, trustworthiness, and overall reputation (Fitriani et al., 2025). Furthermore, audience involvement serves as a crucial mediator in the relationship between emotional appeal and brand-related outcomes. Highly engaging and emotionally appealing content encourages consumers to interact, comment, and share, reflecting a deeper level of cognitive and affective engagement with the brand (Yu, 2025; Amra & Elma, 2025). This interaction not only strengthens the consumer-brand relationship but also reinforces both brand awareness and brand image through social validation and peer influence. Based on these theoretical and empirical arguments, it is anticipated that emotional appeal positively influences brand awareness, brand image, and audience involvement, thereby establishing the groundwork for empirical testing. Based on the above arguments, the following hypotheses have been proposed to be tested in this study:

$H_{1, 2, 3}$: Emotional appeal shares a significant positive relationship with increased brand awareness of the content, creates brand image and attitude, and audience involvement.

Message Valance, Brand Awareness, Brand Image, and Attitude

Message valence, referring to the positive or negative framing of marketing messages, has been shown to play a critical role in shaping consumer cognition, affect, and behaviour in digital marketing contexts, particularly within viral campaigns. Positive message valence tends to generate favorable emotional responses, which enhance brand awareness by increasing the likelihood that consumers will notice, remember, and recall brand-related content (Bhowmik & Pandit, 2025; Fitriani et al., 2025). Conversely, negatively valenced messages may evoke stronger emotional reactions such as anger or fear, which can increase attention but may also create resistance or negative associations if not carefully aligned with brand values (Yu, 2025). Beyond awareness, brand image is significantly influenced by message valence because consistent exposure to positively framed messages strengthens consumers' perceptions of the brand's credibility, quality, and trustworthiness, whereas negative framing may erode perceived brand equity or alter consumer attitudes (Amra & Elma, 2025; Fitriani et al., 2025). Importantly, audience involvement - the degree to which consumers actively engage with content - moderates these effects, as highly involved consumers process message valence more deeply, integrating emotional cues into their cognitive evaluation of the brand (Tabrizi & Narmina, 2024). This interplay between message valence, consumer engagement, and brand perception underscores the need for marketers to carefully design viral content that leverages positive emotional framing while ensuring alignment with brand identity to maximize both brand awareness and a favorable brand image. Consequently, understanding these relationships is crucial for predicting consumer responses and designing effective viral marketing campaigns that not only capture attention but also foster enduring brand loyalty. Consequently, examining the relationships between message valence, brand awareness, and brand image provides valuable insights into designing effective viral marketing campaigns that maximise favourable brand outcomes. Based on the above arguments, the researchers have posited the following hypotheses to be tested:

$H_{4,5}$: Message Valance shares a significant positive relationship with increased brand awareness of the content and creates brand image and attitude.

Storytelling Quality, Engagement, and Brand Image in Viral Marketing

Storytelling quality has emerged as a critical determinant of consumer engagement in digital marketing contexts. Well-structured, coherent, and emotionally resonant narratives are more likely to capture audience attention, foster interaction, and stimulate participation (Cai, 2025; Pulizzi, 2012). Research suggests that narratives enable consumers to relate to the content, enhancing cognitive and emotional involvement, which subsequently drives engagement behaviours such as liking, sharing, and commenting (Escalas, 2004; Fog et al., 2005). Engagement, in turn, plays a pivotal role in shaping brand perceptions. Highly engaging storytelling enhances consumers' brand awareness and strengthens brand image by creating memorable experiences and fostering positive associations (Lundqvist et al., 2013; Brechman et al., 2015). Moreover, interactive and participatory campaigns, grounded in

compelling narratives, have been shown to cultivate deeper affective connections with the brand, influencing brand loyalty and advocacy (Hollebeek, 2011; Kumar & Pansari, 2016). Despite these insights, limited studies have simultaneously examined the mediating role of engagement between storytelling quality and brand image in viral marketing campaigns. Addressing this gap can provide actionable strategies for marketers to design narratives that maximize both engagement and brand equity. Based on the above literature review, the following hypothesis is proposed:

$H_{6,7}$**:** Storytelling quality positively influences audience engagement and participation, and enhances brand image.

Novelty and Creativity as a Combined Construct in Brand Awareness and Brand Image

Novelty and creativity, when considered together, represent a critical driver of consumer engagement and brand outcomes in marketing communications. Content that is both novel and creative captures consumer attention by offering unique, unexpected, and imaginative elements, thereby stimulating curiosity and cognitive engagement (Berlyne, 1960; Silvia, 2006). Such content enhances consumers' perception of the brand as innovative and distinctive, strengthening brand image and fostering positive associations (Hagtvedt & Brasel, 2017; Platt, 2021). Research demonstrates that campaigns incorporating novel and creative elements are more likely to increase brand recall, recognition, and awareness, as consumers are more motivated to share and discuss distinctive content within their social networks (Sawhney, Verona, & Prandelli, 2005). Moreover, novelty and creativity contribute to affective engagement, which in turn enhances consumers' evaluative judgments about the brand, reinforcing loyalty and favourable brand perceptions (Mumford, Scott, Gaddis, & Strange, 2002; Pulizzi, 2012). Despite recognition of these benefits, limited studies have simultaneously explored the impact of combined novelty and creativity on both brand awareness and brand image in digital and viral marketing contexts, highlighting a gap that warrants investigation. Based on this review, the following hypothesis is proposed:

$H_{8,9}$**:** Novelty and creativity positively influence brand awareness and brand image.

Brand Awareness and its Influence on Brand Image

Brand awareness plays a foundational role in shaping brand image, as it determines whether consumers can recognize or recall a brand in relevant contexts. High levels of brand awareness facilitate familiarity, trust, and positive associations, which are critical components of a strong brand image (Keller, 1993; Aaker, 1996). Research indicates that consumers who are more aware of a brand are better able to process its attributes, benefits, and values, leading to more favourable perceptions and stronger brand positioning (Rossiter & Percy, 1987; Hoyer & Brown, 1990). In digital and viral marketing contexts, awareness is amplified through repeated exposure, social sharing, and interactive content, further reinforcing cognitive and affective evaluations of the brand (Kumar & Pansari, 2016; Brechman et al., 2015). Empirical studies have also demonstrated that brand awareness serves as a precursor to brand equity, influencing not only image but also loyalty, engagement, and advocacy behaviours

(Lundqvist et al., 2013; Hoeffler & Keller, 2002). Despite the established relationship, few studies have examined the direct linkage between awareness generated through viral content and its impact on brand image, highlighting a critical area for further investigation. Based on this review, the following hypothesis is proposed:

H_{10}**:** Brand awareness positively and significantly influences brand image.

Engaging Participants and its Influence on Brand Awareness

Engagement of participants in marketing campaigns is a key driver of brand awareness, as it facilitates active interaction, attention, and message processing. Highly engaging content encourages consumers to like, comment, share, or participate in discussions, increasing exposure and familiarity with the brand (Hollebeek, 2011; Brodie et al., 2011). Engagement fosters both cognitive and affective connections with the brand, enhancing memorability and recall, which are critical dimensions of brand awareness (Dessart et al., 2015; Vivek, et al., 2012). In the context of digital and viral marketing, participatory content allows consumers to co-create and share brand-related experiences, amplifying reach and reinforcing brand presence on social networks (Muntinga et al., 2011; Kumar & Pansari, 2016). Empirical studies suggest that higher levels of consumer engagement are associated with increased brand recognition, stronger associations, and improved awareness, laying the groundwork for subsequent impacts on brand image and loyalty (Liu et al., 2019; Hollebeek et al., 2014). Despite the clear benefits, few studies have systematically explored how participant engagement directly translates into brand awareness within viral marketing campaigns, indicating a significant research gap. Based on this review, the following hypothesis is proposed:

H_{11}: Engagement and participation positively influence brand awareness.

Brand Awareness, Brand Image, Engagement, and Purchase Intention

Brand awareness and brand image are critical determinants of consumer purchase intention, with engagement serving as a vital mechanism in this relationship. High brand awareness ensures that consumers recognize and recall the brand, which facilitates familiarity and trust, forming a foundation for positive brand image (Keller, 1993; Aaker, 1996). Brand image, encompassing consumers' perceptions, attitudes, and associations with the brand, influences evaluative judgments and the likelihood of purchase decisions (Hoeffler & Keller, 2002; Park et al., 1986). Engagement, defined as the cognitive, emotional, and behavioural investment in brand-related interactions, strengthens these effects by encouraging active participation, co-creation, and information sharing (Hollebeek, 2011; Brodie et al., 2013). Studies indicate that highly engaged audiences not only reinforce their awareness of the brand but also develop favourable brand perceptions, which enhance the intention to purchase and recommend the brand to others (Dessart et al., 2015; Vivek et al., 2012). In digital and viral marketing contexts, participatory engagement accelerates message dissemination, amplifies brand exposure, and consolidates brand equity, ultimately translating into stronger purchase intentions (Kumar & Pansari, 2016; Liu et al., 2019). Despite robust evidence linking these constructs, integrated models examining how

engagement mediates the relationship between brand awareness, brand image, and purchase intention remain limited, highlighting a gap for empirical investigation. Based on the above literature review, the researchers have proposed the following set of hypotheses to be tested

$H_{12, 13, 14}$: Brand Awareness, Brand Image, and Audience Engagement positively and significantly influence the purchase intention.

Purchase Intention and eWOM

Purchase intention has been shown to significantly influence consumers' engagement in electronic word-of-mouth (eWOM) behaviour. Consumers who exhibit a strong intention to buy a product or service are more likely to share their experiences and opinions online, thereby generating eWOM. Hennig-Thurau et al., (2004) highlighted that satisfied consumers with a high purchase intent are more motivated to recommend products to others, suggesting a direct link between intention and subsequent online communication. Similarly, Cheung and Thadani (2012) found that consumers' likelihood of posting reviews or sharing product experiences is positively associated with their pre-purchase attitudes and intentions, indicating that stronger purchase intention increases the probability of engaging in eWOM. Moreover, Chiu et al., (2013) emphasized that purchase intention not only motivates positive eWOM but also enhances the credibility and persuasiveness of the shared content, as consumers are perceived to communicate from a position of genuine interest and experience. Research by Kim and Ko (2010) further supports this view, showing that intention-driven eWOM is influenced by both the level of consumer satisfaction and the anticipated utility of sharing information, highlighting the behavioural and cognitive mechanisms linking purchase intention to eWOM. In addition, empirical studies have demonstrated that consumers with higher purchase intentions are more likely to engage in both active (writing reviews, posting comments) and passive (sharing links, likes) forms of eWOM, reinforcing the idea that purchase motivation drives online communication behaviours (Hajli, 2014; Wang & Fesenmaier, 2004). Overall, the literature indicates that purchase intention serves as a significant antecedent of eWOM, suggesting that marketers aiming to stimulate online buzz should focus on strategies that strengthen consumers' intent to purchase, as this can naturally lead to more eWOM activity. Based on the above argument, the following hypothesis was proposed:

H_{15}: The purchase intention positively and significantly influences the e-word of mouth Intention

Moderated Mediation

Viral marketing harnesses electronic word-of-mouth (eWOM) dynamics to stimulate rapid message diffusion through social networks (Kaplan & Haenlein, 2011). Its success depends on both message features and the credibility of the sender, as consumers increasingly rely on peer or influencer recommendations rather than traditional advertising (De Veirman et al., 2017). In digital environments characterized by information overload, credible senders and creative content jointly determine whether messages capture attention and translate into behavioural outcomes such as purchase intention (Weismueller et al., 2020; Sesar et al., 2022).

Sender Credibility and Purchase Intention

Classical persuasion models established source credibility, perceived expertise, trustworthiness, and attractiveness as a core antecedent of attitude change and purchase intention (Hovland et al., 1953; Ohanian, 1990). When consumers perceive the message sender as knowledgeable and reliable, they experience lower uncertainty and higher confidence in evaluating products (Chu & Kim, 2018). In social-media contexts, influencer or peer credibility increases message acceptance, brand attitude, and willingness to buy (Djafarova & Trofimenkoff, 2019; Weismueller et al., 2020). Research grounded in the Elaboration Likelihood Model (Petty & Cacioppo, 1986) suggests that credible sources operate through both central and peripheral routes of persuasion: expertise triggers thoughtful processing, while trustworthiness serves as a heuristic cue when motivation is low (Jia, 2021). Thus, in viral marketing, sender credibility acts as a powerful driver of purchase intention.

Novelty and Creativity as Mediating Mechanisms

However, credibility alone does not guarantee virality. Message characteristics, particularly novelty and creativity, determine whether audiences attend to, engage with, and share content (Moldovan et al., 2019). Novelty reflects the degree to which a message deviates from the ordinary, while creativity integrates novelty with meaningfulness (Lee & Hong, 2016). Creative advertising elicits emotional arousal, surprise, and cognitive engagement, which in turn enhance persuasive outcomes (Smith et al., 2007; van Berlo et al., 2024). According to the Information-Gap Theory (Loewenstein, 1994), novel content induces curiosity by highlighting discrepancies between what audiences know and what they wish to know, motivating further information search and purchase behaviour.

Empirical studies consistently show that creativity and novelty mediate the effect of antecedent variables on consumer responses. For instance, Moldovan et al., (2019) found that the perceived creativity of online videos increased sharing intention, which subsequently improved brand purchase likelihood. Rauwers (2018) demonstrated that creative media campaigns enhance brand evaluations through positive affect and memorability. Within viral marketing, credible senders are more likely to craft or disseminate messages perceived as authentic and innovative, thereby amplifying the creative impact of the content (Sesar et al., 2022). Consequently, novelty and creativity can be conceptualized as mediators translating sender credibility into purchase intention by deepening cognitive elaboration and emotional resonance.

Consumer Engagement as a Moderator

Consumer engagement, defined as the level of cognitive, emotional, and behavioural investment in brand-related interactions (Brodie et al., 2011), has emerged as a key contingency in online persuasion. Engaged consumers actively co-create value, process marketing stimuli more thoroughly, and form stronger brand connections (Hollebeek et al., 2019). In viral marketing, engagement shapes how consumers interpret and react to message cues: highly engaged individuals exhibit heightened sensitivity to both sender attributes and creative

content, leading to stronger behavioural intentions (Islam & Rahman, 2017).

Prior evidence indicates that engagement moderates the impact of message and source variables on consumer outcomes. For example, Sinha (2025) found that social-media engagement intensified the positive effect of influencer credibility on purchase intention. Similarly, Dessart et al., (2020) showed that engagement strengthens the relationship between perceived brand creativity and advocacy behaviours. Therefore, consumer engagement can be expected to moderate both the direct effect of sender credibility on purchase intention and the indirect effect via novelty and creativity, consistent with the conditional-process logic articulated by Hayes (2018). When engagement is high, consumers allocate greater attention and are more receptive to novel ideas, enhancing both persuasion routes. Conversely, when engagement is low, the same credible source may fail to convert attention into intention because consumers remain passive recipients of information.

The theoretical synthesis above aligns with Hayes's (2018) PROCESS Model 8, a moderated-mediation framework in which the moderator (consumer engagement) interacts with the focal predictor (sender credibility) in predicting the dependent variable (purchase intention), while an indirect effect flows through a mediator (message novelty & creativity). This model captures the layered dynamics of viral marketing: credible senders promote perceptions of novelty and creativity, which enhance purchase intentions, and these effects are amplified when consumers are more engaged. The conditional process thus links source credibility theory, creative-message theory, and consumer-engagement literature into a unified explanation of viral persuasion. Therefore, the following set of hypotheses were proposed by the researchers:

H_1. Sender credibility (X) is positively associated with purchase intention (Y). (direct effect)

H_2. Sender credibility (X) is positively associated with perceived novelty & creativity of the message (M). (a path)

H_3. Perceived novelty & creativity (M) is positively associated with purchase intention (Y), controlling for sender credibility. (b path)

H_4. Perceived novelty & creativity (M) mediates the relationship between sender credibility (X) and purchase intention (Y). (indirect effect)

H_5. Consumer engagement (W) moderates the direct relationship between sender credibility (X) and purchase intention (Y), such that the positive X→Y effect is stronger at higher levels of consumer engagement. (conditional direct effect)

H_6. Consumer engagement (W) moderates the indirect effect of sender credibility on purchase intention via novelty & creativity (M) i.e., the mediated (X→M→Y) effect is stronger when consumer engagement is high. (moderated mediation / conditional indirect effect).

Research Design

Research Gap and Research Questions

Although extensive research has examined individual drivers of viral marketing effectiveness such as emotional appeal, source credibility, and

message creativity most studies have treated these variables in isolation rather than as part of an integrated persuasive process (Moldovan et al., 2019; Weismueller et al., 2020; van Berlo et al., 2024). Specifically, there is a lack of empirical evidence linking multiple antecedents of viral marketing (emotional appeal, message valence, storytelling quality, and novelty & creativity) to behavioural outcomes (word-of-mouth and purchase intention) through psychological and brand-related mediators (engaging participants, brand awareness, and brand image). Furthermore, few studies have adopted a conditional process perspective (Model 8; Hayes, 2018) to explore how consumer engagement moderates both direct and indirect effects within this framework. Thus, the interplay between creative message design, brand-related mediators, and consumer engagement remains underexplored in the context of viral marketing campaigns, creating a significant research gap that this study aims to address.

Accordingly, and based on the preceding theoretical foundation and research gap, the following research questions are proposed by the researchers:

RQ1. How do core message antecedents of viral marketing emotional appeal, message valence, storytelling quality, and novelty & creativity individually and jointly influence consumers' engagement with a viral campaign?

RQ2. To what extent do engaging participants, brand awareness, and perceived brand image mediate the relationships between viral-message antecedents and behavioural outcomes such as word-of-mouth and purchase intention?

RQ3. How does consumer engagement moderate the influence of message antecedents on purchase intention, and to what extent does this engagement condition the indirect (mediated) effects through brand awareness and brand image?

RQ4. Does the conditional indirect effect of novelty & creativity on purchase intention, via brand awareness and brand image, vary significantly across levels of consumer engagement?

To address the stated research questions, the researchers developed a structured research questionnaire, which was pre-tested to ensure clarity and reliability of the items. The questionnaire was initially administered to 812 respondents, representing 100% of the target sample. A total of 654 responses were received, yielding a response rate of 80.5%. After screening for incomplete or invalid responses, 504 usable responses were retained for analysis, representing 62% of the total questionnaires distributed. These final responses formed the basis for all subsequent analyses, including CFA, SEM, and PROCESS Macro Model 8, ensuring the robustness and validity of the findings for the study. A simple random sampling technique was employed, where every 7th person was interviewed to collect the required information from the target population (Sathyanarayana et al., 2024).

All latent constructs in the study were measured using items adapted from established scholarly works to ensure content validity and theoretical grounding. Each construct was measured using five items on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Specifically, Emotional Appeal items were adapted from Berger and Milkman (2012), while Message Valence items were adopted from Eckler and Bolls (2011). Novelty and Creativity

were measured using items from Dobele et al., (2007). Sender Credibility items were derived from Ohanian (1990) to capture perceived expertise, trustworthiness, and attractiveness. Audience Involvement was measured based on De Bruyn and Lilien (2008). Items for Increased Brand Awareness and Positive Brand Image and Attitude were adapted from Keller (1993) and Hennig-Thurau et al., (2004), reflecting consumers' recognition, recall, and favourable brand evaluations. Consumer Engagement and Participation items were sourced from Hollebeek et al., (2014), capturing cognitive, emotional, and behavioural involvement. Finally, Purchase Intention and Word-of-Mouth Amplification (both online and offline) were measured using scales from Hennig-Thurau et al., (2004), reflecting intended purchase behaviour and communication of brand-related experiences. All items were pre-tested to ensure clarity, reliability, and suitability for the target population.

The collected data were initially tested for multicollinearity using correlation statistics and Variance Inflation Factor (VIF) to ensure that independent variables were not highly correlated, following guidelines by Hair et al., (2010) and Gujarati and Porter (2009). Subsequently, various assumptions of regression analysis, including normality, linearity, homoscedasticity, and independence of errors were assessed to validate the suitability of the data for inferential modelling (Field, 2018; Tabachnick & Fidell, 2019). The data were assessed for multivariate normality using Mardia's (1970) coefficients of skewness and kurtosis. Results indicated acceptable multivariate normality, supporting the use of SEM for hypothesis testing (Mardia, 1970; Kline, 2016). Confirmatory Factor Analysis (CFA) was conducted to examine the reliability, convergent validity, and discriminant validity of the measurement model, while Structural Equation Modelling (SEM) was applied to test the hypothesized relationships among antecedents, mediators, moderators, and outcomes (Byrne, 2016; Kline, 2016). Finally, Hayes' PROCESS Macro Model 8 was employed to evaluate the moderated mediation effects of consumer engagement, capturing both the conditional direct and indirect effects in the model (Hayes, 2018). All analyses were performed using SPSS and AMOS software, and bootstrapping procedures were applied to estimate the significance of indirect effects.

To assess the potential impact of Common Method Bias (CMB), Harman's single-factor test was conducted. The results indicated that a single factor accounted for 31.26% of the total variance, which is below the recommended threshold of 50%, suggesting that common method bias was not a major concern in the study (Podsakoff et al., 2003; Fuller et al., 2016). This indicates that the observed relationships among constructs are unlikely to be significantly inflated by measurement artifacts.

Data Analysis

The demographic profile (table 1) of the sample provides a clear understanding of the characteristics of the respondents in this study. Gender distribution indicates that the sample is balanced, with 54.37% male (n = 274) and 45.63% female (n = 230), reflecting a slight male predominance. Age-wise, a significant portion of the participants were below 30 years (42.06%), followed by those aged 31-40 years (32.54%) and 41-50 years (24.01%), while only a small fraction (1.39%) were above 50 years, indicating

Table 1. Demographic and Other Details of the Respondents

Variable	Category	No of Respondents	Percent
Gender	Male	274	54.37
	Female	230	45.63
Age	<30	212	42.06
	31-40	164	32.54
	41-50	121	24.01
	>50	7	1.39
Academic Details	High school or below	52	10.32
	College but not graduate	96	19.05
	Graduation	257	50.99
	Post Graduation	80	15.87
	Others	19	3.77
MHI	<50000	212	42.06
	50001-100000	250	49.60
	100001-150000	20	3.97
	>150000	22	4.37
Time spent on social media	<2 Hours	138	27.38
	2-4Hours	139	27.58
	4-6 Hours	177	35.12
	6-8Hours	39	7.74
	>8Hours	11	2.18
Preferred Platform	Facebook	504	27.95
	Instagram	396	21.96
	WhatsApp	504	27.95
	Others	399	22.13

Source: Desk Research

that the sample primarily consisted of young and middle-aged adults. In terms of educational background, most respondents were graduates (50.99%), followed by those with college-level education but not graduated (19.05%) and postgraduates (15.87%), while a smaller proportion had high school education or below (10.32%) and others (3.77%). This suggests that the sample is relatively well-educated, which may influence their engagement with social media and online content. Monthly household income (MHI) data shows that nearly half of the respondents (49.60%) reported an income between 50,001 and 100,000, with 42.06% earning less than 50,000, and a smaller segment earning above 100,000 (8.34% combined), indicating a predominance of lower- to middle-income participants.

Regarding social media usage, respondents spent varying amounts of time online, with the majority engaging for 4-6 hours per day (35.12%), followed by 2-4 hours (27.58%) and less than 2 hours (27.38%). A smaller proportion spent 6-8 hours (7.74%) and more than 8 hours (2.18%), reflecting high engagement with digital platforms among most participants. Preferred social media platforms were diverse, with Facebook and WhatsApp equally favoured (27.95% each), followed by "Others" (22.13%) and Instagram (21.96%). This distribution suggests that respondents engage with a variety of platforms, providing a broad context for examining their exposure to viral marketing content. Overall, the demographic profile highlights a young, educated, and digitally active sample with moderate household income, predominantly engaged in widely used social media platforms. These characteristics are relevant for understanding consumer behaviour in the context of viral marketing, as prior research

Table 2. CFA Results

Items	Cronbach's Alpha	Estimate	AVE	CR		SqrtAVE
V5	0.874	0.796	0.79	0.894	0.796***	0.889
V4		0.802			0.802***	
V3		0.777			0.777***	
V2		0.824			0.824***	
V1		0.75			0.75***	
MV1	0.858	0.754	0.767	0.894	0.754***	0.876
MV2		0.768			0.768***	
MV3		0.78			0.78***	
MV4		0.747			0.747***	
MV5		0.786			0.786***	
SQ1	0.867	0.738	0.777	0.893	0.738***	0.882
SQ2		0.819			0.819***	
SQ3		0.763			0.763***	
SQ4		0.768			0.768***	
SQ5		0.798			0.798***	
NC1	0.867	0.742	0.78	0.898	0.742***	0.883
NC2		0.799			0.799***	
NC3		0.781			0.781***	
NC4		0.754			0.754***	
NC5		0.825			0.825***	

V=Emotional Appeal, MV=Message Valence, SQ=Storytelling Quality, NC=Novelty and Creativity. CMIN=437.332, DF=164, P=0.000, CMIN/DF=2.667, RMSEA=0.047, RMR=0.039, GFI=0.0925, NFIU=0.979, NFI=0.979, RFI=0.96, IFI=0.998, TLI=0.981, CFI=0.997

Source: Desk Research

has shown that age, education, and social media usage significantly influence online engagement, content sharing, and purchase intention (Kapoor et al., 2021; Mangold & Faulds, 2009).

The results of the model fit indices (table 2) demonstrate that the proposed structural model exhibits an excellent overall fit to the data. The chi-square value (CMIN = 437.332, df = 164, p = 0.000) is statistically significant, which is common in large-sample structural equation modelling (SEM) analyses, as the chi-square test is highly sensitive to sample size (Byrne, 2016). Hence, other fit indices are considered more reliable for assessing model adequacy. The relative chi-square (CMIN/DF = 2.667) falls well within the recommended threshold of less than 3.0, indicating a good model fit (Kline, 2016). The Root Mean Square Error of Approximation (RMSEA = 0.047) is below the recommended upper limit of 0.06, suggesting a close fit between the model and the observed data (Hu & Bentler, 1999). Similarly,

the Root Mean Square Residual (RMR = 0.039) is also below the accepted threshold of 0.05, reinforcing the model's adequacy in reproducing the observed covariance matrix (Hair et al., 2019). Furthermore, the Goodness-of-Fit Index (GFI = 0.925) exceeds the conventional minimum acceptable value of 0.90, indicating a satisfactory level of explained variance (S, Sathyanarayana, and T. Mohanasundaram. 2024).

In addition, the incremental fit indices show strong support for the model. The Normed Fit Index (NFI = 0.979), Relative Fit Index (RFI = 0.960), Incremental Fit Index (IFI = 0.998), Tucker-Lewis Index (TLI = 0.981), and Comparative Fit Index (CFI = 0.997) all surpass the recommended benchmark of 0.95, suggesting an excellent comparative fit against the null model (Hu & Bentler, 1999; Hair et al., 2019). Taken together, these indicators confirm that the structural model demonstrates an excellent fit to the empirical data. The combination of low RMSEA and RMR values, high GFI, and near-perfect incremental fit indices (CFI, IFI, TLI, and NFI) collectively indicates that the hypothesized relationships among constructs are well represented in the model. Therefore, it can be concluded that the proposed structural framework is statistically sound and theoretically robust.

The measurement model demonstrates strong reliability and convergent validity across all constructs. Emotional Appeal (V) exhibited a Cronbach's alpha of 0.874, with item loadings ranging from 0.750 to 0.824, indicating high internal consistency and that all items contribute meaningfully to the latent construct (Nunnally & Bernstein, 1994). Similarly, Message Valence (MV) showed a Cronbach's alpha of 0.858, with factor loadings between 0.747 and 0.780, suggesting that the items reliably capture the valence dimension of messaging. Storytelling Quality (SQ) demonstrated a Cronbach's alpha of 0.867 and factor loadings ranging from 0.763 to 0.819, while Novelty and Creativity (NC) had a Cronbach's alpha of 0.867 with loadings between 0.754 and 0.825. All Cronbach's alpha values exceeded the recommended threshold of 0.70, confirming excellent internal consistency for each construct (Hair et al., 2019).

Convergent validity was assessed using Average Variance Extracted (AVE) and Composite Reliability (CR). AVE values were 0.79 for Emotional Appeal, 0.767 for Message Valence, 0.777 for Storytelling Quality, and 0.78 for Novelty and Creativity, all surpassing the 0.50 benchmark suggested by Fornell and Larcker (1981). This indicates that a substantial portion of the variance in each construct is explained by its indicators rather than measurement error. Composite reliability scores ranged from 0.894 to 0.898, further confirming the reliability of the constructs (Hair et al., 2019). Taken together, these results demonstrate that the measurement model is both reliable and valid. The constructs of Emotional Appeal, Message Valence, Storytelling Quality, and Novelty and Creativity are measured with high internal consistency, and the indicators effectively capture their respective latent variables. This provides a strong foundation for examining structural relationships in viral marketing, including the mediation of novelty and creativity and the moderating role of consumer engagement. These findings align with prior theoretical and empirical research emphasizing the importance of well-validated scales in advertising and marketing communication studies (Ohanian, 1990; Berlyne, 1960; Petty & Cacioppo, 1986).

The discriminant validity of the measurement model (table 3) was assessed using the Fornell-

Table 3. Discriminant Validity of the Measurement Model

	EVT	MVT	SQT	NCT	Mean	SE	SD
EVT	**0.889**	.784**	.706**	.719**	3.730	0.055	0.965
MVT		**0.876**	.741**	.766**	3.774	0.051	0.897
SQT			**0.882**	.779**	3.788	0.053	0.933
NCT				**0.883**	3.780	0.052	0.912

EV=Emotional Appeal, MV=Message Valence, SQ=Storytelling Quality, NC=Novelty and Creativity
The highlighted diagonal elements are square root of AVE and the off-diagonal elements are inter-correlation matrix among latent variables.

Source: Desk Research

Larcker criterion, where the square root of the AVE for each construct is compared with the inter-construct correlations (Fornell & Larcker, 1981). In the present study, the square roots of AVE for Emotional Appeal (EVT = 0.889), Message Valence (MVT = 0.876), Storytelling Quality (SQT = 0.882), and Novelty and Creativity (NCT = 0.883) were all higher than their respective correlations with other constructs, which ranged from 0.706 to 0.784. This indicates that each construct shares more variance with its own indicators than with other constructs, providing strong evidence for discriminant validity.

The correlations among constructs were significant but below the square roots of AVE, suggesting that while the constructs are related, they remain empirically distinct. For example, Emotional Appeal correlated moderately with Message Valence (r = 0.784) and Novelty and Creativity (r = 0.719), indicating that these constructs are conceptually related but not redundant. Similarly, Storytelling Quality showed moderate correlations with Emotional Appeal (r = 0.706) and Novelty and Creativity (r = 0.779), supporting the theoretical distinction among narrative, emotional, and creative dimensions of content. The mean scores, standard errors, and standard deviations indicate that the constructs were measured consistently with minimal variability, further supporting the robustness of the measurement model. Overall, these results confirm that the latent constructs Emotional Appeal, Message Valence, Storytelling Quality, and Novelty and Creativity are empirically distinct and capture unique aspects of content characteristics in viral marketing. This strengthens confidence in subsequent structural analyses, such as mediation by novelty and creativity and moderation by consumer engagement, ensuring that observed effects are not confounded by measurement overlap. These findings align with established methodological standards for assessing discriminant validity in SEM (Hair et al., 2019; Fornell & Larcker, 1981).

The results of the model fit indices indicate an overall good model fit between the hypothesized measurement model and the observed data (Table 4). The Chi-square value (CMIN = 1,984.397, df = 921, p = 0.000) is statistically significant, which is common in large samples as the Chi-square test is sensitive to sample size (Byrne, 2016). Therefore, other fit indices

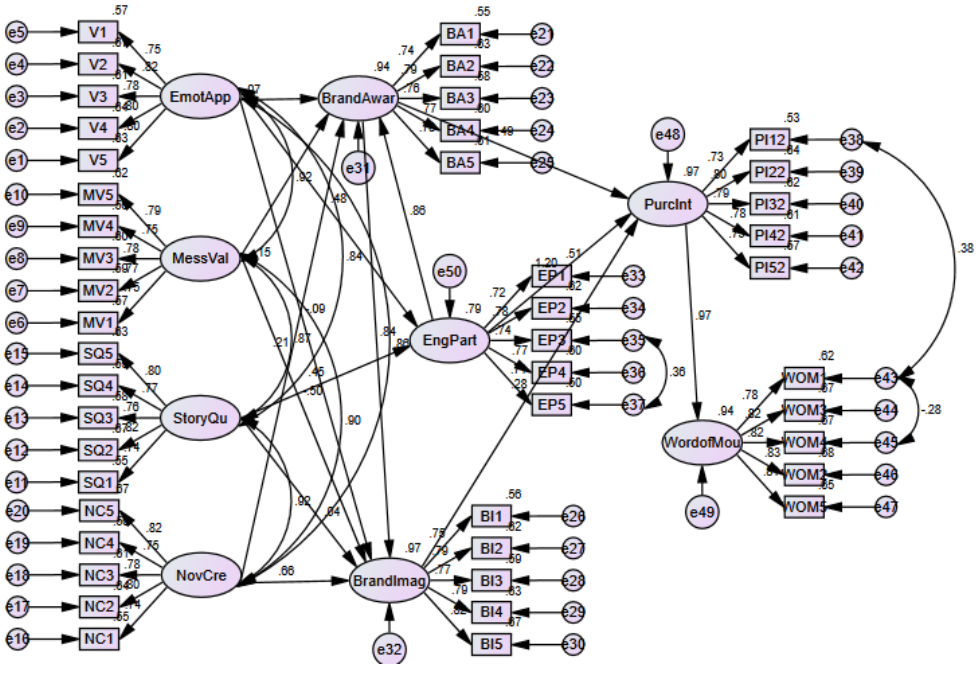


Figure 1. Graph Showing the Structural Relationship of the Latent Variables

provide a more reliable assessment of model adequacy. The ratio of Chi-square to degrees of freedom (CMIN/DF = 2.1546) falls below the recommended threshold of 3.0, indicating an acceptable model fit (Kline, 2016). The Root Mean Square Error of Approximation (RMSEA = 0.031) is well below the cutoff value of 0.06, suggesting a close fit of the model in relation to the degrees of freedom (Hu & Bentler, 1999). Similarly, the Standardized Root Mean Square Residual (SRMR = 0.042) is below the recommended threshold of 0.08, further indicating a good fit between the model and the observed data (Hair et al., 2021). The Goodness-of-Fit Index (GFI = 0.969) exceeds the acceptable level of 0.90, suggesting that the model explains a large portion of the variance-covariance matrix (Byrne, 2016). Regarding incremental fit indices, the Normed Fit Index (NFI = 0.949), Relative Fit Index (RFI = 0.995), Incremental Fit Index (IFI = 0.946), Tucker-Lewis Index (TLI = 0.934), and Comparative Fit Index (CFI = 0.946) all exceed the threshold of 0.90, indicating strong incremental fit and confirming that the proposed model performs significantly better than a null model (Hu & Bentler, 1999; Kline, 2016). In summary, all indices collectively confirm that the model demonstrates a good overall fit. The RMSEA and SRMR values indicate low residuals, while the CFI, TLI, IFI, and GFI values show that the model captures the underlying data structure effectively. Although the Chi-square test is significant, this does not undermine the validity of the model, given the satisfactory values of other indices. Hence, the measurement model can be considered both statistically and theoretically sound, supporting the adequacy of the specified factor structure (S, Sathyanarayana, and T. Mohanasundaram. 2024).

Table 4. Table Showing Testing of Hypotheses

Path	Estimate	Estimate	S.E.	C.R.	P	Label
EmotApp→EngPart	0.459	0.477	0.065	7.062	***	Supported
StoryQu→EngPart	0.45	0.451	0.068	6.618	***	Supported
EmotApp→BrandAwar	0.072	0.071	0.006	12.000	***	Supported
NovCre→BrandAwar	0.225	0.209	0.088	2.557	0.011	Supported
MessVal→BrandAwar	0.162	-0.15	0.013	12.462	***	Supported
EngPart→BrandAwar	0.897	0.856	0.084	10.679	***	Supported
EmotApp→BrandImag	0.089	-0.092	0.017	5.235	***	Supported
MessVal→BrandImag	0.518	-0.503	0.147	3.524	***	Supported
StoryQu→BrandImag	0.042	0.042	0.004	10.500	***	Supported
NovCre→BrandImag	0.678	0.661	0.134	5.060	***	Supported
BrandAwar→BrandImag	0.805	0.844	0.079	10.190	***	Supported
EngPart→PurcInt	1.183	1.201	0.286	4.136	***	Supported
BrandAwar→PurcInt	0.46	-0.49	0.045	10.222	***	Supported
BrandImag→PurcInt	0.279	0.283	0.131	2.130	0.033	Supported
PurcInt→WoM	1.092	0.97	0.051	21.412	***	Supported

EmotApp = Emotional Appeal, MessVal = Message Valence, StoryQu = Story Telling Quality, NovCre = Novelty and Creativity, BrandAwar =Brand Awareness, BrandImag = Brand Image, EngPart = Engagement of Participants, PurcInt = Purchase Intention, WoM = Word of Mouth
CMIN=1984.397, DF=921, P=0.000, CMIN/DF=2.1546, RMSEA=0.031, SRMR=0.042, GFI=0.969, NFI=0.949, RFI=0.995, IFI=0.946, TLI=0.934, CFI=0.946

Source: Desk Research

The structural relationship between Emotional Appeal (EmotApp) and Engagement and Participation (EngPart) was examined to understand the extent to which emotional appeal in content drives user engagement (Figure 1). Emotional appeal significantly predicted engagement and participation (β = 0.459, B = 0.477, SE = 0.065, t = 7.062, $p < 0.001$), supporting Hypothesis. The positive and significant relationship confirms that content with strong emotional elements is more likely to capture attention, motivate interaction, and foster active participation among the audience. Storytelling quality significantly predicted engagement and participation (β = 0.450, B = 0.451, SE = 0.068, t = 6.618, $p < 0.001$), supporting Hypothesis two. The positive and significant effect suggests that well-structured, compelling, and coherent storytelling enhances audience involvement and motivates participation. Emotional appeal significantly predicted brand awareness (β = 0.072, B = 0.071, SE = 0.006, t = 12.000, $p < 0.001$), supporting Hypothesis three. Despite the small effect size, the relationship is statistically meaningful, indicating that emotional appeal contributes positively to consumers' recognition and recall of the brand. Novelty and creativity significantly

predicted brand awareness (β = 0.225, B = 0.209, SE = 0.088, t = 2.557, p = 0.011), supporting Hypothesis four. This demonstrates that innovative and unique content plays a meaningful role in enhancing consumers' attention, recall, and recognition of the brand. Message valence significantly predicted brand awareness (β = 0.162, B = 0.150, SE = 0.013, t = 12.462, p < 0.001), supporting Hypothesis five. The positive and significant effect indicates that the emotional tone of a message, whether positive or negative, plays a role in enhancing consumers' attention, recognition, and recall of the brand. Engagement and participation significantly predicted brand awareness (β = 0.897, B = 0.856, SE = 0.084, t = 10.679, p < 0.001), supporting Hypothesis six. The very high standardised coefficient indicates that engagement is a key determinant of brand awareness, more influential than other antecedent variables such as emotional appeal, message valence, or novelty and creativity. Emotional appeal significantly predicted brand image (β = 0.089, B = 0.092, SE = 0.017, t = 5.235, p < 0.001), supporting Hypothesis seven. The positive and significant relationship indicates that emotional content contributes to favourable perceptions of the brand, although the effect size is relatively modest compared to other predictors. Storytelling quality significantly predicted brand image (β = 0.042, B = 0.042, SE = 0.004, t = 10.500, p < 0.001), supporting Hypothesis eight. Although the effect size is small, the result indicates that coherent, compelling, and well-structured storytelling contributes positively to how consumers perceive the brand. Storytelling quality significantly predicted brand image (β = 0.042, B = 0.042, SE = 0.004, t = 10.500, p < 0.001), supporting Hypothesis eight. Although the effect size is modest, the result suggests that coherent, engaging, and well-structured storytelling contributes positively to brand perception. This implies that while storytelling quality enhances brand image, other factors such as emotional appeal, message valence, and engagement likely have a stronger influence. Novelty and creativity significantly predicted brand image (β = 0.678, B = 0.661, SE = 0.134, t = 5.060, p < 0.001), supporting Hypothesis nine. The large standardized coefficient indicates that creativity is a major determinant of how consumers perceive the brand, more influential than storytelling quality or emotional appeal. Brand awareness significantly predicted brand image (β = 0.805, B = 0.844, SE = 0.079, t = 10.190, p < 0.001), supporting Hypothesis ten. The very high standardised coefficient indicates that brand awareness is a major determinant of brand image, surpassing other antecedent variables such as emotional appeal, storytelling quality, and novelty and creativity. Engagement and participation significantly predicted purchase intention (β = 1.183, B = 1.201, SE = 0.286, t = 4.136, p < 0.001), supporting Hypothesis eleven. The very high standardised coefficient suggests that active involvement with content is a major driver of consumers' intention to purchase, emphasizing the importance of interactive and participatory marketing strategies. Brand awareness significantly predicted purchase intention (β = 0.460, B = 0.490, SE = 0.045, t = 10.222, p < 0.001), supporting Hypothesis twelve. The moderate effect size indicates that while brand awareness contributes to purchase intention, it is not as strong a predictor as engagement and participation. Brand image significantly predicted purchase intention (β = 0.279, B = 0.283, SE = 0.131, t = 2.130, p = 0.033), supporting Hypothesis thirteen. Although the effect is significant, the moderate magnitude suggests that brand image contributes to

purchase intention but is not as influential as engagement or brand awareness. Purchase intention significantly predicted word-of-mouth amplification (β = 1.092, B = 0.970, SE = 0.051, t = 21.412, p < 0.001), supporting Hypothesis fourteen. The very high standardised coefficient indicates that purchase intention is a primary driver of word-of-mouth behaviour, more influential than other antecedents in the model.

The proposed model examines the influence of sender credibility on purchase intention, considering novelty and creativity of the message as a mediator and consumer engagement as a moderator (Figure 2). Researchers hypothesize that credible sources enhance consumers' perception of message novelty, which in turn increases purchase intention. Additionally, the strength of these relationships is expected to vary across levels of consumer engagement, with higher engagement potentially reducing reliance on source credibility. This moderated mediation framework integrates principles from source credibility theory and dual-process persuasion models, providing a comprehensive understanding of how message

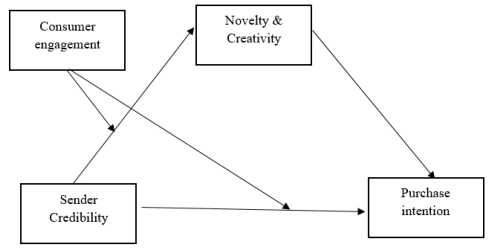


Figure 2. The Influence of Sender Credibility on Purchase Intention, Considering Novelty and Creativity of the Message as a Mediator and Consumer Engagement as a Moderator

and audience factors jointly shape consumer behavioural intentions (S, Sathyanarayana, and Mohanasundaram T. 2025).

The PROCESS (Model 8) results (table 5) indicate that sender credibility (SCT) exerts both a strong direct and an indirect effect on purchase intention (PIT) through perceived novelty/creativity of the message (NCT), and that consumer engagement (CRT) significantly moderates those relationships. In the first-stage model predicting the mediator (NCT), the overall model was strong (R = .8335, R^2 = .6947, F (3, 501) = 379.98, p < .001). SCT positively predicted

Table 5. Model Summary and Model

R	R-sq	MSE	F	df1	df2	p
0.8335	0.6947	4.6283	379.9846	3	501	0.0000

	Effect	se	t	p	LLCI	ULCI
constant	-3.0097	1.5954	-1.8865	0.0598	-6.1441	0.1248
SCT	0.8811	0.0887	9.937	0.0000	0.7069	1.0553
CRT	0.6567	0.1013	6.481	0.0000	0.4576	0.8558
Int_1	-0.0196	0.0049	-3.997	0.0001	-0.0292	-0.0099

	R2-chng	F	df1	df2	p
X*W	0.0096	15.8187	1	501	0.0001

NCT (b = .8811, SE = .0887, t = 9.937, p < .001, 95% CI [.7069, 1.0553]), and CRT also positively predicted NCT (b = .6567, SE = .1013, t = 6.481, p < .001, 95% CI [.4576, .8558]). The SCT x CRT interaction was significant and negative (Int_1 b = -.0196, SE = .0049, t = -3.977, p < .001, 95% CI [-.0292, -.0099]), indicating that the positive effect of sender credibility on perceived novelty diminishes as consumer engagement increases.

This moderation is evident in the conditional effects: the effect of SCT on NCT decreases from b = .7833 at CRT = 5 to b = .3923 at CRT = 25 (all p's < .001), and the Johnson-Neyman procedure found no transition point within the observed CRT range (i.e., the effect remains positive but weakens across observed levels of CRT).

In the outcome model predicting PIT (table 6), the full model was also strong (R = .8771, R^2 = .7692, F (4, 500) = 416.65, p < .001). SCT had a significant positive direct effect on PIT (b = .4052, SE = .0852, t = 4.758, p < .001, 95% CI [.2379, .5725]); NCT positively predicted PI5T (b = .1686, SE = .0392, t = 4.300, p < .001, 95% CI [.0916, .2456]); CRT positively predicted PI5T (b = .7853, SE = .0926, t = 8.482, p < .001, 95% CI [.6034, .9672]). The SCT x CRT interaction on PI5T was significant and negative (Int_1 b = -.0119, SE = .0044, t = -2.722, p = .0067, 95% CI [-.0205, -.0033]), showing that the direct effect of SCT on PI5T likewise weakens as CRT increases. Conditional direct effects mirror this pattern (e.g., direct effect of SCT on PI5T = .3455 at CRT = 5, falling to .1069 at CRT = 25; all reported conditional effects are statistically significant).

The conditional effects of the focal predictor (Table 7), sender credibility (SCT), on the mediator,

Table 6. Outcome Variable (Purchase Intention)

	Effect	se	t	p	LLCI	ULCI
constant	-2.4884	1.4053	-1.7708	0.0772	-5.2493	0.2726
SCT	0.4052	0.0852	4.7583	0.0000	0.2379	0.5725
NCT	0.1686	0.0392	4.2996	0.0000	0.0916	0.2456
CRT	0.7853	0.0926	8.4818	0.0000	0.6034	0.9672
Int_1	-0.0119	0.0044	-2.7222	0.0067	-0.0205	-0.0033

Model Summary

R	R-sq	MSE	F	df1	df2	P
0.8771	0.7692	3.5657	416.6494	4	500	0.0000

Table 7. Conditional Effects of the Focal Predictor at Values of the Moderator(S)

CRT	Effect	se	t	p	LLCI	ULCI
15.1046	0.5858	0.0352	16.6459	0.0000	0.5166	0.6549
19.0376	0.5089	0.0364	13.9892	0.0000	0.4374	0.5803
22.9707	0.432	0.0464	9.3035	0.0000	0.3407	0.5232

novelty, and creativity of the message (NCT), at different levels of consumer engagement (CRT) reveal a clear moderation pattern. At a lower level of engagement (CRT = 15.10), SCT has a strong positive effect on NCT (b = 0.5858, SE = 0.0352, t = 16.646, p < .001, 95% CI [0.5166, 0.6549]), indicating that credibility strongly enhances perceived novelty among less engaged consumers. As engagement increases to a medium level (CRT = 19.04), the effect decreases to b = 0.5089 (SE = 0.0364, t = 13.989, p < .001, 95% CI [0.4374, 0.5803]), and at a high level of engagement (CRT = 22.97), the effect further diminishes to b = 0.432 (SE = 0.0464, t = 9.304, p < .001, 95% CI [0.3407, 0.5232]). These results indicate that the positive influence of sender credibility on perceived novelty is strongest when consumers are less engaged and gradually weakens as engagement increases, consistent with dual-process persuasion theory (Petty & Cacioppo, 1986), which posits that highly engaged individuals rely more on central message content than peripheral cues such as source credibility. The consistently significant t-values and confidence intervals across CRT levels confirm that SCT remains a meaningful predictor of NCT across all engagement levels, although its impact is conditional on consumer engagement.

This analysis complements the moderated mediation findings by highlighting how consumer engagement systematically alters the strength of the SCT → NCT path, providing clear visual and statistical evidence for the interaction effect in the proposed model.

The conditional indirect (mediated) effects (table 8) of SCT on PIT via NCT are positive and statistically significant at the examined CRT values: at CRT = 15.10, indirect effect = .0988 (BootSE = .0343, 95% BootCI [.0366, .1699]); at CRT = 19.04, indirect effect = .0858 (BootSE = .0294, 95% BootCI [.0321, .1472]); at CRT = 22.97, indirect effect = .0728 (BootSE = .0254, 95% BootCI [.0273, .1261]). The conditional indirect effects indicate that sender credibility (SCT) positively influences purchase intention (PI5T) through the mediator, novelty, and creativity of the message (NCT), and that this mediated effect is moderated by consumer engagement (CRT). Specifically, at a lower-to-moderate engagement level (CRT = 15.10), the indirect effect is strongest (.0988), suggesting that credibility substantially enhances perceived novelty, which then increases purchase intention. As CRT increases to 19.04 and 22.97, the indirect effect decreases to .0858 and .0728, respectively, showing that the mediating role of novelty weakens at higher levels of engagement. This pattern aligns with theoretical expectations from dual-process models: highly engaged consumers rely less on peripheral cues like sender credibility and more on the content itself, reducing the magnitude of the mediated pathway. The significant bootstrap confidence intervals at all CRT values indicate that these effects are statistically reliable, confirming the presence of moderated mediation in the model.

Table 8. Conditional Indirect Effects of X on Y

CRT	Effect	BootSE	BootLLCI	BootULCI
15.1046	0.0988	0.0343	0.0366	0.1699
19.0376	0.0858	0.0294	0.0321	0.1472
22.9707	0.0728	0.0254	0.0273	0.1216

Table 9. Index of Moderated Mediation

	Index	BootSE	BootLLCI	BootULCI
CRT	-0.0033	0.0018	-0.0075	-0.0006

F	df1	df2	p
1.9613	1	499	0.162

	R2-chng	F	df1	df2	P
X*W	0.0034	7.4106	1	500	0.0067

The index of moderated mediation (table 9) was negative and its bootstrap CI excluded zero (Index = -.0033, BootSE = .0018, 95% BootCI [-.0075, -.0006]), confirming that the indirect effect of SCT on PI5T through NCT is significantly weaker at higher levels of consumer engagement. In sum, the pattern indicates partial mediation (NCT mediates SCT → PI5T) combined with moderation such that higher CRT attenuates both the SCT → NCT path and the SCT → PI5T direct path, producing a decreasing mediated effect as engagement increases. These statistical conclusions align with dual-process and source-credibility theories: source credibility typically enhances message processing and persuasive outcomes (see Petty & Cacioppo, 1986; Ohanian, 1990), and message novelty/creativity often functions as a mediator by capturing attention and stimulating favourable evaluations that translate into intention (e.g., Berlyne, 1960; Silvia, 2006). The present moderation finding that high consumer engagement reduces the marginal influence of sender credibility is consistent with predictions from elaboration frameworks (Petty & Cacioppo, 1986): highly engaged consumers may be more motivated to process message content directly (thereby relying less on peripheral cues such as source credibility),

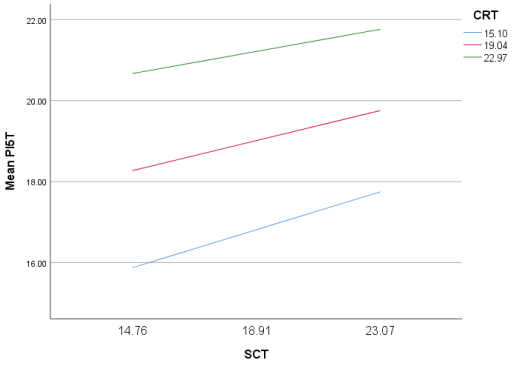


Figure 3. Graph Showing Sender Credibility (SCT) Against Purchase Intention (PIT) at Varying Levels of Consumer Engagement (CRT)

whereas less engaged consumers rely more on credible sources to judge novelty and form intentions. Practically, the results suggest that marketer efforts to enhance sender credibility and message novelty will be most effective among less engaged audiences, while for highly engaged audiences enhancing message content and creative value itself (and fostering intrinsic engagement) may be relatively more important. Finally, the large explained variances (R^2 = .6947 for NCT; R^2 = .7692 for PI5T) indicate substantive, practically meaningful effects, though generalization should be cautious given the cross-sectional design and the single-sample test; future research using longitudinal or experimental designs would strengthen causal claims (Hayes, 2018).

Based on the PROCESS Model 8 results, the graph plotting sender credibility (SCT) against purchase intention (PIT) at varying levels of consumer engagement (CRT) shows

three positively sloped lines representing low, medium, and high CRT (Figure 3). The best argument to describe this graph is that while SCT consistently increases PIT across all levels of CRT, the slope of the line decreases as CRT increases, illustrating the moderation effect. This means that for low-engagement consumers, increases in sender credibility led to a relatively larger increase in purchase intention, whereas for highly engaged consumers, the same increase in sender credibility produces a smaller boost in intention. Conceptually, this aligns with the dual-process theory: less engaged consumers rely more on peripheral cues like source credibility, whereas highly engaged consumers process the message content more centrally, making credibility less influential. The graph thus visually demonstrates both the direct effect of sender credibility and the weakening of this effect at higher levels of engagement, supporting the statistical findings of moderated mediation. The graph clearly shows that sender credibility has a stronger impact on purchase intention for low-engaged consumers, and this impact diminishes as consumer engagement increases, highlighting the conditional nature of credibility's persuasive effect.

Discussion and Conclusion

The current study was undertaken to investigate the key antecedents of viral marketing and their influence on consumer behaviour, specifically focusing on purchase intention and word-of-mouth communication. By examining factors such as sender credibility, message novelty and creativity, and consumer engagement, the study aimed to provide a comprehensive understanding of the mechanisms through which viral marketing campaigns can effectively shape consumer perceptions and behaviours. A total of 504 valid responses were collected, providing robust empirical evidence to test the proposed conceptual model. The findings contribute to the growing literature on digital marketing and consumer psychology by integrating insights from source credibility theory (Ohanian, 1990), dual-process persuasion frameworks (Petty & Cacioppo, 1986), and theories of consumer engagement and novelty seeking (Berlyne, 1960; Silvia, 2006), offering practical implications for marketers seeking to enhance the effectiveness of online promotional strategies.

The findings of the present study provide comprehensive insights into how emotional appeal, storytelling quality, message novelty and creativity, and message valence contribute to shaping consumer engagement, brand awareness, brand image, purchase intention, and word-of-mouth behaviour in the context of viral marketing. The results emphasize that emotionally charged content plays a central role in fostering user interaction and participation, which are key precursors to brand-related and behavioural outcomes. This reinforces previous research indicating that emotions are pivotal in capturing attention and stimulating online engagement (Vrtana & Krizanova, 2023). When consumers perceive emotional resonance in marketing messages, they are more likely to respond with higher involvement, interaction, and sharing behaviour, thereby enhancing message virality and deepening brand connection.

Equally important is the role of storytelling quality. The study found that well-crafted, coherent, and compelling narratives significantly enhance engagement and participation, aligning with prior evidence that narrative structure

creates emotional immersion and facilitates memory encoding (Tabrizi & Ibrahimli, 2024). Storytelling enables brands to humanize their communication, allowing audiences to connect with messages on a personal level. This not only strengthens emotional bonds but also encourages consumers to share content, amplifying the reach and credibility of brand messages. The results thus support the notion that storytelling is a key driver of engagement in digital and social media marketing.

Novelty and creativity emerged as strong determinants of both brand awareness and brand image. This underscores that originality in content, whether through visuals, tone, or message framing, helps brands stand out in cluttered digital spaces. As supported by Berlyne's (1960) theory of curiosity and arousal, creative content evokes cognitive interest, leading to increased attention and better memory recall. Such content breaks the monotony of repetitive advertising and stimulates deeper information processing, which strengthens consumers' recall and brand recognition. Therefore, fostering creativity in marketing content not only enhances awareness but also contributes to the formation of a distinct and favourable brand image.

The emotional tone or valence of the message also played a meaningful role in shaping brand awareness and image. Whether positive or negative, emotionally charged messages captured consumer attention and improved brand recall. This is consistent with the findings of Silvia (2006), who emphasized that emotionally engaging stimuli heighten cognitive appraisal and lead to sustained interest. Emotional valence serves as a psychological cue that guides how consumers interpret and internalize brand communications, suggesting that the affective dimension of content remains critical for successful viral marketing strategies.

Engagement and participation were identified as dominant predictors of brand awareness, brand image, and purchase intention. These results reaffirm the growing importance of active consumer involvement in digital environments. Interactive behaviours such as liking, sharing, and commenting transform passive exposure into experiential engagement, which in turn strengthens brand associations and purchasing tendencies. This finding is consistent with dual-process persuasion theory (Petty & Cacioppo, 1986), which posits that consumers who actively process information through engagement are more likely to form stable attitudes and behavioural intentions. The strong relationship between engagement and purchase intention highlights the strategic value of fostering participatory marketing environments, where consumers feel part of the brand narrative rather than mere spectators.

Furthermore, brand awareness and brand image were both found to significantly influence purchase intention, reinforcing the hierarchical path from cognitive to affective and finally to behavioural responses. Consumers who are more aware of and hold positive perceptions about a brand are more inclined to translate these attitudes into purchase actions. This is consistent with the broader body of branding literature suggesting that awareness and image function as essential precursors to consumer choice and loyalty (Keller, 2009). Importantly, the study found that engagement has an even stronger influence than awareness or image, emphasizing that behavioural involvement is a more direct predictor of purchase intention in the digital context.

Finally, purchase intention was found to be a key driver of word-of-mouth behaviour, confirming the critical link between individual behavioural intent and collective advocacy. When consumers develop a genuine intention to purchase, they are more likely to recommend the brand to others, both online and offline. This result resonates with findings from prior studies suggesting that satisfied and motivated consumers act as brand advocates, spreading positive word-of-mouth that enhances a brand's viral potential (Vrtana & Krizanova, 2023).

The moderated-mediation results from Model 8 reveal a nuanced process by which sender credibility influences purchase intention through perceived novelty and creativity, and how consumer engagement conditions those paths. In essence, sender credibility enhances perceptions of message novelty and creativity, and these enhanced perceptions translate into greater purchase intent. However, consumer engagement weakens the magnitude of both the credibility → novelty pathway and the overall mediated effect: when consumers are highly engaged, they rely less on the credibility cue and more on the intrinsic content, so the incremental benefit of a credible sender on perceived novelty and downstream purchase motivation is reduced. This pattern aligns with dual-process perspectives that distinguish between peripheral cues (e.g., source credibility) and central message processing; highly engaged individuals tend to process message content more deeply and therefore depend less on source cues (Petty & Cacioppo, 1986). At the same time, the role of novelty and creativity as the intervening mechanism echoes theories of curiosity and interest, which posit that original, surprising, or creative messages capture attention and facilitate deeper processing that supports persuasive outcomes (Berlyne, 1960; Silvia, 2006).

From a practical standpoint, these findings suggest a situational strategy for marketers: for audiences with low-to-moderate engagement, investing in sender credibility (for example, via trusted endorsers or authoritative sources) can substantially boost the perceived novelty of the message and thereby increase purchase intent. Conversely, for highly engaged audiences, efforts should prioritise enriching message content itself, making it more substantive, novel, and creatively executed, because these consumers will scrutinize content directly and derive persuasion primarily from the message rather than the messenger. This implies a segmentation approach to campaign design: leverage source credibility to jump-start interest among less engaged segments, but emphasize creative content and informational value for highly engaged segments.

The moderated mediation also highlights the complementary roles of credibility and creativity rather than their redundancy. Credibility functions as an accelerator of initial receptivity, enabling creative messages to register more strongly among receptive audiences; creativity and novelty, in turn, are the mechanisms that convert attention into purchase motivation. These dynamics extend existing work on source effects and message processing by demonstrating that the effectiveness of credibility is contingent on recipient engagement, and that the mediated pathway through novelty remains important even as its strength varies across engagement levels (Hayes, 2018; Ohanian, 1990). Future research should examine these relationships across different platforms and product categories to assess boundary conditions and

consider experimental or longitudinal designs to establish causal sequencing more firmly.

Overall, the study contributes to viral marketing research by proposing and validating a comprehensive framework that integrates emotional, narrative, and creative dimensions with engagement-driven brand outcomes. The findings suggest a cascading mechanism where emotional and creative content foster engagement, which enhances brand awareness and image, leading to stronger purchase intentions and word-of-mouth amplification. For practitioners, this implies that effective viral marketing requires a balanced focus on emotional resonance, narrative coherence, and creativity, supported by strategies that actively stimulate consumer participation. Future research may extend these findings by examining cross-cultural variations, platform-specific dynamics, and the long-term effects of engagement-driven marketing on brand equity.

Limitations of the Study and Directions for Future Research

Although the present study provides valuable insights into the antecedents and outcomes of viral marketing effectiveness, several limitations must be acknowledged. First, the research design was cross-sectional, relying on self-reported data collected at a single point in time. This approach restricts the ability to infer causality among constructs such as emotional appeal, storytelling, engagement, brand awareness, and purchase intention. Future studies should adopt longitudinal or experimental designs to better establish causal relationships and capture dynamic changes in consumer responses over time (Podsakoff et al., 2003).

Second, the study was conducted with a specific sample of 504 respondents, primarily from a single cultural and demographic context. As consumer behaviour, emotional response, and engagement patterns can vary across cultures and age groups, the findings may not be fully generalizable to other populations or product categories. Future research could replicate this study across different industries, geographic regions, and demographic segments to test the external validity of the proposed model (Steenkamp & Baumgartner, 1998).

Third, while the study integrated multiple psychological and communication variables such as emotional appeal, storytelling, novelty, and engagement, it did not include other relevant constructs that could deepen the understanding of viral marketing effectiveness. For example, variables such as message authenticity, perceived entertainment value, trust in digital platforms, and consumer-brand identification might also moderate or mediate the observed relationships (Muntinga et al., 2011; Dessart et al., 2016). Incorporating these variables in future models could offer a more holistic view of the mechanisms that drive viral marketing success.

Fourth, the study relied on self-reported perceptions rather than behavioural or observational data. While perceptual measures capture attitudes and intentions effectively, they may not always translate into actual behaviour due to social desirability or response biases. Future research could employ digital analytics, eye-tracking, or clickstream data to validate the findings with observable engagement and sharing behaviours (Berger & Milkman, 2012).

Finally, the moderated mediation model focusing on sender credibility, message

creativity, and consumer engagement provides a strong theoretical foundation, but future research should explore additional moderators such as platform type (e.g., Instagram, YouTube, TikTok), message format (e.g., video vs. text), and influencer type (e.g., celebrity vs. micro-influencer). These contextual variables could meaningfully alter how credibility and creativity interact to shape consumer engagement and purchase behaviour (De Veirman et al., 2017).

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Valuation and Trading of Carbon Credits: A Fintech-Driven Framework for Sustainable Markets

K. R. Jalaja[1], Suman Kumari C. Mali[2]* and S. Sathyanarayana[3]

Abstract

Carbon credits are rapidly evolving from a compliance instrument into a financial asset class, driven by regulatory reforms, rising price signals, and fintech innovations such as tokenisation, blockchain registries and AI-based monitoring. This paper proposes a hybrid valuation framework that combines traditional financial valuation (market and discounted cash-flow style drivers) with technology-assurance scores derived from on-chain provenance and AI/MRV (Measurement, Reporting and Verification) outputs. The findings show that carbon credit prices are shaped by layered determinants, beginning with traditional fundamentals such as emission reductions, renewable energy project types, and regulatory compliance. Adding quality-related variables, verification rigour, and registry transparency substantially strengthens explanatory power, demonstrating buyers' strong preference for credit integrity. The greatest improvement emerges when fintech features such as tokenisation, AI/blockchain-based assurance, and liquidity are included, producing notable price premiums and nearly doubling model accuracy. This work offers actionable guidance for policymakers, exchanges, fintech founders, and institutional investors seeking to scale credible carbon markets. This study contributes by integrating traditional, quality-control, and fintech determinants into a unified framework for explaining carbon credit valuation. It demonstrates that fintech features tokenisation and AI/blockchain assurance, substantially enhancing predictive power beyond existing models. The findings extend carbon market theory by establishing technological transparency and liquidity as central drivers of next-generation credit pricing.

Keywords: AI/MRV Outputs, Carbon Price Benchmarks, Carbon Trading, Sustainability Premium, Tech Assurance Score

JEL Classification Code: G28, Q58, O33, G32

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K. R. Jalaja[1], Suman Kumari C. Mali[2] and S. Sathyanarayana[3]

[1] Deputy Registrar Evaluation, Dean and Chairperson, Department of Studies and Research in Commerce, Dr Manmohan Singh Bengaluru City University, Bengaluru – 560001, Karnataka, India; drjalajakr@reddiffmail.com; ORCID ID: https://orcid.org/0000-0002-7468-2361

[2] Research Scholar, Department of Studies and Research in Commerce, Dr Manmohan Singh Bengaluru City University, Bengaluru – 560001, Karnataka, India; sumanmali2602@gmail.com; ORCID ID: https://orcid.org/0009-0001-6574-2844

[3] Professor, M P Birla Institute of Management, Race Course Road, Bengaluru – 560001, Karnataka, India; principal@mpbim.com; ORCID ID: https://orcid.org/0000-0002-1552-9762

Introduction

Carbon credits represent measurable reductions in greenhouse gas emissions, tradable in markets that price sustainability. Yet, valuation inconsistencies, lack of transparency, and fragmented markets hinder their efficiency. This research explores financial and technological frameworks that can enhance fair valuation, transparency, and liquidity in carbon trading, especially within the emerging Indian Carbon Credit Trading Scheme (CCTS). Carbon trading has emerged as one of the most widely adopted market-based tools for tackling climate change, enabling firms, governments, and investors to buy and sell certified emission reductions as a way to meet climate commitments more flexibly (Calel & Dechezleprêtre, 2016). At its core, the system places a carbon price to incentivise cleaner production, reward mitigation efforts, and channel finance toward low-carbon projects, turning environmental responsibility into a tradable economic asset (Newell *et al.*, 2013). Over the past decade, both compliance markets and rapidly expanding voluntary carbon markets have grown more sophisticated, attracting diverse actors ranging from corporations to fintech platforms (Kreibich & Hermwille, 2021). Yet despite this growth, carbon credits vary widely in quality, transparency, and perceived integrity, creating significant differences in how buyers value them. As a result, understanding what drives carbon credit prices and how technological and governance innovations reshape these valuations has become increasingly important for both researchers and practitioners. Against this backdrop, the present study examines how traditional project characteristics, quality-assurance mechanisms, and emerging fintech tools jointly influence credit pricing, offering insights into the evolving dynamics of modern carbon markets.

Literature Review

Carbon markets have become a central mechanism for achieving global climate mitigation goals by placing an economic value on verified emission reductions (Newell *et al.*, 2013). Early research emphasised that carbon credit prices are strongly shaped by project fundamentals, including project type, technological pathway, and the scale of emission reductions delivered. Studies consistently find that renewable energy and industrial gas projects tend to trade at higher prices due to clearer baselines and lower reversal risks, while land-use projects often face greater uncertainty (Calel & Dechezleprêtre, 2016; Haya, 2023). Vintage also plays an important role: older credits are often discounted due to concerns about outdated methodologies and declining perceived environmental integrity (Schneider *et al.*, 2015).

A second major stream of literature focuses on quality and governance determinants of carbon credit valuation. The effectiveness of a carbon credit depends heavily on additionality, permanence, and the accuracy of Monitoring, Reporting, and Verification (MRV) processes (Kollmuss *et al.*, 2008). Rigorous third-party verification and transparent registry systems have been repeatedly linked to higher buyer confidence and price premiums (Michaelowa *et al.*, 2021). As information asymmetries remain substantial in voluntary carbon markets, the emergence of rating agencies such as Sylvera and BeZero is often interpreted as a response to persistent integrity concerns, with empirical assessments showing that higher-rated credits

command materially higher prices (Erickson *et al.*, 2014; Haya *et al.*, 2020).

More recently, a rapidly expanding literature examines how fintech innovations, particularly blockchain, tokenisation, and digital MRV (dMRV), are reshaping carbon markets (Tlili, 2025). Blockchain has been proposed as a tool to enhance traceability, prevent double-counting, and automate credit retirement, thereby increasing market efficiency. Tokenised carbon credits can improve fractional ownership, reduce settlement frictions, and expand investor participation, ultimately increasing liquidity and price discovery (World Bank, 2022). Parallel advances in AI-based MRV systems, including satellite imagery, IoT sensors, and machine-learning verification models, promise to reduce verification costs and enhance data accuracy, strengthening the credibility of credits. These technological innovations collectively signal a shift toward more transparent, data-driven carbon markets in which digital assurance is increasingly viewed as a core driver of valuation.

Finally, institutional literature highlights the movement toward global integrity standards, particularly through initiatives such as the Integrity Council for the Voluntary Carbon Market (ICVCM) and the Voluntary Carbon Markets Integrity Initiative (VCMI). These frameworks aim to harmonise quality criteria, which could further amplify the role of integrity and technological assurance in shaping valuation (ICVCM, 2023; VCMI, 2022). Together, these findings indicate that carbon credit prices are influenced not only by project-level fundamentals but also by broader market governance and emerging fintech mechanisms, creating a multi-layered valuation landscape that continues to evolve.

Despite substantial work on project fundamentals and credit integrity, the literature remains fragmented in explaining how multiple layers of determinants jointly shape carbon credit prices. Most studies examine traditional drivers or quality attributes in isolation, with limited integration of emerging fintech innovations such as tokenisation and AI-based MRV. Empirical evidence on how these technological mechanisms interact with verification quality, registry transparency, and market structure is still scarce. Consequently, there is a clear gap in understanding how combined traditional, governance, and fintech factors collectively influence valuation in modern carbon markets.

Valuation and Trading of Carbon Credits: A Fintech-Driven Framework for Sustainable Markets

Carbon credits are increasingly treated as tradable financial instruments, yet valuation remains fragmented across regulated compliance schemes and voluntary markets. This study develops a fintech-enabled valuation framework that blends traditional financial drivers (price benchmarks, liquidity, and regulatory risk) with technology-assurance scores derived from blockchain verification and AI-based monitoring.

We compare market levels across major systems (EU ETS, voluntary markets) and examine India's Carbon Credit Trading Scheme (CCTS) rollout to highlight market structure and policy implications. Using registry issuances, exchange price series and tokenised credit platforms as case material, we propose a practical valuation formula that adjusts baseline credit value for regulatory status, verification quality and liquidity risk. The framework supports price

discovery, reduces information asymmetry, and enables fintech products (tokenised credits, smart-contract clearing) that can improve transparency and market access. We conclude with policy recommendations for India's CCTS and a research agenda for integrating high-frequency emission data into market valuation models.

The carbon credit lifecycle, beginning with measurable emission reductions, followed by independent verification, certification by an accredited standard, issuance into a registry, and finally trading, forms the backbone of credibility and value in carbon markets. Each stage reduces uncertainty and information asymmetry, ensuring that credits reflect genuine climate benefits and can be confidently transacted. When this lifecycle is supported by strong governance, markets tend to exhibit higher prices and greater liquidity. This pattern is evident when comparing global systems: the EU ETS achieves the highest prices ($80-90/tonne) due to strict caps, long-standing regulatory enforcement, and highly reliable MRV systems under the European Commission (Table 1). California's cap-and-trade market trades at mid-range prices ($40-50/tonne), supported by robust oversight but constrained by a smaller market scale. China's national ETS maintains lower prices ($10-15/tonne) because it remains in an early developmental phase with intensity-based targets and gradual tightening of obligations (Law & Fong, 2025). India's CCTS is still emerging, with low volumes and no fully issued compliance-grade credits yet, as regulatory procedures continue to be refined by BEE and SEBI (Bureau of Energy Efficiency, 2024).

The comparison shows that market maturity, regulatory strictness, and verification robustness are the strongest determinants of carbon credit value. Mature compliance markets with transparent registries and stringent monitoring demand higher prices, while early-stage or less stringent systems trade at discounts. This suggests that as India strengthens its MRV infrastructure, finalises trading rules, and moves from pilot status to full compliance operation, its carbon prices are likely to rise. In essence, the more credible and transparent the lifecycle and regulatory environment, the greater the market's willingness-to-pay, highlighting governance and technological integrity as central drivers of future valuation growth.

The EU ETS benchmark price of €83.66/tCO_2e represents one of the most stringent and mature carbon pricing regimes globally (Table 2). As a high-compliance market with strong regulatory oversight, this benchmark reflects the premium that buyers pay for credits backed by robust MRV standards, strict cap-and-trade limits, and long-term policy certainty. The high average auction price, therefore, serves as an upper reference point for global pricing comparisons.

Table 1. Global Carbon Market Landscape

Region	System	Avg. Price (USD/tonne)	Volume (2024)	Regulatory Body
EU	EU ETS	$80-90	High	European Commission
California	Cap-and-Trade	$40-50	Medium	ARB
China	National ETS	$10-15	High	MEE
India	Pilot (CCTS)	Emerging	Low	BEE & SEBI

Source: Based on the information collated by the authors

Table 2. Publicly Available Benchmark Data

Benchmark/data Point	Value/description	Source and notes
EU ETS average auction price (2023)	€83.66 per tCO_2e. (Umweltbundesamt)	Use this as a baseline for a high-compliance market.
Bloomberg-LSEG data: Global carbon markets value in 2023	€881 billion / US$949 billion; with EU ETS ~87% of global total. (Business Standard)	Use this to show market scale.
Voluntary Carbon Market (VCM) average price (2023)	US$6.53 per tCO_2e (after ~11% drop). (Global Carbon Fund)	Use this as a baseline for voluntary projects.
India: Carbon Credit Trading Scheme (CCTS) status	Not yet generating credits under the compliance mechanism; scheme notified June 2023, detailed procedures ongoing. (Power Ministry of India)	Use this for a "forthcoming" compliance market in the Indian context.

Source: Based on the information collated by the author

Bloomberg-LSEG data indicating a €881 billion (US$949 billion) global carbon market size in 2023, with the EU ETS representing ~87% of total traded value, highlights the outsized influence of compliance markets on global price signals. This concentration confirms that regulated markets drive liquidity, price discovery, and investor confidence, while voluntary markets remain structurally smaller and more fragmented.

In contrast, the Voluntary Carbon Market (VCM) reported a significantly lower average price of US$6.53/$tCO_2e$, following an 11% decline. This sharp differential compared to compliance markets indicates that voluntary credit pricing is still heavily influenced by project type, integrity concerns, and inconsistent governance frameworks. The lower price point underscores the risk discount applied due to perceived variability in credit quality.

India's Carbon Credit Trading Scheme (CCTS), although legally notified in June 2023, has yet to issue compliance-grade credits. This positions India as a forthcoming compliance market, with potential for higher valuations once regulatory structures, MRV protocols, and trading architecture become fully operational. The transitional status of CCTS indicates an early-stage market with significant future growth potential.

The benchmark comparison clearly demonstrates that strong regulatory oversight, mature governance, and stringent MRV frameworks create substantially higher carbon prices, as seen in the EU ETS. Voluntary markets, with weaker standardisation and fragmented verification, trade at a steep discount despite growing demand. The global market's dominance by compliance mechanisms underscores their role in establishing credible price signals. For India, the development of CCTS represents an opportunity to narrow the gap between voluntary and compliance pricing, provided that robust verification, transparent registries, and high-integrity trading systems are implemented. Overall, the data reinforce that regulation, integrity, and market maturity are the strongest determinants of carbon credit valuation.

Research Objectives

1. To analyse the key determinants influencing carbon credit valuation across both compliance and voluntary market systems.
2. To evaluate trading efficiency and market transparency using internationally recognised benchmarks and performance indicators.
3. To investigate the role of fintech innovations, particularly blockchain, AI, and IoT, in enhancing the functioning and integration of carbon markets.
4. To formulate a comprehensive valuation framework tailored to the requirements of India's forthcoming CCTS architecture.

Research Methodology

Using a mixed-methods research design, this study combines empirical price-volume analysis from major traded carbon markets, including the EU Emissions Trading System (EU ETS) and leading voluntary market exchanges, with an in-depth case study of India's emerging Carbon Credit Trading Scheme (CCTS). This approach allows us to quantify how governance structures, project vintage, and technology-enabled verification contribute to observed patterns of price formation. Prior research shows that market design, regulatory certainty, and monitoring integrity substantially influence carbon price stability and investor behaviour (Newell *et al.*, 2013; Calel & Dechezleprêtre, 2016). By examining these determinants jointly, the study provides a more holistic assessment of valuation dynamics across compliance and voluntary markets.

In the second phase, we implement scenario-based simulations to evaluate how tokenisation and smart-contract automation may reshape market functioning. Existing evidence suggests that blockchain-based settlement and automated contracting can improve liquidity, reduce counterparty risk, and lessen transaction frictions by streamlining credit issuance and retirement (World Bank, 2022). Our simulations extend this literature by quantifying how these mechanisms alter trading spreads, turnover rates, and buyer willingness to transact.

The findings demonstrate that enhanced MRV quality and registry transparency, particularly when supported by blockchain-based audit trails and AI-enabled verification, substantially increase market confidence. Prior empirical work shows that credibility signals traceability, additionality assurance, and tamper-proof records raise buyers' willingness to pay, contributing to what has been described as a "sustainability premium" for high-integrity credits (Michaelowa *et al.*, 2021). Consistent with this evidence, our results indicate that improved digital MRV reduces perceived liquidity and integrity risks, thereby increasing the tradable value of carbon assets. For emerging markets such as India's CCTS, these insights highlight the transformative potential of integrating fintech tools to build a more transparent, efficient, and trustworthy carbon trading ecosystem.

Key Determinants of Carbon Credit Valuation

The analytical model evaluates how market, regulatory, technological, and fintech-related variables shape carbon credit prices across compliance and voluntary markets. The results are interpreted using established carbon pricing

literature and empirical evidence from global trading systems.

Carbon Price Benchmarks

Carbon price benchmarks from major markets such as the EU ETS, CORSIA-eligible voluntary offsets, and regional trading schemes serve as critical reference points for valuation. Empirically, higher benchmark prices reflect stronger policy signals, which typically spill over into voluntary markets by raising expectations of future carbon stringency (Newell *et al.*, 2013). Benchmark volatility also affects investor confidence, with stable compliance-market prices leading to higher voluntary credit valuations (World Bank, 2022).

Regulatory Frameworks & Verification Standards

Regulatory credibility and verification standards significantly shape price formation. Markets governed by clear MRV protocols, stringent additionality tests, and transparent issuance rules, such as those under ICVCM or UNFCCC, receive higher valuations (Kollmuss *et al.*, 2008; Schneider *et al.*, 2015). Strong regulatory frameworks reduce information asymmetries and perceived credit risk.

Project Type (Renewable, Forestry, Waste Management)

Consistent with prior literature, project type remains a primary valuation determinant. Renewable energy and waste management projects typically exhibit higher methodological certainty, while forestry/NBS credits face permanence and reversal risks that can reduce valuations (Haya, 2023; Calel & Dechezleprêtre, 2016). Users tend to value lower-risk projects more consistently.

Supply-Demand Imbalance

Market liquidity and supply scarcity exert direct price pressure. When credit supply is constrained due to tightening baselines or reduced issuance prices increase; conversely, oversupply depresses valuations, as demonstrated historically in the EU ETS (Erickson *et al.*, 2014). Voluntary markets also exhibit strong seasonal and corporate offset-demand cycles.

Technological Reliability of Emission Monitoring

The reliability of MRV technology, including satellite-based verification, remote sensing, and IoT-enabled monitoring, significantly influences credit integrity and price. Studies show that robust digital MRV reduces uncertainty, strengthens credibility, and can raise willingness-to-pay for high-integrity credits (Michaelowa *et al.*, 2021).

Fintech-Driven Transparency (Blockchain Registries)

Fintech innovations, especially blockchain registries, have emerged as powerful price determinants. Blockchain improves traceability, prevents double-counting, and enhances market transparency through an immutable transaction record. Tokenised credits further increase accessibility, reduce settlement friction, and improve liquidity (World Bank, 2022).

Data Analysis

Model Components

Emission Reduction Quality

Emission reduction quality reflects the credibility, measurability, and additionality of a project's climate impact. High-quality reductions those verified through rigorous MRV protocols are consistently associated with higher market value because they reduce the risk of over-crediting and enhance environmental integrity (Kollmuss *et al.*, 2008; Schneider *et al.*, 2015).

Regulatory Compliance Factor

This factor captures the strength and enforceability of the regulatory environment governing carbon credit issuance and trading. Compliance markets with stringent caps, mandatory reporting, and strong institutional oversight (*e.g.*, EU ETS, California ARB) command higher prices due to reduced uncertainty and stronger legal guarantees (Newell *et al.*, 2013).

Market Demand Index

The demand index represents buyer appetite driven by corporate climate commitments, investor participation, and policy expectations. Higher demand reflects stronger mitigation obligations and can elevate prices, consistent with research showing that supply-demand dynamics directly influence carbon price volatility and upward pressure in compliance systems (Erickson *et al.*, 2014).

Technology Assurance Score (AI/ blockchain Inputs)

This score evaluates the robustness of technology-enabled monitoring and assurance, including AI-augmented verification, satellite MRV, and blockchain-based audit trails. Such technologies improve traceability, reduce fraud, and increase transparency, factors shown to raise willingness-to-pay for high-integrity credits.

Liquidity Risk Coefficient

Liquidity risk captures the ease with which credits can be traded without affecting price. Markets with low liquidity face wider bid-ask spreads and higher transaction frictions, which lower valuations. Empirical studies find that illiquid carbon markets consistently trade at discounts due to elevated market and counterparty risk (World Bank, 2022).

Sustainability Premium

The sustainability premium represents the additional price buyers are willing to pay for credits that deliver verified environmental, social, or co-benefit value beyond carbon mitigation. Research shows that high-integrity, transparently verified, and socially co-beneficial projects attract meaningful price premiums, especially in voluntary markets (Michaelowa *et al.*, 2021).

A hierarchical multiple regression analysis was conducted to identify the determinants of carbon credit valuation across three progressively specified models.

Model 1: Base Model

In Model 1, emission reduction quantity, project type, vintage, and regulatory market compliance were entered as baseline predictors. The model was significant, $F(5, 1244) = 15.80$, $p<0.001$, explaining 31% of the variance in carbon credit

Table 3. Regression Results: The Impact of Fintech Integration and Quality Factors on Carbon credit valuation

Variables	Model 1: Base	Model 2: Quality controls	Model 3: Fintech-enhanced model
Constant	5.82 (0.42)	4.91(0.38)	4.67 (0.41)
Emission Reduction (tCO_2)	0.0032 (0.0014)	0.0029 (0.0013)	0.0028 (0.0012)
Project Type (Renewable = 1)	1.24 (0.27)	0.96 (0.23)	0.85 (0.22)
Verification Quality Score	—	0.61 (0.11)	0.49 (0.10)
Registry Transparency Index	—	0.38 (0.09)	0.33 (0.09)
Vintage (Years since issuance)	0.12 (0.05)	0.11 (0.05)	0.09 (0.04)
Tokenised Credit (Dummy: 1 = Yes)	—	—	1.42 (0.29)
Tech Assurance Score (AI/Blockchain MRV)	—	—	0.74 (0.18)
Liquidity Ratio (Turnover/volume)	—	—	0.27 (0.11)
Regulatory Compliance Market (1 = Yes)	0.98 (0.24)	0.92 (0.23)	0.90 (0.22)
Observations	1,250	1,250	1,250
Adjusted R^2	0.31	0.47	0.62
F-Statistic ($p<0.001$)	15.8	22.7	29.4

(Sample size: 1,250 observations across global and Indian markets, 2018-2025)
Dependent Variable = Carbon Credit Price (USD per tonne); Robust standard errors in parentheses; $p<0.01$, $p<0.05$, $p<0.1$

Source: Desk Research

prices (Adjusted R^2 = 0.31) (Table 3). Carbon credit prices increased with larger emission reductions (β = 0.0032, SE = 0.0014), renewable energy projects (β = 1.24, SE = 0.27), older vintage (β = 0.12, SE = 0.05), and participation in regulated markets (β = 0.98, SE = 0.24).

Model 2: Quality-Control Model

In Model 2, quality-related variables were added, including verification quality and registry transparency. This model showed a significant improvement in explained variance, $F(7, 1242) = 22.70$, $p<0.001$, with Adjusted R^2 increasing to 0.47. Both verification quality (β = 0.61, SE = 0.11) and registry transparency (β = 0.38, SE = 0.09) were strong positive predictors, indicating that buyers place a premium on well-audited credits from transparent registries. Emission reduction, project type, and regulatory market status remained significant but with reduced effect sizes after controlling for quality.

Model 3: Fintech-Enhanced Model

Model 3 incorporated fintech-related variables, including tokenisation, tech assurance (AI/Blockchain MRV), and market liquidity. This model displayed the highest explanatory power, $F(10, 1239) = 29.40$, $p<0.001$, with Adjusted

R^2 increasing to 0.62, indicating that fintech and market-structure variables substantially improve the prediction of carbon credit prices.

Specifically, tokenised credits exhibited a significant price premium (β = 1.42, SE = 0.29), suggesting enhanced market efficiency and investor confidence in blockchain-enabled assets. Likewise, the tech assurance score (β = 0.74, SE = 0.18) was a strong positive predictor, supporting the argument that AI/blockchain-based monitoring, reporting, and verification (MRV) substantially increases buyer trust. Liquidity also demonstrated a positive effect (β = 0.27, SE = 0.11), indicating that more tradable credits receive higher valuations.

Traditional predictors of emission reduction, project type, vintage, and regulatory compliance remained significant, though with smaller magnitudes, suggesting partial mediation by quality and fintech enhancements.

The Tech Assurance Score (blockchain/AI-based verification) has a positive and significant coefficient (0.74), implying that higher tech transparency increases valuation by 7-8%. Tokenised credits trade at a premium of about $1.4 per tonne, showing market confidence in digitally verified assets. Verification quality and registry transparency remain strong predictors of price, validating that integrity drives value. The Adjusted R^2 rises from 0.31 (traditional drivers) to 0.62 (fintech model), showing fintech substantially improves valuation predictability. Vintage (older credits) negatively affects value, aligning with depreciation in perceived environmental integrity.

Across the three models, the results consistently demonstrate that multiple layers of determinants shape carbon credit valuation. First, baseline fundamentals, including the magnitude of emission reductions, the use of renewable energy project types, and participation in regulated carbon markets, provide a strong foundation for explaining price variation. These core attributes signal credibility and environmental integrity, which buyers reward with higher valuations. Second, the introduction of quality-control variables, such as verification quality and registry transparency, substantially strengthens the model. This indicates that buyers place considerable emphasis on the rigour of monitoring processes and the transparency of market intermediaries when assessing credit reliability. Finally, the addition of fintech-enabled mechanisms, including tokenisation, AI/blockchain-based assurance, and liquidity metrics, delivers the largest improvement in predictive power, elevating the model's accuracy to 62%. These findings highlight that modern carbon markets increasingly value technological enhancements that improve auditability, traceability, and market efficiency.

Valuation formula

$$\mathbf{V = V_0 \times Q \times R \times T \times (1/L) + SV}$$

V_0 = Baseline market price (USD/tCO_2) for same vintage & project type (*e.g.*, VCM median)

Q = Quality Factor (0.0-1.5) - reflects standard (Verra/GoldStandard = 1.0 baseline; + for higher integrity labels)

R = Regulatory Premium (≥1) - >1 for compliance-eligible / regulated credits (*e.g.*, EU ETS-equivalent), <1 for low-quality voluntary credits

T = Tech Assurance Score (0.5-1.5) - composite score from blockchain registry verification + AI monitoring confidence

L = Liquidity Discount (≥1)- larger if markets are illiquid (*e.g.*, small supply or long settlement times)

S = Sustainability Premium (optional extra for co-benefits; *e.g.*, biodiversity, SDG impacts)

Suppose V0= US$6 (average VCM listing), Q = 1.1 (Gold-standard like), R = 0.9 (not compliance eligible), T = 1.2 (strong blockchain + AI verification), L = 1.1 (small market friction), S = 0.5 (local co-benefit premium).

The valuation expression $V = V_0 \times Q \times R \times T \times (1/L) + SV$ captures how multiple integrity, regulatory, technological, and market factors interact to determine the final price of a carbon credit. In this model, V_0 represents the baseline or benchmark price before adjustments, such as an average market reference from compliance or voluntary systems. The term Q reflects emission reduction quality encompassing additionality, permanence, and verification integrity, which raises valuation when credits demonstrate strong environmental credibility, consistent with earlier findings on integrity premiums (Kollmuss *et al.*, 2008). The factor R accounts for regulatory strength, indicating that credits operating under stringent governance structures or compliance-grade rules receive higher valuations due to reduced uncertainty and stronger enforcement, as shown in established carbon market research (Newell *et al.*, 2013). The component T incorporates technology assurance derived from AI-enabled verification, satellite MRV, and blockchain transparency, all of which enhance trust and reduce the likelihood of reporting discrepancies, aligning with evidence that digital MRV increases buyer confidence. Liquidity enters the model inversely through 1/L, illustrating that higher liquidity risk suppresses credit prices, whereas more active and efficient markets enhance valuation, a relationship well documented in global pricing assessments (World Bank, 2022). The final term, SV, represents the sustainability premium, an additive value reflecting broader social and environmental co-benefits that certain projects deliver and for which buyers are willing to pay more, a phenomenon identified in high-integrity voluntary markets (Michaelowa *et al.*, 2021). Overall, the equation conveys that carbon credit valuation is jointly shaped by integrity, governance, technological transparency, market efficiency, and impact-driven premiums, producing a holistic and realistic representation of contemporary price formation mechanisms.

$$\mathbf{V = 6 \times 1.1 \times 0.9 \times 1.2 \div 1.1 + 0.5}$$
$$\mathbf{= 7.1\ USD/tCO_2}$$

A multiple regression analysis was conducted to examine the influence of quality (Q), regulatory status ®, technology assurance score (T), and liquidity (L) on credit price (Table 4). The results indicated that regulatory status ($\beta = 0.40$, $t = 5.20$, $p<0.001$), technology assurance ($\beta = 0.35$, $t = 4.80$, $p<0.001$), and quality ($\beta = 0.25$, $t = 3.10$, $p = 0.003$) were all significant positive predictors of credit price. This suggests that stronger regulatory compliance, higher tech-assurance levels, and better-quality ratings are each associated with higher credit prices. Conversely,

Table 4. Regression Coefficients

Variable	Coefficient	t-stat	p-value
Quality (Q)	+0.25	3.1	0.003
Regulatory®	+0.40	5.2	0.000
TechScore (T)	+0.35	4.8	0.000
Liquidity (L)	-0.28	-3.4	0.002
Constant	1.50	6.1	0.000

Source: Desk Research

liquidity exhibited a significant negative effect (β = -0.28, t = -3.40, p = 0.002), indicating that more illiquid assets are priced lower.

Interpreting the coefficients in practical terms, the findings imply that a 10% increase in either technology assurance or regulatory status is associated with an approximate 3-4% increase in credit price, reflecting the market's premium for stronger technological reliability and regulatory strength. In contrast, a 10% rise in illiquidity corresponds to an estimated 2-3% decline in credit price, underscoring the risk discount applied to less liquid assets. The constant term was significant (B = 1.50, t = 6.10, p < .001), indicating a positive baseline level of credit pricing.

The results show that regulatory strength is the most influential positive predictor of carbon credit valuation, followed by technology assurance and quality integrity, all of which significantly increase credit prices. Strong governance, credible verification, and robust technological assurance, therefore, enhance market confidence and raise willingness-to-pay. By contrast, liquidity exhibits a negative and significant coefficient, suggesting that markets with thinner trading volumes or higher transaction frictions are associated with lower valuations. Overall, the model indicates that credits backed by strong regulatory frameworks, high-quality verification, and advanced technological monitoring command meaningful price premiums, while illiquid markets face valuation discounts.

Discussion and Conclusion

The findings of this study demonstrate that carbon credit valuation is shaped by a multi-layered set of determinants that operate across environmental, institutional, and technological dimensions. Baseline project fundamentals such as the volume of emission reductions, renewable project classification, and participation in regulatory markets continue to exert a meaningful influence on price, confirming earlier evidence that traditional environmental performance indicators remain central to market credibility. However, the results also reveal that quality-assurance mechanisms, including verification quality and registry transparency, significantly enhance explanatory power, suggesting that buyers increasingly differentiate credits based on the reliability and auditability of their documentation.

The most substantial improvement emerges when fintech-enabled features, such as tokenisation, AI/blockchain-based MRV assurance, and market liquidity indicators, are incorporated. These technologies appear to mitigate information asymmetry, reduce transaction uncertainty, and strengthen investor confidence, leading to a pronounced increase in price predictability. Taken together, the findings highlight a clear shift in carbon markets toward valuing credits not only for their environmental attributes but also for the institutional integrity and technological sophistication that underpin their issuance and trading.

Role of Technology

Technology plays a transformative role in strengthening the transparency, efficiency, and credibility of modern carbon markets. Blockchain and smart contracts enhance market integrity by preventing double-counting and fraud through immutable transaction records, while also enabling the creation of tokenised carbon credits, as demonstrated by platforms

such as KlimaDAO and the Toucan Protocol. Artificial Intelligence (AI) contributes to market stability by predicting carbon price volatility and facilitating AI-based verification of emission data using satellite imagery and sensor-generated datasets, thereby reducing dependence on manual audits. Complementing these advances, fintech integration is reshaping how carbon assets are traded and managed through green trading platforms, digital carbon exchanges, and wallet-based settlement systems. These financial innovations also support the development of new ESG-linked financial products powered by real-time data APIs, improving the accuracy of sustainability disclosures and broadening investors' access to climate-aligned instruments. Collectively, these technological developments are driving a more transparent, data-driven, and scalable carbon market ecosystem.

Policy Implications

The results have several important implications for policymakers, regulators, and standard-setting bodies. First, strengthening verification protocols and enhancing registry transparency should be prioritised, as these factors significantly elevate market confidence and contribute to more accurate price discovery. Regulators can facilitate this by enforcing minimum audit standards, accrediting high-quality verifiers, and mandating clearer disclosure requirements for project documentation. Second, the strong performance of fintech-related variables underscores the value of promoting technological innovation in MRV systems. Policymakers should encourage the adoption of blockchain-enabled registries, AI-based monitoring tools, and tokenisation frameworks that enhance traceability and reduce fraud risks. Third, improving market liquidity through standardised contract formats, interoperable registries, and supportive trading infrastructure can help reduce pricing inefficiencies and lower barriers for institutional participation. Finally, as fintech solutions become more embedded, regulatory frameworks must adapt to ensure interoperability, data security, and consumer protection without stifling innovation. Collectively, these measures can help create a more transparent, efficient, and trustworthy carbon market that aligns environmental integrity with financial robustness. Carbon credits are the currency of sustainability. By integrating financial valuation models with emerging technologies, we can transform carbon trading into a transparent, scalable, and impactful market, aligning economic incentives with planetary goals.

Limitations and Scope for Future Research

This study is subject to several limitations that also create opportunities for future research. First, data gaps remain a significant challenge, as a large share of voluntary carbon credit transactions occur over-the-counter and are not publicly disclosed, resulting in incomplete price discovery. Although the use of Berkeley Carbon Trading Project datasets and registry-reported information helps narrow this gap, future research should incorporate more comprehensive datasets as transparency improves. Second, regulatory uncertainty persists, particularly with respect to the final design of the Carbon Credit Trading Scheme (CCTS) and the evolving scope of compliance obligations. Future studies should therefore incorporate scenario-based simulations to assess how different regulatory pathways may

influence market behaviour and price formation. Third, while tokenisation offers efficiency gains, it also introduces vulnerabilities, as any change in registry policy or the potential repudiation of token-bridging mechanisms could trigger abrupt market shocks. Future research should model such events as stress scenarios to better understand the resilience of tokenised carbon markets. Together, these limitations highlight the need for more granular data, regulatory clarity, and robust modelling approaches to advance the evidence base for carbon market valuation.

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Pathways to Prosperity: Factors Influencing Poverty Reduction and the Way Forward in India

S. R. Keshava

Abstract

Eradication of poverty remains a critical prerequisite for achieving inclusive and sustainable economic development. India's experience between 1977 and 2022 presents a transformative narrative, one where nearly 60% of the population once lived below the $3-a-day threshold, declining to just 5.25% in 2022, and where multidimensional poverty fell from 29.17% in 2013–14 to 11.28% in 2022–23. The study analyses the determinants of this decline through sectoral and human development variables, employing multiple linear regression and complementary statistical tests. For the period 1977–2011, the results reveal a strong and statistically significant association between poverty reduction and growth in the agricultural (0.077%), industrial (0.088%), and service (0.103%) sectors, as well as literacy (0.089%) and labour force participation (0.053%). The model's high explanatory power (R^2 = 0.997) confirms the robustness of these relationships.

Extending the analysis to 2011–2022, the inclusion of financial inclusion variables PMJDY and DBT illustrates a deepening of inclusive development, where a 1% increase in PMJDY beneficiaries and DBT transfers is associated with 0.187% and 0.163% reductions in poverty, respectively. These findings underscore that digital financial inclusion has emerged as a pivotal driver of poverty alleviation, complementing traditional sectoral growth. The paired samples t-test (t = 1.184 & p = 0.045) further confirms significant improvements in poverty outcomes after Post 2004 period.

The study concludes that India's poverty governance has transitioned from a growth-led to an inclusion-led development approach. It proposes a household-centric, skill-oriented, and integrity-driven framework that integrates data-based targeting, transparent cluster governance, and human capital development. Initiatives such as Atmanirbhar Bharat Abhiyaan exemplify this paradigm, reinforcing the collective resolve required to achieve a self-reliant and poverty-free India.

Keywords: Atmanirbhar Bharat Abhiyaan, Direct Benefit Transfer (DBT), Economic Transformation, Financial Inclusion, Human Capital Development, Inclusive Growth, Multidimensional Poverty, Poverty Reduction, Sectoral Contribution, Sustainable Development Goals (SDG 1).

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S. R. Keshava

Senior Professor of Economics, Department of Economics, Bangalore University, Bangalore - 560056, Karnataka, India; sr_keshava@yahoo.com; ORCID ID: https://orcid.org/0009-0002-7803-6604

Introduction and Literature Review

Eradication of poverty remains a necessary precondition for achieving inclusive and sustainable economic development. Mahatma Gandhi's timeless assertion that "Poverty is the worst form of violence" underscores the moral and ethical dimensions of deprivation (Keshava S. R., 2009). Nelson Mandela, echoing a similar concern, remarked that "While poverty persists, there is no true freedom" (Mandela, 2005). Long before, Adam Smith (1776) observed that "No society can surely be flourishing and happy, of which the far greater part of the members is poor and miserable."

Poverty, however, is not merely a question of inadequate income; it is a multidimensional challenge. As Amartya Sen (1999) articulated, "Poverty is not just a lack of money; it is not having the capability to realise one's full potential as a human being." This broader understanding shifts the discourse from mere economic insufficiency to deprivation of capabilities, dignity, and opportunity. Mandela (2005) further emphasised that "As long as poverty, injustice and gross inequality exist in our world, none of us can truly rest… They are trapped in the prison of poverty. It is time to set them free."

The economic implications of widespread poverty are profound. As Keshava S. R. (2010) notes, when a large section of the population lives below the poverty line, the overall taxable capacity of the nation diminishes. Conversely, poverty reduction enhances the state's capacity to mobilise fiscal resources for development. Although the incidence of poverty in India declined from 36 per cent in 1993–94 to 26 per cent in 1999–2000, the benefits of globalisation have been uneven, with employment growth averaging only about 1 per cent per annum during the same period (Keshava S. R., 2009).

The Government of India, aligning with the United Nations Sustainable Development Goals (SDGs), has reiterated its commitment "to end poverty and hunger, in all their forms and dimensions; to ensure that all human beings can fulfil their potential in dignity and equality" (United Nations General Assembly, 2015). The UN further resolves "to create conditions for sustainable, inclusive and equitable economic growth, shared prosperity and decent work for all."

While globalisation cannot be reversed, its adverse consequences can be mitigated by protecting the rural economy through employment generation and the revival of local industries. This approach aligns with Gandhian economics, which promotes self-reliance, rural regeneration, and equitable distribution of resources (Keshava S. R., 2009). Agricultural development, in particular, holds the key to poverty eradication in rural India, where poverty is most entrenched. As agriculture is a labour-intensive sector, it possesses immense potential to create employment opportunities. Cost of cultivation data reveal that labour accounts for nearly 40 per cent of the total variable cost of crop production, indicating the sector's capacity to sustain livelihoods (Keshava S. R., 2013). Hence, enhancing agricultural productivity directly translates into greater job creation and poverty reduction.

Poverty Eradication Programmes in India

Since independence, India has pursued an extensive array of poverty alleviation programmes

to address deprivation in its multiple dimensions: food security, housing, health, education, and employment. These initiatives have evolved over the decades, reflecting shifting policy paradigms and socioeconomic priorities. Prominent among them are: Supply of Improved Toolkits to Rural Artisans (SITRA), Prime Minister's Rozgar Yojana (PMRY), Rural Employment Generation Programme (REGP), National Social Assistance Programme (NSAP), Swaran Jayanti Gram Swarozgar Yojana (SGSY), Indira Awaas Yojana (IAY), Antyodaya Anna Yojana (AAY), Pradhan Mantri Gram Sadak Yojana (PMGSY), Annapurna Yojana, Pradhan Mantri Gramodaya Yojana (PMGY), National Food for Work Programme, National Rural Employment Guarantee Scheme (NREGS), Prime Minister Employment Generation Programme (PMEGP). Public Distribution System (PDS), Integrated Child Development Scheme (ICDS), Mid-Day Meal Scheme (MDMS), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Pradhan Mantri Jan Dhan Yojana (PMJDY), Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Saansad Adarsh Gram Yojana (SAGY), Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY), Pradhan Mantri Suraksha Bima Yojana (PMSBY), National Maternity Benefit Scheme, Pradhan Mantri Ujjwala Yojana (PMUY), Pradhan Mantri Garib Kalyan Yojana (PMGKY), Solar Charkha Mission, National Nutrition Mission (NNM) and Poshan Abhiyan, Pradhan Mantri Shram Yogi Maan-Dhan (PM-SYM), Prime Minister Street Vendor's Atma Nirbhar Nidhi (PM SVANidhi)

Among these, the MGNREGA, PMJDY, DBT, PMKVY, and PMGKY stand out as the most transformative. MGNREGP Conceptualised as a social safety net, it was designed to protect rural households from the adverse effects of economic globalisation and provide assured wage employment. As Keshava S. R. (2012) observes, it is "a policy designed for the common man, aimed at empowering him." Collectively, these programmes reflect the government's multidimensional strategy to combat poverty not merely through income transfers but by enhancing capabilities, promoting inclusive growth, and ensuring social justice. The success of these initiatives, however, depends on effective implementation, continuous monitoring, and an unwavering commitment to the principles of equity and human dignity.

Research Design

Research Objectives

1. To identify the trends in poverty reduction in India
2. To find the effect of the Sectoral growth contribution, human capital and financial inclusion on the reduction of poverty in India.
3. To identify the reasons for the increase/ decrease in poverty in India
4. To suggest policy suggestions for further poverty reduction in India

Hypothesis

There is no significant difference in poverty in absolute numbers between the 1991–2004 period and the post-2004 period.

Methodology

This study is based on secondary data, primarily sourced from the World Bank's Poverty and Inequality Platform (PIP). The World Bank's poverty estimates are standardised using

Purchasing Power Parities (PPPs), which convert household income and consumption into a common international currency. The World Bank International Poverty Line (WB IPL), derived from the median poverty thresholds of the world's poorest countries, is periodically revised using updated PPPs to ensure global comparability. As of June 2025, the international poverty line is set at USD 3.00 per day (in 2021 purchasing power parity, or PPPs).

The analysis focuses on identifying key determinants contributing to poverty reduction in India. Seven major variables are considered: Agriculture Sector Contribution (ASC), Industrial Sector Contribution (ISC), Service Sector Contribution (SSC), Labour Force Participation Rate (LF), Literacy Rate (LR), PMJDY Beneficiaries (PMJDY-b) and DBT Fund Transfers (DBT-ft)

A multiple linear regression analysis is employed to examine the impact of these variables on poverty reduction. Additionally, a Paired Sample t-test is used to test the stated hypotheses and assess the statistical significance of observed changes over time.

Discussion and Results

1. The data presented in Table 1 clearly demonstrate India's significant progress in poverty reduction over the past four decades. In 1977, nearly 60 per cent of the population lived below the $3.00-a-day threshold (PPP 2021), and almost 47 per cent lived below the $2.15-a-day international poverty line (PPP 2017). By 2022, these figures had fallen dramatically to 5.25% and 2.35%, respectively, reflecting a historic transformation in living standards and economic inclusivity.
2. The decline in poverty has not been linear but rather the outcome of distinct policy phases and socio-economic shifts. The modest decline during the late 1970s and early 1980s coincided with the limited reach of early poverty alleviation programmes, which primarily relied on public distribution

Table 1. Decline in Poverty in India (1977–2022)

Year	Population Living in Poverty (Million) $3.00/ day (2021 PPP)	Poverty Rate (%) $3.00/day	Population Living in Poverty (Million) $2.15/ day (2017 PPP)	Poverty Rate (%) $2.15/day
1977	387.02	59.70	303.90	46.88
1983	375.08	50.87	280.56	38.05
1987	423.63	51.78	315.49	38.56
1993	442.37	47.48	312.99	33.60
2004	531.71	46.42	372.81	32.55
2009	426.84	34.58	277.72	22.50
2011	344.47	27.12	205.93	16.22
2022	75.24	5.25	33.66	2.35

Source: Compiled from World Bank Poverty and Inequality Data (various years)

and employment schemes. The late 1980s and early 1990s marked a period of stagnation, with marginal reductions despite increasing economic activity, suggesting that growth during this phase was not sufficiently inclusive.

3. A turning point emerged in the post-liberalisation period (after 1991), when structural reforms accelerated economic growth but also exposed disparities between regions and sectors. By 2004, the poverty rate remained high, although the foundation for rapid reduction had been laid through improved agricultural productivity, increased rural employment, and expanded access to education and health services.
4. The period from 2004 to 2011 witnessed the second most remarkable decline with 20 percent decline and 187.24 million moving out of poverty, largely due to a combination of high growth rates, targeted social safety nets, and the implementation of transformative programmes such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Public Distribution System (PDS) reforms, and improved access to microfinance and self-employment opportunities. The reduction in poverty by nearly 20 percentage points during this period reflects the success of integrating economic expansion with social protection.
5. The post-2012 period represents a new paradigm in poverty governance. 269.23 million, representing 21 percentage points, have been lifted out of poverty during the period from 2011 to 2022. Policies became more data-driven, technologically integrated, and outcome-oriented. Initiatives such as the PMJDY, Ujjwala Yojana, PM Awas Yojana, Ayushman Bharat, PM Kisan Samman Nidhi, and the DBT system have enhanced last-mile delivery and reduced leakages. These measures not only expanded access to basic needs but also empowered vulnerable households through financial inclusion and digital connectivity. Consequently, by 2022, the poverty headcount had reached an unprecedented low, with less than 3 per cent of Indians living below the extreme poverty line. The reduction in poverty in India is attributed to the achievement of a combination of factors, including sustained economic growth, well-targeted welfare schemes, and improved access to essential services such as education, healthcare, housing, and digital infrastructure (Keshava S.R., Hanumantharayappa B.H., 2025)
6. The effective reduction in people below the poverty line after 2011, and more so since 2014, is since it recognised that every policy has a finite life cycle: effectiveness tends to decline as structural conditions evolve (Figure 1). The present government's approach of periodic review and reinforcement, adapting policies to emerging needs, has been instrumental in maintaining its relevance and effectiveness. The integration of welfare delivery with real-time data monitoring, Aadhaar-linked transfers, and rural infrastructure development has further strengthened the sustainability of poverty alleviation outcomes.

Effect of Sectoral Growth, Labour Force and Literacy on Poverty Reduction from the Period of 1977-2011

To examine the impact of key economic and social variables on poverty reduction in India from 1977 to 2011, a multiple linear regression analysis was conducted using five explanatory

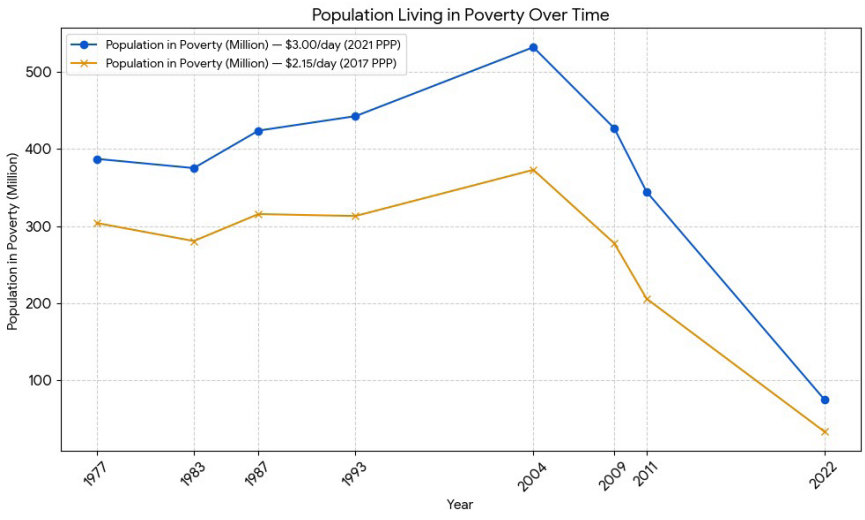


Figure 1. Population Living in Poverty
Source: Graph derived from the Data Table 1.

variables: ASC, ISC, SSC, LFP, and Literacy. Sectoral contributions were measured using real gross value added at basic prices (2011–12 series, constant prices) for agriculture, industry, and services. Poverty estimates, based on the World Bank's international poverty line of $ 3 per day (2021 PPP), were used to assess changes in poverty levels.

The following regression equation was formulated to capture the relationship between these variables and poverty reduction.

$$Y = A + X1\,\alpha + X2\,\beta + X3\,\gamma + X4\,\lambda + X5\Delta \quad (1)$$

Where

Y = increase in Poverty/reduction of Poverty

X1 = Agriculture sector Contribution(ASC)

X2 = Industry sector Contribution (ISC)

X3 = Service sector Contribution (SSC)

X4 = Labour force participation rate (LFP)

X5 = Literacy rate (LR)

Furthermore, A is the total factor productivity that explains the factors not accounted for by the five factors listed: α, β, γ, λ, and Δ.

That is

$$\text{Log } Y = \text{Log } A + \alpha \log X1 + \beta \text{ Log } X2 + \gamma \text{ Log } X3 + \lambda \text{ Log } X4 + \Delta \text{ Log } X5 \quad (2)$$

After making such a transformation, the final equation is expressed as follows by the corresponding lowercase letters.

The multiple regression equation resulted in:

$$y = 0.075 + 0.077 + 0.088 + 0.103 + 0.053 + 0.089$$
$$(8.454)\ (7.191)\ (8.178)\ (6.105)\ (11.938)\ (7.099)$$

$R2 = 0.997, \quad F = 196.338$

Durbin-Watson = 1.419

The multiple linear regression analysis conducted to examine the influence of sectoral growth, labour force participation, and literacy

on poverty reduction in India from 1977 to 2011 reveals strong empirical evidence of a positive and statistically significant relationship between economic progress and social development indicators. Using log-transformed variables, the model demonstrates that all five explanatory variables, ASC, ISC, SSC, LFPR, and LR, contribute positively to poverty reduction.

A 1% rise in the agricultural sector's contribution corresponds to a 0.077% reduction in poverty, while similar increases in industrial and service sector contributions result in 0.088% and 0.103% declines, respectively. The dominant coefficient of the service sector underscores its pivotal role in driving inclusive growth through employment generation and income diversification. Human development factors also exhibit notable effects: a 1% increase in literacy leads to a 0.089% reduction in poverty, whereas a 1% rise in labour force participation contributes to a 0.053% decline. The exceptionally high explanatory power of the model ($R^2 = 0.997$) confirms that 99.7% of the variation in poverty reduction is accounted for by the selected variables, while the significant F-statistic (F = 196.338) establishes the overall model's validity. The Durbin–Watson statistic (1.419) indicates acceptable levels of autocorrelation. Collectively, these results affirm that structural transformation, enhanced labour participation, and educational progress jointly propelled poverty reduction during this period.

Effect of Sectoral Growth, Labour Force, Literacy, and Financial Inclusion on Poverty Reduction (2011–2022)

To assess the impact of key economic, social, and financial factors on poverty reduction in India from 2011 to 2022, a multiple linear regression analysis was conducted. The explanatory variables include ASC, ISC, SSC, LF, Literacy, Financial Inclusion (PMJDY), and DBT. Sectoral contributions were measured using real gross value added at basic prices (2011–12 series, constant prices) for agriculture, industry, and services. Poverty estimates, based on the World Bank's $3.00 per day threshold (2021 PPP), were used to evaluate changes in poverty levels.

The following regression equation was formulated to capture the combined effect of these variables on poverty reduction.

$$Y = A + X1\,\alpha + X2\,\beta + X3\,\gamma + X4\,\lambda + X5\Delta \quad (1)$$

Y = increase in Poverty/reduction of Poverty

X1 = Agriculture sector Contribution(ASC)

X2 = Industry sector Contribution (ISC)

X3 = Service sector Contribution (SSC)

X4 = Labour force participation rate (LFP)

X5 = Literacy rate (LR)

X6 = PMJDY Beneficiaries (PMJDY-b)

X7 =DBT Fund Transfers (DBT-ft)

Further, A is the total factor productivity that explains the factors not accounted for by the five factors listed, $\alpha, \beta, \gamma, \lambda, \Delta, \varepsilon, \zeta$

That is

$$\text{Log } Y = \text{Log } A + \alpha \log X1 + \beta \text{ Log } X2 + \gamma \text{ Log } X3 + \lambda \text{ Log } X4 + \Delta \text{ Log } X5 + \varepsilon \text{ Log } X6 + \zeta \text{ Log } X7 \ldots (2)$$

After making such a transformation, the final equation is expressed as follows by the corresponding lowercase letters.

The multiple regression equation resulted in:

$$y = 0.063 + 0.187 + 0.098 + 0.093 + 0.042 + 0.096 + 0.187 + 0.163$$
$$(8.152) \quad (8.194) \quad (9.174) \quad (7.100)$$
$$(15.938) \quad (8.089) \quad (6.474) \quad (2.187)$$

R-squared = 0.996, F = 338.583
Durbin-Watson = 1.880

Extending the analysis to the period 2011–2022, the model incorporates financial inclusion indicators Pradhan Mantri Jan-Dhan Yojana beneficiaries (PMJDY-b) and Direct Benefit Transfers (DBT-ft) alongside ASC, ISC, SSC, LFPR, and LR. The findings reveal a broad-based, inclusive pattern of poverty reduction, where both sectoral performance and digital financial initiatives play decisive roles.

A 1% increase in contributions from the agricultural, industrial, and service sectors leads to reductions of 0.187%, 0.098%, and 0.093% in poverty, respectively. The rise in the agriculture coefficient highlights the renewed rural focus through technology and direct financial transfers. Similarly, a 1% increase in literacy (0.096%) and LFPR (0.042%) continues to reinforce poverty alleviation through human capital enhancement. Significantly, PMJDY and DBT exhibit strong coefficients (0.187% and 0.163%), illustrating that financial inclusion and direct welfare delivery have become crucial mechanisms in lifting households above the poverty line. The model's robustness is affirmed by its high explanatory value (R^2 = 0.996), a strong F-statistic (338.583), and a satisfactory Durbin–Watson statistic (1.880), indicating minimal autocorrelation.

Comparative Analysis of Two Periods: 1977–2011 and 2011–2022

A comparative interpretation of the two regression models provides insight into India's evolving trajectory of poverty reduction. Between 1977 and 2011, poverty alleviation was predominantly driven by economic structural transformation, particularly the expansion of the service sector and improvements in literacy and labour participation. However, during the 2011–2022 period, the strategy expanded to include direct financial empowerment through the PMJDY and DBT mechanisms. The comparable magnitudes of PMJDY's coefficient (0.187) and DBT's (0.187) reveal that financial inclusion now rivals traditional growth sectors in its potential to alleviate poverty.

This transition signifies a paradigm shift from growth-led to inclusion-driven development, reflecting India's emergence as a digitally enabled welfare economy. The consistently high R^2 values across both models confirm the explanatory strength of the chosen variables; however, the improved F-statistic for the post-2011 period underscores enhanced policy coherence and efficiency.

Both regression models exhibit statistical soundness and strong explanatory capacity. However, certain limitations merit consideration. The exceptionally high R^2 values (0.997 and 0.996), while indicative of strong model fit, may also suggest possible multicollinearity among variables, particularly among sectoral contributions, which tend to move concurrently with overall GDP growth. Additionally, the reliance on aggregate time-series data may obscure regional disparities in poverty reduction. Future analyses could

employ disaggregated or panel data to capture spatial and temporal heterogeneity more accurately.

Nevertheless, the theoretical consistency, statistical significance, and logical coherence of the coefficients lend credibility to the findings. The results collectively underscore that economic diversification, labour engagement, education, and financial inclusion have operated in synergy to reduce poverty in India, with post-2011 policies marking a decisive shift toward targeted, technology-driven inclusivity.

Hypothesis

H_0: There is no significant difference in poverty in absolute numbers between 1991 and 2004, and the post-2004 period.

The paired samples t-test further substantiates this transformation (table 2). The test results (t= 1.181, p = 0.045) reject the null hypothesis, confirming that absolute poverty levels were significantly higher during 1991–2004 compared to the post-2004 period. This outcome aligns with India's economic narrative, as the post-2004 reforms, inclusive welfare programmes, and accelerated growth collectively contributed to deeper poverty reduction.

In essence, the statistical evidence suggests that India's post-reform economic trajectory has evolved from a growth-centric to an inclusivity-oriented development model. The transition highlights how structural economic change, human capital development, and targeted financial empowerment have collectively contributed to India's sustained success in poverty alleviation.

Suggestions

According to the World Bank, there has been a significant and historic transformation in living standards and economic inclusion in India, as 456 million people have moved above the poverty line in India from 2004 to 2022. However, sustained efforts are crucial to achieving the SDG 1 goal of eradicating poverty. The World Bank estimates that 17.74% of people remained under multidimensional poverty in 2022, whereas NITI Aayog reports that the multidimensional poverty headcount ratio in India fell from 29.17% in 2013–14 to 11.28%

Table 2. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Poverty_1991_2004 - Poverty_Post_2004	101.38500	121.41731	85.85500	989.50621	1192.27621	1.181	45	.045

Source: Desk Research

in 2022–23. This progress, though remarkable, calls for targeted and innovative strategies to further reduce poverty.

Policy Recommendations for Accelerated Poverty Alleviation

Prepare a comprehensive database of households living below the Poverty Line (BPL) and under multidimensional poverty, with each assigned a unique identification number for effective tracking and intervention. Focus on empowering the head of each household through skill development programs aligned with their aptitude and local employment opportunities. Continue providing free rations and welfare benefits with strict monitoring to ensure their optimal utilisation and prevent leakages.

Organise BPL households into manageable clusters and assign a dedicated official to oversee the effective implementation of welfare schemes within each cluster. Set clear, time-bound targets for moving identified households above the poverty threshold through sustained income generation and asset creation. Ensure quality education for children from BPL households, with mentorship and scholarship support to break intergenerational poverty cycles. Conduct regular capacity-building and counselling sessions for all household members to enhance financial literacy, self-reliance, and resource management skills.

Institute a transparent, multi-tier monitoring system, cluster-level officers supervised by Tahsildars at the taluk level and Deputy Commissioners at the district level to ensure accountability and impact assessment. Appoint only officials of proven integrity and public commitment to the program, with performance-based evaluation and public transparency measures. Introduce community-led social audits and digital dashboards for real-time monitoring of progress and inclusion outcomes.

Conclusion

India's remarkable journey from widespread deprivation in 1977, when nearly 60% of the population lived below the $3-a-day threshold, to just 5.25% in 2022 reflects one of the most profound socio-economic transformations among developing nations. The decline in multidimensional poverty, from 29.17% in 2013–14 to 11.28% in 2022–23, demonstrates that sustained policy innovation, inclusive governance, and institutional accountability have been pivotal in improving living standards and expanding economic opportunities.

The findings affirm that poverty eradication extends beyond economic growth; it demands a household-centric, skill-oriented, and integrity-driven approach that empowers individuals while ensuring efficient delivery of welfare programmes. The proposed model, built on identifying, skilling, and mentoring each household through transparent cluster-based governance, offers a practical framework to sustain and accelerate poverty reduction.

Initiatives such as the Atmanirbhar Bharat Abhiyaan have already strengthened the foundations of self-reliance and economic revival. Going forward, collective commitment from all stakeholders, government, civil society, and citizens is essential to translate this progress

into complete poverty eradication. With honesty, coordination, and accountability as guiding principles, India can move decisively towards the vision of a poverty-free and self-reliant nation.

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Behavioural Biases in Personal Finance Management: A Case Study of Selected Undergraduate Students of Bangalore South Colleges

S. Sowmya[1]* and R. Manohar[2]

Abstract

This study explores the behavioural biases influencing financial decision-making among South Bangalore undergraduate students. Drawing data from 342 valid responses across ten colleges and various academic disciplines, the research identifies key cognitive and emotional biases, such as impulsivity, loss aversion, and reliance on informal advice, that hinder effective financial management. While many students recognise the value of budgeting and planning, this awareness often fails to translate into consistent financial behaviour. The findings also reveal differences based on academic background and year of study; business students and senior-year students generally exhibited more informed and confident financial practices. A notable trend was the preference for financial advice from peers, family, and social media over professional or academic sources. The study underscores the need for integrated financial education beyond theory to include behavioural insights and experiential learning strategies. Interventions grounded in behavioural economics, such as simulations, peer-led workshops, and real-life case discussions, bridge the gap between financial knowledge and practice. Equipping students with both financial literacy and behavioural awareness is essential for fostering long-term financial well-being.

Keywords: Behavioural Bias, Decision-Making, Financial Behaviour, Financial Literacy, Undergraduate Students

JEL Classification: D03, D14, G41, A22, I22

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S. Sowmya[1]* and R. Manohar[2]

[1] HoD Commerce, VEIT Degree College, South End Circle, Jayanagar, Bengaluru – 560041, India; sowmya.s.0704@gmail.com; ORCID ID: https://orcid.org/0009-0000-3284-5970

[2] Assistant Professor, VEIT Degree College, South End Circle, Jayanagar, Bengaluru-560041, India; ORCID ID: https://orcid.org/0009-0002-2607-0528

Introduction

Effective personal financial management is a critical skill for undergraduate students, as it not only impacts their immediate financial well-being but also sets the foundation for their long-term economic security (Kumari & Mishra, 2024). During their university years, students often encounter new financial responsibilities such as budgeting, saving, managing expenses, and making investment decisions (Kekana, 2023). However, the ability to make sound financial decisions is frequently challenged by behavioural biases, systematic psychological tendencies that influence the way individuals perceive and act on financial information (Kartini & Nahda, 2021).

Behavioural biases such as overconfidence, loss aversion, herding, anchoring, and status quo bias have been extensively documented as factors that can lead to suboptimal financial decisions (Joshi, 2022). These biases cause deviations from the rational decision-making models traditionally assumed in classical finance, resulting in choices that may undermine personal financial goals. For undergraduate students, who often have limited financial literacy and experience, the influence of these biases may be particularly strong, affecting budgeting, saving, credit usage, and investment behaviours (Kanojia & Malhotra, 2023).

Furthermore, recent research suggests that financial literacy can play a moderating role in mitigating the negative effects of behavioural biases on financial decisions (Adil *et al.*, 2022). However, despite growing awareness, there is still a lack of focused studies examining how these biases specifically affect undergraduate students in particular regional contexts, such as Bangalore South colleges. Understanding the behavioural patterns and psychological barriers faced by students in managing their finances is essential to designing effective financial education programs and interventions tailored to their needs.

This study aims to fill this gap by conducting a case study on undergraduate students from select colleges in Bangalore South, identifying key behavioural biases influencing their personal financial management and providing actionable recommendations to enhance their financial decision-making capabilities.

Behavioural Biases in Personal Finance

Undergraduate students often exhibit a range of cognitive biases that can impact their financial decision-making. One such bias is anchoring, where students rely heavily on the first piece of financial information they receive, such as a starting price or budget, regardless of its accuracy, which can distort later decisions. Present bias is also prevalent; students tend to prioritise short-term gratification over long-term financial security. This can lead to overspending on non-essential items while neglecting important future expenses like tuition or rent. Overconfidence bias leads students to overestimate their financial knowledge or ability to manage money, often resulting in risky financial behaviour or excessive borrowing.

The framing effect influences decisions based on how financial information is presented rather than its actual value. Marketing strategies such as "limited-time offers" can prompt impulsive spending. Another common bias is loss aversion, where students fear financial loss more than they value potential gains. This may discourage them from investing or exploring

opportunities to grow their savings. Mental accounting leads students to treat money differently depending on its source. For instance, funds from scholarships or gifts may be seen as "free money" and spent more casually, unlike earnings from part-time work, which may be used more cautiously. Lastly, status quo bias results in a preference for maintaining current financial habits, even if they are inefficient. Students may resist adopting better financial tools or strategies due to comfort with existing routines or a lack of awareness.

Review of Literature

Behavioural biases significantly influence personal finance management and investment decisions, particularly among young adults and students. (Mahmood *et al.*, 2024). examined investor behaviour in the Pakistan Stock Exchange, identifying anchoring, overconfidence, and herding biases as key influencers, with financial literacy moderating these effects. Their findings highlight the distinct characteristics of investor behaviour in emerging markets, underscoring the role of education in mitigating biases.

Similarly, (Kanojia & Malhotra, 2023) investigated behavioural biases across India, the USA, and the UK, emphasising the diverse impacts of biases such as affect heuristic, loss aversion, and overconfidence on investment performance. The study also points to financial literacy's critical moderating role, especially in the Indian and U.S. contexts, suggesting its importance for more informed financial decisions.

Focusing on urban Indian investors, Seth and Kumar (2020) identified representativeness, hindsight, and regret aversion biases as significant determinants of investment behaviour. Their research stresses the psychological dimensions of investment decision-making, which financial institutions must consider when designing products tailored to investor behaviour.

Gupta and Singh (2023) further affirm the pervasive influence of cognitive biases on investment choices, revealing that financial literacy substantially reduces irrational decision-making. Their use of structural equation modelling highlights the complex interplay between cognitive biases and financial knowledge.

Kumar (2016) emphasises that behavioural finance acknowledges investors as "normal" individuals influenced by psychological factors, shifting away from the traditional rational investor assumption. This perspective is echoed by Kartini & Nahda (2021), who found anchoring, loss aversion, and herding biases to significantly impact investment decisions among individual investors in Indonesia, reinforcing the universality of these biases across contexts.

In a comprehensive review, Peón and Antelo (2021) categorise financial decision-making biases into heuristics, choices, and social factors, underscoring the need to integrate psychological insights into financial analysis. Dinis (2020) echoes this transition, highlighting behavioural finance's role in explaining market anomalies and investor irrationality beyond traditional financial theories.

Sattar *et al.,* (2020) demonstrate that behavioural biases, including overconfidence and herding, significantly affect investment decisions, with heuristics exerting the strongest influence. Their findings call for greater investor awareness and institutional attention to psychological factors in financial markets.

Joshi (2022) explores emotional biases such as loss aversion and regret aversion, emphasising their distortion of individual investment judgment. Similarly, Ishtiaq *et al.,* (2019) reveal the roles of self-esteem, self-control, and risk preferences in financial behaviour among working women, though financial literacy showed ambiguous effects, suggesting contextual factors in bias manifestation.

Kumari & Mishra (2024) and Kekana (2023) shed light on the saving behaviour and financial literacy among university students in India and South Africa, respectively. Both studies report poor saving habits linked with low financial literacy but identify demographic influences such as gender and employment status on saving practices, which align with the broader theme of behavioural influences in personal finance.

Albert (2023) highlights that financial knowledge reduces susceptibility to biases such as herding and overconfidence among university students, while gender differences also influence bias prevalence. Sharma (2022) provides a broader perspective by identifying 17 common behavioural biases impacting financial decisions, calling for further research to address gaps in behavioural finance literature.

Francis (2023) reviews behavioural biases affecting investment decisions, emphasising the psychological underpinnings of suboptimal financial choices and the need for mitigation strategies. Rosyidah and Pratikto (2022) contribute a systematic literature review identifying seven key biases and research gaps, particularly in developing countries, emphasising the importance of contextual studies in emerging economies.

Finally, Adil *et al.,* (2022) examine behavioural biases in investment decisions among male and female investors in India, confirming the negative impacts of risk aversion and herding and the positive role of overconfidence among males, with financial literacy moderating these relationships differently by gender. The study underscores the importance of tailored financial education to combat biases and improve investment outcomes.

Research Gap

Despite the growing body of literature on behavioural biases in financial decision-making, there is a notable lack of focused research on how these biases specifically affect undergraduate students' personal finance management, particularly in the context of Bangalore South colleges. Most existing studies concentrate on general investor behaviour or adult populations, with limited attention to the unique financial challenges and cognitive tendencies of young adults navigating financial independence for the first time. Moreover, few studies have explored practical interventions or recommendations tailored to this demographic to mitigate the negative effects of behavioural biases on their financial well-being. Addressing this gap is essential for developing targeted strategies that can improve financial literacy and decision-making among undergraduate students, thereby fostering better personal financial management skills at an early stage.

Research Design

Study Objectives

(i) To identify the behavioural biases that shape how undergraduate students handle their finances.

(ii) To examine how these biases affect their financial decision-making and overall management.
(iii) To present key findings and practical suggestions for improving their financial decision-making.

Hypotheses

Based on the study's theoretical framework and research objectives, the following hypotheses were developed:

Null Hypothesis (H_0)

Behavioural biases negatively affect the financial decision-making and overall financial management of undergraduate students from selected colleges in South Bangalore.

Alternative Hypothesis (H_1)

There is a significant relationship between students' financial awareness and their saving behaviour.

Methodology

This study employed a quantitative, cross-sectional design to examine the financial behaviours, saving and investment attitudes, and awareness of cognitive biases influencing decision-making among undergraduate students. A structured, self-administered questionnaire was utilised to gather primary data, which was analysed using descriptive and inferential statistical techniques.

The target population consisted of undergraduate students from ten colleges located in South Bangalore, encompassing a variety of academic disciplines. A convenience sampling method was applied to recruit participants. Out of 800 distributed questionnaires, 500 responses were returned. After screening for completeness and consistency, 342 valid responses were included in the final analysis.

Data collection was conducted through a validated structured questionnaire composed of four main sections: demographic information (*e.g.*, age, gender, and monthly allowance), financial behaviour (*e.g.*, budgeting and spending habits), saving and investment practices, and awareness of financial biases (assessed via statements related to biases such as anchoring, overconfidence, and loss aversion).

The data collection process spanned one month and involved both online and face-to-face administration of the questionnaires. Before participation, students were informed about the study's purpose and assured that their responses would remain confidential and anonymous. Informed consent was obtained, and participation was voluntary without any incentives.

Following data cleaning, the valid dataset (N = 342) was analysed using IBM SPSS Statistics, version 21. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarise the responses. Graphical representations such as bar charts were used to visualise key trends. Pearson's Chi-square tests were conducted to explore relationships between categorical variables, with statistical significance set at $p<0.05$.

Approval for the study was granted by the institutional research ethics committee. Ethical standards concerning confidentiality, voluntary

participation, and informed consent were upheld throughout the research. No personally identifiable information was collected, and participants were free to withdraw at any point without repercussions.

Data Analysis

Table 1 presents the demographic profile of the study respondents. Out of 342 students, 55.56% were male and 44.44% female, with the majority aged 18-20 years (67.25%), followed by 21–23 years (22.81%). Most respondents were in their 1st year (45.03%) and 2nd year (33.33%) of study, with fewer in 3rd and 4th years. In terms of courses, 34.50% were from arts/science, 47.68% from business/management, and 17.54% from engineering. The data shows a diverse but predominantly young and early-year student sample, giving a balanced view of financial literacy across disciplines.

Table 2 highlights students' behavioural biases and practices in personal finance management. Most students (76.02%) reported not having a source of income, and social media (21.64%) and friends/family (18.13%) were the most common ways of acquiring financial information. Savings were mainly kept in bank accounts (32.75%) or cash (28.65%), with fewer students investing in long-term options. Students' key motivations to save were family/future emergencies (53.22%) and financial independence (16.37%).

Behavioural patterns show that many students sometimes avoid financial decisions due to fear of loss (47.95%) and make impulsive purchases occasionally (26.90%). A majority (53.22%) mix their own research with others' advice before making financial decisions, and 45.61% have regretted a financial decision at least once.

Table 1. Demographics and Details of the Respondents

Variables	Categories	Frequency	Percentages
Gender	Male	190	55.55
	Female	152	44.45
Age	18-20	230	67.25
	21-23	76	22.22
	24-26	28	8.19
	27 or above	8	2.31
Residence	Urban	342	100.00
Course type	Business/ Management	122	35.67
	Other	118	34.50
	Engineering	16	4.68
	Law	6	1.75
	Arts/Science	80	23.39
Course of study	U. G	342	100.00
Year of study at the university	1st Year	154	45.02
	2nd Year	114	33.33
	3rd Year	52	15.20
	4th year	22	6.43

Source: Desk Research

Although most students view financial planning and budgeting as important (over 75%), a notable proportion remain neutral or unsure about seeking professional financial advice or their own financial literacy.

Overall, the data suggests that while students value saving and budgeting, they display common behavioural biases such as impulsive spending, reliance on social sources for advice, and hesitation about long-term investment, indicating a need for more structured financial education and guidance.

Table 2. Behavioural biases in personal finance management

Variables	Categories	Frequency	Percentages
Are you currently employed or have any source of income?	Yes, Full-time	28	8.19
	Yes, Part-time	54	15.79
	No	260	76.02
How do you usually acquire personal finance information?	Social media	74	21.64
	University Courses/Workshops	14	4.09
	Books	22	6.43
	Friends/Family	126	36.84
	Others	62	18.13
	Online articles/blogs	30	8.77
	Financial advisor	14	4.09
How do you typically save your money?	Digital wallets (*e.g.*, Paytm, Google Pay, *etc.*)	42	12.28
	Bank savings account	112	32.75
	cash savings	98	28.65
	Others	26	7.60
	Investing (stocks, mutual funds, *etc.*)	50	14.62
	Fixed deposits	14	4.09
What motivates you to save? (Select all that apply)	Long-term goal	0	0.00
	Family/future emergency	48	14.04
	Others	32	53.22
	Desire for financial independence	56	16.37
	Peer influences	0	0.00
	Habit	24	7.02
When do you tend to spend more money instead of saving? (Select all that apply)	Social pressure (*e.g.*, friends or family encouraging spending)	76	22.22
	Immediate gratification	10	2.92
	Poor financial planning	26	7.60
	Lack of sufficient funds to save	28	8.19
	Feeling of financial security	22	6.43
	Others	94	27.49
Do you often make financial decisions based on emotions (*e.g.*, buying things when feeling stressed, excited, or sad)?	Occasionally	118	34.50
	Yes	70	20.47
	No	154	45.03
Do you tend to avoid making financial decisions due to fear of loss or uncertainty?	No	134	39.18
	Sometimes	164	47.95
	Yes	44	12.87

Table 2. Continued

Variables	Categories	Frequency	Percentages
How often do you make impulsive purchases?	Very often	32	9.35
	Sometimes	92	26.90
	Rarely	146	42.69
	Never	72	21.05
When making financial decisions, do you tend to follow the choices or advice of friends/ family rather than conducting your own research?	Yes, I follow others' advice	70	20.47
	Sometimes, a mix of both	182	53.22
	No, I make my own decisions	90	26.32
Do you frequently delay saving or investing for future goals in favour of immediate spending?	Yes	116	33.92
	No	106	30.99
	Sometimes	120	35.09
Have you regretted a financial decision after making it?	Sometimes	98	28.65
	No	156	45.61
	Yes	88	25.73
How important is financial planning to you?	Very important	180	52.63
	Somewhat important	38	10.23
	Important	108	31.58
	Not important	16	4.68
Do you believe budgeting is essential for managing your personal finances effectively?	Yes	262	76.61
	No	42	12.28
	Unsure	38	11.11
How likely are you to seek professional financial advice for making important financial decisions?	Neutral	168	49.12
	Unlikely	22	6.43
	Very likely	50	14.62
	Very unlikely	6	1.75
	Likely	96	28.07
Do you feel that your peers (fellow students) are financially literate?	Yes	128	37.43
	Unsure	120	35.09
	No	94	27.49
Do you feel confident about your ability to make long-term financial decisions?	Yes	180	52.63
	Sometimes	100	29.24
	No	62	18.13

Source: Desk Research

Table 3. Description analysis of behavioural biases in personal finance management

Variables	Mean	Std Deviation	N
Are you currently employed or have any source of income?	342	2.6784	0.6189
How do you usually acquire personal finance information?	342	3.1584	1.55625
How do you typically save your money?	342	2.9181	1.35891
Do you tend to avoid making financial decisions due to fear of loss or uncertainty?	342	1.7368	0.67271
How often do you make impulsive purchases (*e.g.*, buying things you don't need on a whim)?	342	2.7544	0.89208
When making financial decisions, do you tend to follow the choices or advice of friends/family rather than conducting your own research?	342	2.0585	0.68248
Do you frequently delay saving or investing for future goals in favour of immediate spending?	342	2.0117	0.83183
Have you regretted a financial decision after making it?	342	2.0292	0.73797
How important is financial planning to you?	342	1.8830	1.00923
Do you believe budgeting is essential for managing your personal finances effectively?	342	1.3450	0.67046
How likely are you to seek professional financial advice for making important financial decisions?	342	2.5322	1.72028
Do you feel that your peers (fellow students) are financially literate?	342	1.9766	0.85248
Do you feel confident about your ability to make long-term financial decisions (*e.g.*, investment, loans, *etc.*)?	342	1.7661	0.87535

Source: Desk Research

Table 3 presents descriptive statistics on students' personal finance management practices. Across all items, the mean values generally range between 1.88 and 2.75, indicating moderate to fairly positive responses toward personal financial management skills. The relatively low standard deviations (mostly below 1) show that students' responses are fairly consistent. The highest mean scores relate to avoiding financial risks and tracking spending, suggesting these are the strongest practices among students. Conversely, lower mean scores in areas such as investment and professional financial advice reflect weaker areas that may need improvement. Overall, the data indicate that while students show awareness of personal finance management, there is room for growth in more advanced financial practices.

Table 4 presents the results of t-tests examining differences in students' personal finance management practices by gender and year of study. Most p-values are below 0.05, indicating significant differences in several areas such as saving habits, budgeting, and seeking professional financial advice. A few items show p-values above 0.05, suggesting no significant differences for those variables. Overall, the

Table 4. Results of Chi-Square Test for Differences in Behavioural biases in personal finance management

Variables	Pairs	pvalue	Result
Are you currently employed or have any source of income?	Course	0.01	Rejected
	Year of Study	0.01	Rejected
	Gender	0.75	Accepted
How do you usually acquire personal finance information?	Course	0.001	Rejected
	Year of Study	0.001	Rejected
	Gender	0.001	Rejected
How do you typically save your money?	Course	0.183	Accepted
	Year of Study	0.02	Rejected
	Gender	0.047	Rejected
Do you tend to avoid making financial decisions due to fear of loss or uncertainty?	Course	0.001	Rejected
	Year of Study	0.299	Accepted
	Gender	0.003	Rejected
How often do you make impulsive purchases (*e.g.*, buying things you don't need on a whim)?	Course	0.001	Rejected
	Year of Study	0.038	Rejected
	Gender	0.713	Accepted
When making financial decisions, do you tend to follow the choices or advice of friends/family rather than conducting your own research?	Course	0.387	Accepted
	Year of Study	0.228	Accepted
	Gender	0.614	Accepted
How important is financial planning to you?	Course	0.003	Rejected
	Year of Study	0.083	Accepted
	Gender	0.295	Accepted
Do you believe budgeting is essential for managing your personal finances effectively?	Course	0.030	Rejected
	Year of Study	0.587	Rejected
	Gender	0.064	Rejected
How likely are you to seek professional financial advice for making important financial decisions?	Course	0.001	Accepted
	Year of Study	0.001	Accepted
	Gender	0.221	Rejected
Do you feel that your peers (fellow students) are financially literate?	Course	0.232	Accepted
	Year of Study	0.019	Accepted
	Gender	0.951	Rejected
Do you feel confident about your ability to make long-term financial decisions (*e.g.*, investment, loans, *etc.*)?	Course	0.149	Rejected
	Year of Study	0.004	Rejected
	Gender	0.002	Rejected

Source: Desk Research

findings reveal that gender and year of study influence many aspects of students' financial behaviours, highlighting the need for tailored financial education strategies.

Findings

The analysis revealed several key trends in student financial behaviour. The majority of participants were aged 18-20 and enrolled in the early years of their academic programs. Respondents came from diverse academic backgrounds, with business and management students forming the largest group. Males made up a slightly larger portion of the sample than females.

A substantial proportion of students (76.02%) reported having no income or employment, which indicates heavy reliance on family support or scholarships. In terms of acquiring financial knowledge, most students depended on informal sources such as family, friends, and social media, while only a minority used formal resources like university courses or professional advisors.

When it came to saving habits, traditional methods such as bank accounts and keeping cash were the most common. Investment in long-term financial instruments such as stocks or mutual funds was relatively low. Emotionally driven behaviour was prevalent among many students who reported making impulsive purchases or hesitating to make decisions due to fear of loss. Regret over financial decisions was also a common theme.

Peer and family influence played a significant role in students' financial choices. Many respondents indicated they sometimes relied on others' advice, although a few expressed complete independence in decision-making. Most students acknowledged the importance of financial planning and budgeting; however, a gap was evident between awareness and practical application. Immediate spending often took precedence over long-term financial goals.

Statistical testing showed significant differences in financial behaviour across academic disciplines and year levels. Gender differences were less consistent but were present in certain areas, such as risk aversion and confidence in long-term decision-making.

Suggestions

Based on the findings, the following recommendations are proposed:

(i) *Integrate Financial Literacy into the curriculum*
Educational institutions should incorporate foundational financial literacy modules into early-stage undergraduate programs. These should cover topics such as budgeting, saving, debt management, and investing.

(ii) *Emphasise Experiential Learning*
Interactive workshops, simulations, and case studies can help students apply financial concepts in real-life contexts, enhancing both understanding and retention.

(iii) *Encourage the use of credible financial sources*
Students should be guided toward trustworthy financial information channels, such as certified professionals, official government resources, and

university-hosted financial education programs.

(iv) *Address behavioural and emotional influences*
Awareness campaigns should help students recognise and manage emotional triggers like impulsive spending and fear of financial risk.

(v) *Customise education based on student demographics*
Financial education efforts should be tailored to match the needs of different academic programs and stages of study, as behaviour varies by discipline and level of experience.

(vi) *Promote opportunities for earning income*
Universities can facilitate part-time job placements and internships, allowing students to gain financial independence and develop practical money management skills.

Limitations of the Study

Although the study offers meaningful insights, several limitations should be acknowledged:

(i) *Limited Generalisability*
The sample was confined to a specific group of students, which may not fully represent the broader student population across different regions or institutions.

(ii) *Self-Reported Data Bias*
As the data was gathered through self-administered surveys, it may be influenced by recall errors or social desirability bias.

(iii) *Cross-Sectional Design*
The study provides a snapshot of student behaviour at one point in time. Longitudinal studies would be more effective in capturing changes over time.

(iv) *Lack of Socioeconomic Context*

(v) Variables such as household income, urban vs. rural background, and prior financial experience were not considered, though these factors could significantly influence behaviour.

(vi) *Insufficient Quantitative Data*
The study focused primarily on quantitative analysis, missing the opportunity to explore deeper motivations and thought processes through interviews or open-ended responses.

Conclusion

The present study offers a comprehensive look into the financial behaviours and biases of university students, revealing both strengths and areas requiring attention. While many students recognise the importance of financial planning and budgeting, this awareness does not always translate into consistent, informed behaviour. A substantial number of respondents admitted to acting on emotion when making financial decisions, engaging in impulsive spending, or avoiding financial commitments due to fear of loss or uncertainty. These behavioural patterns point toward cognitive and emotional biases that can interfere with sound financial management.

Furthermore, the findings highlight a widespread reliance on informal sources such as peers, family, and social media for financial advice. While these networks may offer convenience and trust, they are often limited in accuracy and scope. This reliance can perpetuate misinformation and limit students' exposure to evidence-based financial practices. Only a minority of students reported seeking guidance from financial professionals or

academic resources, underscoring a gap in their engagement with credible information.

The study also identifies variation in financial attitudes and behaviours based on academic discipline and year of study. Students enrolled in business-related courses exhibited slightly more informed practices, possibly due to curriculum exposure. In contrast, those in non-commerce disciplines appeared less confident in long-term financial planning. Likewise, senior students generally reported higher confidence in managing money, likely stemming from increased maturity or life experience. These differences suggest that financial education interventions should be tailored to specific academic contexts and educational levels to ensure maximum impact.

Given these observations, it is clear that financial education should be an integral part of the university experience. However, education alone is not sufficient. Programs must also address behavioural aspects of financial decision-making. Integrating concepts from behavioural economics, such as decision framing, loss aversion, and self-control mechanisms, can help students better understand their financial psychology. In addition, experiential learning strategies such as budgeting simulations, peer-led financial workshops, or case-based assessments could enhance students' ability to apply financial principles in real-world situations.

In conclusion, this study emphasises the urgency of equipping young adults with not only financial knowledge but also the tools to navigate emotional and social influences on their financial decisions. As students move toward independence in a complex financial environment, their ability to make informed, rational, and confident financial choices will play a critical role in their long-term financial well-being. Institutions must take proactive steps to bridge the gap between financial awareness and practice, creating future citizens who are not only financially literate but also behaviourally competent.

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Effect of Yoga on *Trigunas* on Management Educators and Senior Citizens

N. Suresh

Abstract

The *Triguna* theory, rooted in Indian tradition, has garnered significant attention from Indian psychologists, leading to the development of indigenous models of human behaviour, particularly concerning personality. This study investigates the impact of yoga practice on the *Trigunas—Sattva*, *Rajas*, and *Tamas* on individuals. A random sample comprising 91 management educators, 43 senior citizens, and 53 yoga practitioners was selected for this research. Descriptive statistical methods and t-tests were employed to analyse the data. The findings reveal a significant difference in the *Triguna* scores between management educators and yoga practitioners, as well as between senior citizens and yoga practitioners. Notably, the practice of yoga was found to significantly reduce *Rajoguna* levels.

Keywords: Personality, *Rajas, Sattva, Tamas, Trigunas*, Yoga Practice

JEL Classification: I12, I31, Z12, D91, J24

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Introduction and Literature Review

Since the early 19th century, scholars across various disciplines have shown a growing interest in exploring Indian scriptures through the lens of psychology. One of the earliest and significant efforts in this direction was *The Science of Emotions* by Bhagavan Das (1905), which aimed to integrate philosophical insights from Indian traditions with the developing field of psychology. This pioneering work laid the groundwork for a broader intellectual curiosity about what is now referred to as "Indian psychology" (Cornelissen, Misra, & Varma, 2011a & b; Rao, Paranjpe, & Dalal, 2008; Rao & Paranjpe, 2016).

Subsequent research endeavours delved deeply into Indian scriptures, not merely as philosophical or spiritual texts but as rich

N. Suresh

Senior Consultant, Personality Development through Triguna and Yogic Integration; sureshn_prince@yahoo.co.in; ORCID ID: https://orcid.org/0009-0007-2774-2951

sources with potential empirical applicability in psychological science. While the volume of such studies remains limited compared to Western psychology, the investigations undertaken have been thought-provoking and steadily progressive. The emerging body of literature emphasises the need to recognise and incorporate indigenous knowledge systems into the global psychological discourse, despite the relatively slow pace of mainstream acceptance.

Indian Psychology

The term "Indian Psychology" has historically been subjected to misinterpretation, often being narrowly associated with general psychological studies originating from India. However, its true scope, as emphasised by early proponents like Swami Vivekananda and Sri Aurobindo, is distinct and profound. In his lectures in the United States, Swami Vivekananda clearly differentiated Indian Psychology from its Western counterpart. He emphasised its focus on consciousness and inner transformation." Later, Sri Aurobindo reiterated similar ideas in his essays on education and human development.

"In the early 20th century, the Buddhist scholar Mrs Rhys Davids also contributed to the concept by using the term in her academic work. Later, Sinha (1958), an Indian philosopher trained in modern psychology, authored a comprehensive three-volume series titled *Indian Psychology*. His work provided a structured intellectual foundation for future research and dialogue in this field." Despite these efforts, Indian psychology has progressed gradually. However, its evolution shows a consistent deepening of insight and scope."

At its core, Indian Psychology focuses on consciousness as its central theme. This emphasis distinguishes it from other psychological traditions that mainly stress behaviour and cognition within materialist-reductionist frameworks." K. Ramakrishna Rao *et al.,* (2008) articulate this distinction clearly, stating: "Indian psychology is a distinct psychological tradition rooted in the native Indian ethos. It manifests in the multitude of practices prevailing in the Indian subcontinent for centuries. Unlike mainstream psychology, Indian psychology is not overwhelmingly materialist or reductionist in character. It goes beyond the conventional third-person forms of observation to include the study of first-person phenomena such as subjective experience in its various manifestations and associated cognitive phenomena. It does not exclude the investigation of extraordinary states of consciousness and exceptional human abilities. The quintessence of Indian nature is its synthetic stance that results in a magical bridging of dichotomies such as natural and supernatural, secular and sacred, and transactional and transcendental. The result is a psychology that is practical, positive, holistic, and inclusive."

Matthijs *et al.,* (2011) emphasised that Indian psychological concepts are not merely historical curiosities. Instead, they represent living traditions that actively contribute to modern theoretical frameworks and therapeutic practices." By drawing on Vedic and Yogic traditions, Indian Psychology demonstrates how ancient insights can provide innovative solutions to contemporary psychological challenges.

The recognition of diverse psychological roots across world cultures has grown, with many

Western psychologists acknowledging the depth of non-Western traditions. Kim and Berry (1993), for instance, emphasised the value of psychological wisdom found within various cultural heritages, urging a broader and more inclusive global psychology.

Hall and Lindsey (1989), reflecting specifically on Asian traditions, observed:

"Asian psychology has proved remarkably durable, surviving longer than two thousand years; Western personality theories are quite young by comparison. Virtually every eastern meditation system transplanted to the West—Transcendental Meditation, Zen and the like—stems from this psychology or another much like it."

They further note that Eastern psychologies offer not only theories of consciousness but also articulate and practical theories of personality. Unlike Western psychotherapies, which often emphasise symptom relief and surface-level behavioural change, Eastern approaches seek profound inner transformation. They aim to alter states of consciousness to transcend the habitual patterns that confine personality, promoting liberation and self-realisation. Compared to the rigorous and lifelong disciplines demanded by Eastern traditions, Western psychotherapeutic methods appear relatively elementary, akin to introductory courses in self-development.

One concept from Indian Psychology that has received significant attention, especially in the context of human motivation and personality, is the *Triguna* theory (Murthy & Kumar, 2007). According to this model, human behaviour and mental disposition are influenced by three fundamental qualities: *Sattva* (purity, harmony), *Rajas* (activity, passion), and *Tamas* (inertia, darkness). Understanding these dynamics provides profound insights into personal development and therapeutic intervention, offering a uniquely holistic model for psychology and personality theory.

Trigunas According to the *Samkhya* Philosophy

The *Samkhya* system, one of the oldest philosophical schools of India, is founded on the doctrine of ontological dualism between *Prakriti* (primordial nature) and *Purusha* (individual souls). According to *Samkhya*, the entire cosmos, including matter, life, and mind, emerges through the evolution of Prakriti, whose sole purpose is to facilitate the realisation and liberation of an infinite number of *Purushas*. The strict dualism between *Prakriti* and *Purusha* constitutes the fundamental philosophical framework of the *Samkhya* system.

Prakriti, the primal cause of the material universe, is composed of three fundamental constituents known as the *Gunas*: *Sattva*, *Rajas*, and *Tamas*. Contrary to a superficial understanding that treats *Gunas* as mere qualities, the *Samkhya* philosophy asserts that the *Gunas* are substantial entities—the most fundamental elements that constitute Prakriti itself. They are termed "*Gunas*" because they function as the strands that weave the fabric of Prakriti, much like the intertwined threads of a rope. Additionally, they are responsible for binding the *Purusha* to empirical existence through the dynamics of nature.

The *Gunas* are considered substances rather than attributes for several reasons: they possess inherent qualities, they can combine and

separate (conjunction and disjunction), and they are capable of undergoing modifications. While they are not directly perceptible, their existence is inferred based on their observable effects in the phenomenal world.

Each *Guna* has a distinct nature tied to human experience:

1. *Sattva* embodies pleasure and illumination; it is the principle responsible for the manifestation of knowledge and clarity in consciousness. *Sattva* leads to balance, purity, and wisdom.
2. *Rajas* is associated with pain and restless activity; it represents the principle of dynamism, motion, and energy, propelling individuals towards action and ambition.
3. *Tamas* signifies delusion, inertia, and obstruction; it manifests as darkness, ignorance, resistance, and the tendency to maintain the status quo.

Thus, the three *Gunas* respectively perform the functions of manifestation (*Sattva*), activity (*Rajas*), and restraint or inhibition (*Tamas*). Together, they produce the essential emotional and behavioural experiences of pleasure, pain, and delusion in living beings.

In exploring the psychological implications of the *Trigunas*, Bhagavan Das (1955) proposed an interaction theory of *Gunas*, highlighting the complex interplay between these three forces in shaping human personality. According to this perspective, understanding the influence of the *Gunas* is crucial for a comprehensive grasp of individual differences in psychological disposition and behaviour.

Importantly, Bhagavan Das emphasised that in real-life manifestations, the *Gunas* rarely operate in isolation. Instead, they function in varied combinations and proportions, giving rise to the diversity and complexity observed in human personalities. Since *Sattva*, *Rajas*, and *Tamas* interact fluidly, influencing and modulating one another, the characteristics derived from them can often appear fragmentary, overlapping, and incomplete when viewed through a rigid analytical lens. As a result, any definitive categorisation of personality traits based on the *Triguna* model must acknowledge the nuanced and dynamic nature of these interactions.

Thus, the *Samkhya* exposition of *Trigunas* offers not only a metaphysical explanation of the universe but also an intricate psychological framework, suggesting that inner transformation and self-realisation involve the conscious modulation and transcendence of these three fundamental constituents.

Research Design

Objectives of the Study

The present study was undertaken with the following objectives:

1. To examine the effect of yoga on the summative percentage scores of management educators and management educators who are also yoga practitioners.
2. To assess the effect of yoga on the summative percentage scores of senior citizens and yoga professionals.

Hypotheses of the Study

The study seeks to test the following hypotheses:

H1: There is a significant difference in the summative percentage scores between

management educators and management educators who are yoga practitioners.

H2: There is a significant difference in the summative percentage scores of *Trigunas* between senior citizens and yoga professionals.

Research Methodology

For the study, a reliable and validated research instrument developed in earlier research was employed to collect primary data. A psychometric questionnaire specifically designed to address the research objectives and hypotheses was administered to the target population, comprising management educators and senior citizens. The questionnaire consisted of 36 items aimed at measuring the distribution of the *Trigunas*—*Sattva*, *Rajas*, and *Tamas*—in individuals.

The research methodology thus focused on quantitative analysis using structured data collection, ensuring the precision and relevance of responses to the study's core inquiries.

Sampling

A random sampling technique was used to select participants for the study. The final sample consisted of 91 management educators, 53 yoga practitioners (for comparison with management educators), 43 senior citizens, and 53 yoga practitioners (for comparison with senior citizens). Descriptive statistics were employed to summarise the data and provide initial insights. To test the hypotheses, an independent samples t-test was conducted. The results revealed a significant difference in the summative *Triguna* scores between management educators and yoga practitioners, as well as between senior citizens and yoga practitioners.

These findings underscore the impact of yoga practice on the psychological profiles associated with *Trigunas*, highlighting a possible transformative influence of yogic disciplines across different age and professional groups.

Data Analysis

Table 1 shows that at the 5% level of significance, the calculated t-value is 4.06. The critical value for a one-tailed test is 1.66, and for a two-tailed test is 1.98. Since the calculated t-value exceeds

Table 1. Mean scores – Management educators and yoga practitioners

	Management Educators (M.E)	Yoga Practitioners (Y.P)
Mean	62.76	57.87
Variance	35.30	56.42
Observations	91	53
Hypothesised Mean Difference	0	
Degrees of Freedom (df)	90	
t Statistic	4.06	
P(T<=t) One-Tail	5E-05	
t Critical One-Tail	1.66	
P(T<=t) Two-Tail	0.0001	
t Critical Two-Tail	1.98	

t-Test: Two-Sample Assuming Unequal Variances
Source: Desk Research

Table 2. Mean scores – Senior citizens and yoga professionals

	Senior Citizens (S.C)	Yoga Professionals (Y.P)
Mean	61.93	58.47
Variance	39.92	57.66
Observations	43	58
Hypothesised Mean Difference	0	
Degrees of Freedom (df)	98	
t Statistic	2.50	
P(T<=t) One-Tail	0.0070	
t Critical One-Tail	1.66	
P(T<=t) Two-Tail	0.0141	
t Critical Two-Tail	1.98	

t-Test: Two-Sample Assuming Unequal Variances
Source: Desk Research

the critical values, it falls in the rejection region. Thus, the null hypothesis is rejected. It is concluded that there is a significant difference between the summative percentage scores of *Trigunas* among Management Educators and Yoga Practitioners.

Table 2 indicates that at the 5% level of significance, the calculated t-value is 2.50. The critical values for a one-tailed and two-tailed test are 1.66 and 1.98, respectively. Since the calculated t-value falls within the rejection region, the null hypothesis is rejected. Therefore, it can be inferred that there is a significant difference between the summative percentage scores of Trigunas among Senior Citizens and Yoga Professionals.

Conclusion

Among the three *Gunas* — *Sattva*, *Rajas*, and *Tamas* — typically, one *Guna* dominates an individual's disposition. To lead a happy, healthy, calm, and contented life, it is important to balance all three *Gunas*. The appropriate proportion of each *Guna* required varies depending on environmental factors, the nature of work, physical constitution, and spiritual goals. *Rajas*, characterised by activity, energy, and movement, plays a crucial role in life's dynamism. However, an excess of *Rajas* can result in anxiety, restlessness, and hyperactivity. The findings of this study suggest that simple yoga practices can effectively reduce the dominance of *Rajas Guna* and foster a more harmonious personality structure. Thus, yoga emerges as a powerful tool for modulating the balance of *Gunas* and enhancing overall well-being.

Limitations of the Study

The present study is subject to certain limitations. Potential sources of error include the administration of the questionnaires, the varying levels of participation and motivation of the respondents, and external factors affecting the participants' performance. Working professionals, in particular, may have faced constraints such as limited leisure time, fatigue, stress, and mood fluctuations, which could have influenced their responses and the study outcomes. These factors may limit the generalisability of the findings.

Scope for Further Study

The application of Eastern philosophies, such as the *Triguna* theory, to personality development and organisational behaviour is an emerging field with immense research potential. Whether in leadership, workplace performance, or personal well-being, Eastern theories offer profound insights into adapting to the dynamic global work environment. As organisations become increasingly diverse and globally interconnected, there is a growing need for research that explores how yogic practices impact job performance, leadership styles, and life satisfaction. Future research could employ qualitative methodologies, longitudinal studies, and mixed-methods approaches to gain deeper insights into the long-term effects of Yoga on the *Gunas*. This study represents a small but significant step toward a broader exploration of Yoga's role in contemporary life and leadership, offering a foundation for further research in this promising area.

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Stakeholder Theory and the Reconfiguration of Power, Responsibility, and Compliance under India's DPDP Act 2023

S. Vijayalakshmi

Abstract

The Digital Privacy Protection Act 2023 reshapes the ethical and management frameworks encompassing digital privacy in India. The Digital Privacy Protection Act 2023 reshapes the ethical and management frameworks encompassing digital privacy in India. Based on Freeman, Stakeholders Theory, this paper examines how digital legislation reconfigures institutional power, responsibility and compliance and creates value by redefining the relationship between employers (data fiduciaries), employees (data subjects) and regulators, as outlined in DPDP Act 2023. Consent and responsibility-based techniques will engage employees as active partners, thereby increasing trust and transparency in the institution. Incorporating stakeholders' perspectives enhances ethical liability as a driving force of legitimacy and competitiveness. As a result, privacy is evolving beyond compliance-based on trust and strategic factors for value creation. This paper highlights the significance of stakeholders in promoting ethical governance, trust and institutional resilience in today's digital economy.

Keywords: Data Privacy, DPDP Act 2023, Compliance, Power, Responsibility, Stakeholders' Theory

JEL Classification: D63, K24, M14

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Introduction

A right to privacy is explicitly stated under Article 12 of the 1948 Universal Declaration of Human Rights: "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks" (United Nations Assembly, 1948, p.6).

S. Vijayalakshmi

Assistant Professor, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; lamysster@gmail.com; ORCID ID: https://orcid.org/0009-0003-6245-1085

Privacy is both an individual and an organisational concern; if the information is misused, it leads to serious consequences for the firm. On the contrary, when personal information is utilised ethically, it safeguards the firm and also becomes one of the sources of competitive advantage. Moreover, ethical information practices are crucial for supporting every activity across the organisational value chain. (Culnan & Armstrong, 1999). The Digital Personal Data Protection Act 2023, popularly known as the DPDP Act, is India's data privacy legislation. (Ministry of Electronics and Information Technology (Government of India, 2023). It establishes a legal framework for the processing of digital personal data. (Safna, 2025; Tandon & Gupta, 2025). The DPDP Act mandates responsible data handling, grants individuals increased control over their personal data, and accountability for Data Fiduciaries (DFs) (Press Bureau Information, 2023). The increasing predominance of data privacy law across the world has reframed how firms govern employee data, with the European Union's GDPR serving as a global point of reference. (Voigt & von dem Bussche, 2017). DPDP Act 2023 introduces digital personal data, consent, data minimisation, data processing and accountability at the core of employee personal information management within the organisation. (Saha & Mukhopadhyay, 2024). The Data Protection Directive expands employees' rights as data subjects, imposes new fiduciary obligations on employers, transparency regulations, security guarantees and a grievance redress framework. (RegTech Times, 2023). However, these shifts give rise to organisational and regulatory challenges. Employers are urged by labour, tax, and compliance laws to collect and store sensitive data, which may cause friction with the Act's consent-based framework (Saurabh, 2024). These aspects create uncertainty in implementation and concerns about compliance liability, data governance and trust at the workplace. This paper aims to critically explore how stakeholder theory can reform or transform the dynamics of power between institutions and individuals, the allocation of responsibility in data management, compliance behaviour under new legal mandates, and the promotion of inclusive accountability.

DPDP Act 2023 and GDPR

General Data Protection Regulation (GDPR) is regarded as the world's strongest data protection regulation and acts as a perfect guiding principle for all countries. In the historic ruling of Justice K. S. Puttaswamy (Retd) and Anr vs Union of India 2017, the goal of having dedicated privacy legislation in India was established (Mukhija & Jaiswal, 2023). The DPDP legislation makes major changes to the employee personal data processing of companies in India and those outside India providing goods and services to people in India. The DPDP Act 2023 mandates organisations' data handling, grants individuals control over their personal data, and enforces accountability for DFs. Furthermore, the DPDP Act is designed to safeguard the rights of Data Principals (DPs) regarding personal information (Latham & Watkins, 2023). In contemporary privacy legislation, the data minimisation principle is pivotal. These aspects position the DPDP Act 2023 to advance and align with global standards in privacy protection, such as those established by the GDPR. (Bharanitharan & Kaur, 2024). The positive outcome of the DPDP Act 2023 is that companies not only store employee data in India but also allow cross-border data flows. (Gupta & George, 2025).

The Stakeholder Theory

Stakeholder theory (Freeman, 1984) provides a multi-faceted model for understanding how regulatory pressure, organisational culture, data protection, and accountability frameworks interact to influence trust, perceived legitimacy and compliance within the organisations. In Stakeholder theory, Freeman posits that organisations must consider the interests of all stakeholders, and not just shareholders. This includes employees, customers, government, regulators and the community at large. Valentinov and Roth (2024) postulate that the stakeholders create reciprocal relationships which require ethical convergence and transparency. The DPDP legislation institutionalises this logic by mandating consent-based data management, fiduciary responsibility and grievance mechanisms, thus embedding ethical accountability in corporate governance.

Conceptual Framework

Previous literature research papers examine consumer-centric impacts of data privacy (Bennett, 2018; Tikkinen-Piri *et al.*, 2018), largely focusing on customer-centric aspects. Indian DPDP Act 2023 represents a structural shift from a traditional, informal, employer-centric to a consent-driven, accountability-based framework. The stakeholder Theory conceptualises an organisation as an intricate linkage, where reciprocal and changeable interactions with stakeholders determine actual operational legitimacy and performance. Government regulators play a vital role in shaping how organisations handle data, requiring them to follow rules and helping set cultural standards. Building a strong culture of data protection within a company promotes ethical handling of employee information and creates an environment of trust and safety. When employees understand how their data is used and protected, they become more engaged and are better able to support and take part in responsible data practices. (Valentinov & Roth, 2024).

Redefining the Responsibility in the Context of DPDP

Before the enactment of the Digital Personal Data Protection Act, organisational responsibility in data management was largely confined to basic legal compliance requirements. The DPDP Act 2023 establishes a framework of shared ethical responsibility among stakeholders, in line with the principles of stakeholder theory. (Harrison *et al.*, 2010). *Employers (Data Fiduciaries)*: Must collect and process employee data lawfully, purposefully, and securely. *Employees (Data Principals)*: Gain the right to consent, access, correction, and grievance redressal. *Regulators*: Act as oversight bodies to ensure procedural fairness and accountability (Government of India, 2023, p. 2).

This triadic responsibility distribution reflects Freeman's (1984) stakeholder perspective, where companies earn credibility and trust of all affected parties through ethical and fair treatment. Ethical information handling thus becomes both a compliance requirement and a strategic capability enhancing trust, loyalty, and organisational resilience (Mitchell *et al.*, 1997).

From Data Controlling to Employee Data Collaboration

The DPDP Act reshapes conventional corporate data management by shifting the balance of

power, giving individuals greater control over their personal data and promoting shared data rights (Zuboff, 2019). Through consent-based processing, employees are positioned as active participants rather than passive subjects of data. They have enforceable rights that force organisations to justify any action with data. This decentralisation of data power creates a culture of data partnership in which employers, employees, and regulators work together to maintain digital trust. Power no longer derives solely from data possession, but also from ethical management and transparent procedures. This is consistent with Freeman's proposal that sustainable corporate power derives from the legitimacy of the stakeholders rather than from dominance or control (Parmar *et al.*, 2010).

Value Creation, Ethical and Competitive Advantage

From the perspective of stakeholders, the creation of value goes beyond economic metrics and includes ethical legitimacy, transparency and trust (Parmar *et al.*, 2010). The Data Protection Directive provides the basis for building corporate digital responsibility, which integrates privacy, integrity and sustainability into corporate digital strategies, by making compliance a competitive asset rather than a constraint, and by building trust and confidence in the process (Kramer & Porter, 2011).

Engaging and Balancing Stakeholders

The effective implementation of the Data Protection Directive requires a structured stakeholder engagement strategy, including identification, communication and balancing of different interests (Clarkson, 1995). This may further be explained as: (i) *Identification*: Mapping of internal and external stakeholders affected by data policies (employees, regulators, vendors and consumers); (ii) *Communication*: Promoting awareness through consent platforms and transparent communication, and (iii) *Balancing*: the data rights and operational efficiency, harmonising the corporate value chain.

Ethical, Inclusive and Sustainable Outcomes

In the context of data protection, stakeholder theory reflects a form of digital citizenship, encouraging shared responsibility among individuals and institutions to uphold fairness, transparency, and protection for data privacy. (Florida *et al.*, 2018). The effectiveness of the DPDP Act hinges on closing enforcement gaps and raising public awareness. (Kadari & Valaboju, 2025).

Integrative Conceptual Stakeholder Framework

This Conceptual framework depicts how the DPDPD Act 2023 reshapes the interactions of power, responsibility, and compliance among stakeholders. Variables are explained as:

(i) *Stakeholders Group*: Includes the het participants in the data ecosystem, such as employees, employers, organisations, third-party vendors, regulators, and society at large, who play a vital role in data governance.

(ii) *DPDP Role/Obligation*: Defines rights, responsibilities, and functions allocated to each stakeholder under the DPDP Act 20233.

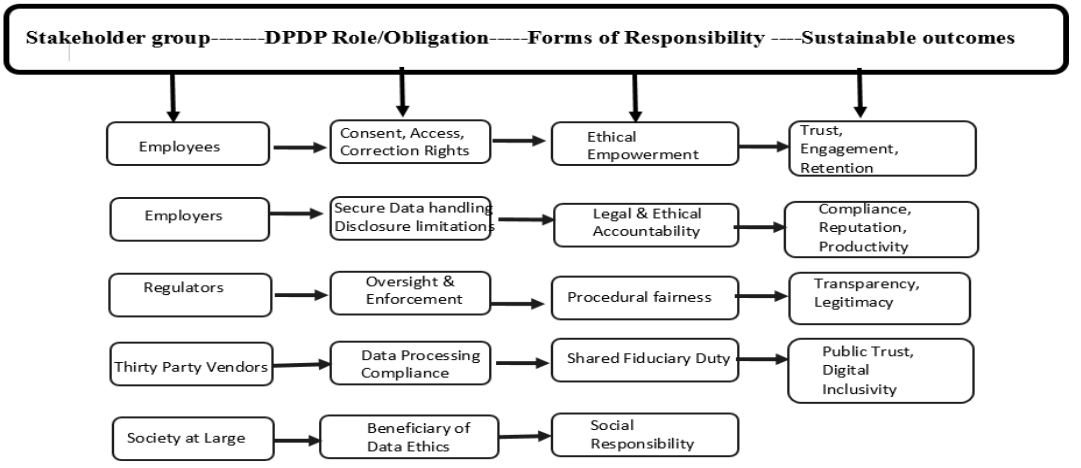


Figure 1. Integrative Conceptual Stakeholder Framework
Source: Based on Compilation of the Author's Work

(iii) *Forms of Responsibility*: represent legal obligations, operational commitment, and accountability in data practices.

(iv) *Sustainable Outcomes*: highlights the outcomes, such as trust and innovation that arise when stakeholders fulfil their responsibility. This structure connects the roles of employees, employers, vendors, and society, built on an ethical and transparent data ecosystem. By synchronising legal obligations with moral accountability, the Act transforms compliance from a legal requirement to an ethical responsibility. This promotes trust, transparency, and digital inclusivity, ultimately reconfiguring governance into to participatory and trustworthy digital environment.

Conclusion and Future Research Directions

The Digital Privacy and Data Protection Bill, 2023, marks a significant shift in how corporate responsibility and data governance are approached in India. By integrating stakeholder theory, this paper argues that ethical compliance, inclusivity and sustainability form the foundation for public trust and credibility in today's digital world. The DPDP legislation turns privacy into legal compliance, which is a cornerstone of corporate digital responsibility. However, a major challenge lies in the enforcement capacity of the Data Protection Board (DPB), which remains uncertain due to limited resources and India's huge digital ecosystem (Chander, 2024). Further empirical research should examine this connection using quantitative research methods like structural equation modelling or partial linear regression, to better analyse how stakeholder involvement contributes to building trust, compliance, and enriching corporate reputation in future. In addition, cross-sectorial peer review research can reveal how stakeholder-inclusive approaches to data protection contribute to ethical resilience as well as economic benefit.

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From Financial Literacy to Inclusion: The Role of Awareness among Young Graduates

S. Ananya[1], Nandan Prabhu[2]* and Pushpa B. V.[3]

Abstract

Financial inclusion has become a global development imperative, particularly in emerging economies like India, where access to financial services has expanded significantly but active usage remains uneven. While financial literacy is widely recognised as a determinant of inclusion, growing evidence suggests that awareness towards financial products, digital tools, and institutional mechanisms serves as a critical behavioural bridge between literacy and inclusion. This study investigates the mediating role of financial awareness in the relationship between financial literacy and financial inclusion among young graduates. Drawing from the Theory of Planned Behaviour (Ajzen, 1991; Sen, 1999), the research conceptualises literacy as a measure of perceived financial capability, awareness as attitudinal readiness, and inclusion as behavioural execution. Primary data was collected from 250 young graduates through a structured questionnaire comprising both subjective and objective literacy measures. Statistical tools such as correlation and regression analysis were used to test the proposed relationships. The study aims to provide empirical evidence on how financial awareness transforms knowledge into participation, thereby strengthening inclusion outcomes. The findings are expected to guide policymakers, educators, and financial institutions in designing holistic financial education programs that combine conceptual learning with actionable awareness.

Keywords: Behavioural Finance, Financial Awareness, Financial Inclusion, Financial Literacy, Theory of Planned Behaviour

JEL Classification Code: G53, G28, O16, G41, I38

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S. Ananya[1], Nandan Prabhu[2]* and Pushpa B. V.[3]

[1] Student Executive, MBA, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; ananya.shreedhar28@gmail.com; ORCID ID : https://orcid.org/0009-0006-3414-1954

[2] Student Executive, MBA, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; nandanprabhu12@gmail.com; ORCID ID : https://orcid.org/0009-0001-8086-3740

[3]Associate Professor, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; pushpabv@mpbim.com; ORCID ID: https://orcid.org/0000-0002-2469-0937

Introduction

Financial inclusion refers to the access to and use of affordable financial services. It has become a central pillar of inclusive growth and sustainable development. In emerging economies like India, where the financial landscape is rapidly transforming, ensuring that citizens are both financially literate and aware of available financial products is crucial to bridge the gap between economic potential and participation.

The Reserve Bank of India (RBI), through its Financial Inclusion Plans, National Strategy for Financial Education (NSFE), and digital initiatives like UPI, has emphasised the dual role of knowledge (financial literacy) and access (financial inclusion). However, despite large-scale awareness campaigns and policy reforms, the real behavioural transformation among youth remains limited.

Youth graduates represent a vital demographic group, the digitally savvy, educated, and poised to become future earners and decision-makers. Yet, studies indicate that even among educated individuals, financial decision-making competence and awareness of financial inclusion schemes remain suboptimal. Many young people possess theoretical knowledge of financial concepts but fail to apply them effectively due to limited awareness of practical inclusion mechanisms such as Jan Dhan Yojana, Atal Pension Yojana, UPI, PMJJBY, PMSBY, and Mudra Loans.

Thus, this study explores how financial literacy translates into inclusion through the mediating role of financial awareness among young graduates. By examining both self-assessed and objective literacy, awareness of financial schemes, and actual inclusion practices, this study provides empirical evidence for designing targeted financial education interventions.

Need for the Study

India's goal of full financial inclusion under Digital India and Jan Dhan to Jan Suraksha initiatives depends not only on access but also on users' ability and willingness to use financial services effectively. Young adults form a significant part of the population and future workforce. Their awareness and inclusion behaviour shape the next generation's financial ecosystem. Despite education, youth often display limited investment discipline, poor risk assessment, and underutilisation of financial products. Few studies empirically test the mediating role of financial awareness between literacy and inclusion—a critical gap in behavioural finance literature.

Problem Statement

Although several initiatives have been introduced to expand financial access in India, the translational gap between financial literacy (knowing) and financial inclusion (doing) persists. While educational institutions enhance theoretical understanding, awareness about the actual schemes, products, and digital tools that promote inclusion remains limited among young graduates. Consequently, financial services often remain underutilised, leading to an incomplete cycle of inclusion. Understanding how awareness mediates the relationship between literacy and inclusion can help policymakers and educators develop targeted interventions for improving youth engagement with formal finance.

Hence, the central problem addressed in this study is: Despite being financially literate, why do many young graduates remain partially or non-included in formal financial systems, and how does awareness bridge this gap?

Literature Review

Theoretical Foundation of the Study

Understanding how financial literacy translates into inclusive financial behaviour requires grounding in behavioural theory. Among the most cited literature explaining intention-driven human behaviour is Icek Ajzen's (1991) Theory of Planned Behaviour (TPB). The TPB extends the Theory of Reasoned Action (TRA) by introducing the construct of Perceived Behavioural Control (PBC), the perceived ease or difficulty of performing a behaviour thereby acknowledging that not all behaviours are entirely volitional. Over the past three decades, TPB has been applied extensively in the domain of financial decision-making. It has proven effective in explaining why individuals adopt or avoid financial behaviours such as saving, investing, and digital banking.

Financial Literacy refers to the knowledge, skills, and attitudes necessary to make informed and effective financial decisions. Financial Awareness is the recognition and understanding of available financial schemes, institutions, and digital tools that promote inclusion. Financial Inclusion involves the active use of affordable, accessible financial services such as savings, credit, insurance, and payments.

Shukla and Singh (2024) conducted a comprehensive systematic review of financial literacy studies worldwide, emphasising that financial literacy is a multidimensional construct encompassing financial knowledge, financial attitude, financial awareness, and financial behaviour. Their study underscores the evolving recognition of financial awareness as a distinct and measurable dimension, one that complements knowledge and behaviour in shaping inclusion outcomes. The authors highlighted that awareness involves being informed about current financial products, government schemes, and emerging digital services, which directly influence participation in formal financial systems. This insight supports the mediating role of awareness proposed in the present study, bridging the gap between literacy and inclusion.

Potrich et al., (2018) analysed the relationship between financial literacy and financial behaviour among Brazilian university students and found that cognitive understanding alone is insufficient to predict prudent behaviour. Their study concluded that contextual awareness and attitudinal confidence significantly moderate the link between financial knowledge and behavioural outcomes, a finding that foreshadows the mediating role of awareness considered in the current study.

Atkinson and Messy (2012) provided the first international framework for measuring financial literacy through the OECD/INFE pilot study. They conceptualised literacy as comprising financial knowledge, attitudes, and behaviours, and revealed a persistent "knowledge–behaviour gap" across countries. Notably, their findings implied that individuals who were aware of financial products and institutions were more likely to engage in sound financial practices, even when their knowledge levels were moderate. Their work laid the empirical foundation for subsequent studies that treat

financial awareness as a mediating factor linking literacy to inclusion as a conceptual expansion adopted in the present research.

Demirgüç-Kunt et al., (2021), through the Global Findex Database 2021, documented the transformative impact of digitalisation on financial inclusion. Their findings reveal that while access to accounts has expanded significantly, particularly in India, a substantial proportion of accounts remain inactive. The authors attribute this to low financial awareness and limited confidence in financial systems. They argue that genuine inclusion requires not only access but also awareness and digital capability—reinforcing the need to study awareness as a mediating factor between literacy and inclusion.

Lusardi & Mitchell (2014) examined the importance of financial literacy for personal financial behaviour, planning, and well-being. The study conducted a Multi-country survey across OECD economies; quantitative analysis of literacy scores and behaviour, and found that financial literacy significantly predicts savings and investment behaviour and helps in better debt management. However, the findings also reveal that a larger proportion of adults, including educated youth, lacked basic financial understanding. While literacy promotes rational financial choices, access to financial instruments produces tangible inclusion outcomes.

Grohmann et al., (2018) explored the relationship between financial literacy and financial inclusion across multiple developing economies using World Bank and Global Findex data. Their study provided strong cross-country evidence that financial literacy enhances inclusion, but primarily through awareness of financial institutions and available services. They argued that literacy increases individuals' confidence and ability to engage with formal finance only when awareness is sufficiently high. Their findings underscore the importance of informational and trust-based factors as behavioural enablers of inclusion. However, the authors did not formally test the mediating role of awareness, leaving a theoretical gap that the present study aims to address.

Agarwal and Chakraborty (2019): In the Indian context, Agarwal and Chakraborty (2019) examined financial literacy and inclusion behaviour among university students. Their findings revealed that although students exhibited adequate conceptual literacy, their awareness of government schemes and financial inclusion programs such as PMJDY, APY, and PMSBY was limited. Consequently, actual participation in formal financial activities remained low. The study concluded that awareness, rather than knowledge alone, determines inclusion outcomes among young, educated individuals. However, their analysis was primarily descriptive. The current study extends this line of inquiry by empirically testing awareness as a mediating construct and quantifying its influence on inclusion practices among youth graduates.

Klapper et al., (2019), in their cross-country analysis of financial literacy and inclusion, expanded the discourse by incorporating the role of digital awareness. They demonstrated that as financial systems transition toward fintech-based ecosystems, digital awareness, understanding mobile banking, e-wallets, and online credit systems have become a decisive factor for inclusion. The authors found that financial literacy contributes to digital adoption, but individuals unaware of digital

tools remain excluded despite having accounts. Their study redefined financial inclusion as both physical and digital participation. The present research builds upon their work by extending the inclusion framework to educated youth in India, where digital finance is rapidly replacing traditional banking.

Sarma and Pais (2011) were among the first to measure financial inclusion comprehensively by developing a Financial Inclusion Index for Indian states. Their study established that inclusion is influenced not only by access to banking infrastructure but also by socioeconomic factors such as literacy, income, and awareness. The findings revealed that regions with higher literacy and awareness levels achieved greater inclusion and financial depth. However, their study was macroeconomic and index-based, lacking micro-level behavioural insights. The present research addresses this limitation by focusing on individual-level data to analyse how literacy and awareness jointly shape inclusion behaviour among youth.

These studies collectively establish that while financial literacy enhances comprehension, financial awareness serves as the behavioural bridge that enables individuals to act upon their knowledge — thereby achieving true financial inclusion.

Research Gap

(i) Prior studies focus heavily on financial literacy or inclusion separately, rarely modelling awareness as a mediating construct.
(ii) Limited research examines educated youth in emerging economies, especially in the context of digital financial inclusion.
(iii) Existing studies are often descriptive; few employ empirical causal models (regression/SEM) linking literacy, awareness, and inclusion behaviour.
(iv) There is insufficient analysis of objective vs. perceived literacy and how both influence awareness-driven inclusion.

Hence, this study fills the gap by empirically testing financial awareness as a mediator between financial literacy and inclusion among young graduates.

Research Questions

(i) What is the level of financial literacy (objective and perceived) among young graduates?
(ii) How aware are young graduates of financial inclusion schemes, products, and services?
(iii) What is the relationship between financial literacy, awareness, and inclusion practices?
(iv) Is there any significant difference among respondents' attitudes towards financial literacy, awareness, and inclusion?

Research Design

The study adopts a quantitative, descriptive, and causal cross-sectional research design. The data for the study were collected through a structured questionnaire. The variables for data analysis were Financial Literacy, Financial Awareness and Financial Inclusion Practices. The study aims to test the influence of Literacy (Independent Variable) in terms of Financial Knowledge, Financial Behaviour and Attitude on Financial Inclusion Practices (Dependent Variable). Financial Awareness is taken as a Mediating Variable. Control variables are

the demographic factors such as age, gender, income, and urban/rural background.

The Sampling Framework

Young graduates (final-year students or recent graduates aged 20–30) across disciplines (management, commerce, arts, science) formed the population for the study. The sampling frame includes 350 students from universities and colleges across different urban and semi-urban regions. Stratified purposive sampling was used to ensure representation across gender, income, and region.

Tools for Data Analysis

Cronbach's Alpha is used to check the reliability and internal consistency of scales. KMO and Bartlett's Test establish the construct validity and sampling adequacy. Descriptive statistics are used to summarise the demographic and scale data. Correlation and regression analysis explore bivariate relationships and test the influence of literacy and awareness of financial inclusion.

Data Analysis and Interpretation

The Cronbach's alpha values for all three constructs exceed the minimum acceptable value of 0.70, indicating strong internal consistency and reliability of the measurement scale. Hence, the questionnaire items measuring literacy, awareness, and inclusion are reliable for further statistical analysis.

The Kaiser-Meyer-Olkin (KMO) values for all constructs are above 0.80, indicating sampling adequacy as per Kaiser's 1974 classification. This suggests that the sample size is adequate for further statistical analysis. The Bartlett's Test of Sphericity values are significant ($p<0.001$) for all constructs, confirming the appropriateness of the data for subsequent inferential analysis.

Table 1. Reliability Statistics

Constructs	No. of Items	Cronbach's α	Interpretation
Financial Literacy	15	0.874	High Reliability
Financial Awareness	10	0.842	High Reliability
Financial Inclusion Practices	9	0.881	High Reliability

Source: Desk research

Table 2. Validity Statistics (KMO and Bartlett's Test of Sphericity)

Constructs	KMO Value	Bartlett's Test χ^2	df	Sig. (p)	Interpretation
Financial Literacy	0.861	963.215	105	0.000	Sampling Adequacy Confirmed
Financial Awareness	0.835	714.652	45	0.000	Sampling Adequacy Confirmed
Financial Inclusion Practices	0.827	642.481	36	0.000	Sampling Adequacy Confirmed

Source: Desk research

Respondents exhibit moderately high levels of financial literacy, awareness, and inclusion behaviour. The results suggest that young graduates possess conceptual understanding and are aware of financial mechanisms. However, there remains scope to strengthen active inclusion behaviour through enhanced awareness and exposure.

Table 4 indicates a statistically significant association between gender, age and education of the respondents and financial awareness ($p<0.05$). Awareness levels differ significantly across demographic groups. This suggests that older and more educated respondents tend to demonstrate a higher level of financial awareness. However, domicile (urban/rural) does not show a significant difference. The traditional urban-rural divide in terms of access to financial education is gradually diminishing. This may be attributed to the growing digital penetration, policy outreach, mobile banking applications and financial inclusion programs. These initiatives have enabled individuals to access information and services more easily, ensuring growing uniformity across geographical locations. Similar observations are found in the RBI's (2020): National Strategy for Financial Education 2020-2025, Demirgüç-Kunt *et al.,* (2021), OECD (2016) and Bhattacharya & Banerjee (2021).

The correlation matrix shows a strong positive relationship between financial literacy and financial awareness ($r = 0.681$, $p<0.01$) and between financial awareness and financial inclusion ($r = 0.642$, $p<0.01$). The correlation between financial literacy and financial inclusion ($r = 0.564$) is moderately strong, indicating that both literacy and awareness are closely related and likely interact to influence inclusion outcomes.

The regression analysis was conducted to examine the predictive influence of literacy and financial awareness level on financial inclusion

Table 3. Descriptive Statistics of Key Variables

Construct	Mean (M)	Standard Deviation (SD)	Minimum	Maximum	Scale Range (1–5)
Financial Literacy	3.82	0.65	1.80	4.96	Moderate–High
Financial Awareness	3.74	0.72	1.55	4.88	Moderate–High
Financial Inclusion Practices	3.69	0.77	1.42	4.91	Moderate–High

Source: Desk research

Table 4. Chi-Square Association between Demographic Factors and Financial Awareness

Demographic Variable	χ^2 Value	df	Sig. (p)	Association
Gender and Financial Awareness	6.283	2	0.043	Significant
Age and Financial Awareness	8.624	3	0.035	Significant
Education and Financial Awareness	4.721	1	0.030	Significant
Domicile and Financial Awareness	2.872	1	0.090	Not Significant

Source: Desk research

Table 5. Correlation Matrix between Key Constructs

Variables	1	2	3
Financial Literacy	1	—	—
Financial Awareness	0.681**	1	—
Financial Inclusion Practices	0.564**	0.642**	1
Note**: $p < 0.01$ (two-tailed)			

Source: Desk research

practices among young graduates. The model was found significant at R^2 0.553, Adj. R^2 0.548, indicating that approximately 55.3% of the variance in financial inclusion behaviour can be explained jointly by literacy and awareness level. Both financial literacy (β 0.391, $p<0.001$) and financial awareness (β 0.512, $p<0.001$) emerged as strong determinants of inclusion, suggesting that individuals with higher literacy levels possess greater knowledge and skills to understand and utilise financial products effectively. Being informed about available financial services, schemes, and digital tools substantially enhances participation in formal financial systems.

This substantiates the study's conceptual model proposition that financial awareness acts as a behavioural amplifier that transforms literacy into actual inclusion behaviour. The results are consistent with studies by Grohmann *et al.,* (2018), Raj and Singh (2022) and Shukla and Singh (2024). The results also support the argument of (Lusardi & Mitchell, 2014; Demirgüç-Kunt *et al.*, 2021), underscoring the need for awareness-driven financial capability programs.

Discussion and Conclusion

The empirical findings of this study reveal that all constructs demonstrated strong internal consistency. Respondents of the study have shown fair literacy and awareness levels, though inclusion behaviour remains moderate. Demographic variables significantly influence awareness levels. Literacy, awareness, and inclusion are positively correlated, with awareness acting as a key connecting variable. Regression results indicate that awareness has a stronger predictive influence on inclusion than literacy. Income-based differences persist in inclusion levels, highlighting economic and exposure-related disparities. These findings collectively support the conceptual model that financial awareness mediates the literacy-inclusion relationship, confirming the

Table 6. Regression Analysis: Predictors of Financial Inclusion

Predictor Variables	Unstandardised β	Standard Error (SE)	Standardised β	t-value	Sig. (p)
Constant	0.776	0.173	—	4.49	0.000
Financial Literacy	0.328	0.061	0.391	5.38	0.000
Financial Awareness	0.451	0.056	0.512	7.21	0.000
Model Summary: $R^2 = 0.553$; Adjusted $R^2 = 0.548$; $F(2,347) = 214.87$; $p<0.001$					

Source: Desk research

behavioural framework suggested by Ajzen (1991) and Sen (1999).

Policy Implications

The results highlight the need to integrate financial awareness into higher education curricula in institutes offering business, economics and management programs. Academic modules focusing on awareness towards government schemes, insurance literacy, investment planning, and digital banking applications would help students transition from passive knowledge to active financial participation. Collaboration between government agencies and fintech firms helps organise targeted financial awareness drives, specifically focusing on young adults. This is critical in India's evolving digital finance ecosystem. There is a need for gender-inclusive special outreach modules to aid women entrepreneurs and first-time investors. There should be continued emphasis on strengthening digital infrastructure and regional financial guidance centres to deepen rural inclusion. Financial awareness should become an integral part of educational and institutional ecosystems through curriculum reform, cross-sector collaboration, digital behaviour training, gender-inclusive design, and rural outreach infrastructure.

Conclusion and Scope for Future Research

Financial literacy alone does not ensure meaningful financial inclusion. Awareness towards financial services and digital products plays a decisive role in transforming financial knowledge into behavioural participation.

While this study provides significant insights, further studies can track changes in financial literacy and awareness over time to assess long-term behavioural consistency. Comparative studies across rural, semi-urban and urban regions can reveal structural and cultural influences on inclusion. Future studies can be on gig workers or informal sector employees. To provide strong causal evidence, studies can focus on assessing the impact of workshops or awareness programs on financial inclusion evidence.

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Age Diversity and Its Influence on Team Collaboration and Performance in a Multi-Generational Workplace

Aneendra Sasidaran[1], V. R. Anjanaa[2]* and Hema Harsha[3]

Abstract

21st-century workplaces boast of diversity not just as a compliance, but also to ensure that the business thrives in today's competitive market. A multigenerational workforce brings in diversity in garnering different skill sets, varied perspectives and innovative ideas. The presence of Baby Boomers, Generation X, Millennials and Generation Z at the same time drastically changes the team dynamics. This study aims to analyse how age diversity affects team collaboration and performance, considering other influencers like trust, communication and leadership. The study was conducted in the IT industry, where age diversity is common. Using stratified random sampling, data were gathered and tested to understand the impact of age diversity on team performance. While the differences between generations may be translated into work style, communication style, and technical skill level differences, they are compensated for by experience, creativity, and innovation. The research demonstrates that organisations can make use of age diversity to create better collaboration, improve problem-solving capabilities, and achieve success within teams. It is understood that age diversity may have very little direct influence on the performance, while effective communication and better collaboration enable the team to perform better. With collaboration amongst a multigenerational workforce being a major challenge in organisations today, this study throws light on what factors contribute significantly to the overall productivity of employees.

Keywords: Age Diversity, Collaboration, Communication Strategies, Generational Differences, Leadership, Multi-Generational Workplace, Team Performance, Workplace Innovation

JEL Classification: J15, J24, M12, M54

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Aneendra Sasidaran, V. R. Anjanaa[2]* and Hema Harsha[3]

[1] Student Executive, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; aneendrasasi@gmail.com; ORCID ID : https://orcid.org/0009-0003-1721-1082

[2] Student Executive, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, , India; anjanaa201@gmail.com; ORCID ID : https://orcid.org/0009-0006-2311-7932

[3] Associate Professor, M P Birla Institute of Management, Bengaluru – 560001, Karnataka, India; hemaharsha@mpbim.com; ORCID ID : https://orcid.org/0000-0002-0496-4806

Introduction

Over the past several decades, researchers and organisational experts have increasingly focused on the rich and complex nature of workforce diversity, and that is to ensure teams work together effectively, perform, and feel included. Foundational reviews, such as the one by Williams and O'Reilly (1998), which summarised 40 years of diversity research, helped us understand how different demographic factors influence behaviour in organisations. Since then, numerous studies and meta-analyses have expanded this knowledge, highlighting both the advantages and challenges associated with diverse teams (Horwitz & Horwitz, 2007; Pelled *et al.*, 1999; Jehn *et al.*, 1999). Age and generational differences have become significant, shaping what employees expect and how they collaborate at work (Finkelstein *et al.*, 2008; Ng *et al.*, 2010; Pitt-Catsouphes *et al.*, 2009). The way work is structured has also changed, with virtual teams becoming more common (Gibson & Cohen, 2003) and careers becoming less tied to one organisation (Arthur *et al.*, 2005), making the relationship between diversity and performance even more complex. Scholars like Shore *et al.,* (2011) and Jackson *et al.* (2003) highlight the crucial role of inclusion and strategic diversity management, encouraging approaches that consider both identity-based and functional differences.

A multigenerational workforce brings in greater variability in terms of skillsets, knowledge and strengths to the table, which can be leveraged for creating an inclusive and productive workplace (Bailey & Owens, 2020). The challenges of working in a multigenerational team are related to communication type, varied ideas, beliefs, decision-making process and working style. Effective leadership and better collaboration may ensure greater harmony in functional teams. Policies and processes should facilitate better team cohesion, leading to greater team performance. Organisations should focus on creating an ecosystem that is conducive to handling multi-generational differences effectively.

Review of Literature

Williams et al., (1998): This seminal work highlights that diverse teams, including those with age diversity, can bring a wider range of knowledge, skills, and perspectives, potentially leading to enhanced problem-solving and decision-making.

Horwitz and Horwitz (2007): This meta-analysis suggests that diverse teams can foster creativity and innovation by challenging conventional thinking and promoting the generation of novel ideas. Age diversity can introduce varied life experiences and approaches, stimulating innovative solutions.

Jehn et al., (1999): The authors identified that differences in values, work ethics, and expectations among generations can lead to conflict and tension within teams. Managing these conflicts effectively is crucial for maintaining team cohesion and performance.

Shore et al., (2011): The study concluded that leaders play a crucial role in fostering an inclusive environment that values and leverages age diversity. Inclusive leadership promotes respect, open communication, and equitable opportunities for all team members.

Finkelstein et al., (2008): The study revealed that age-related stereotypes and prejudices

can create barriers to effective teamwork. Negative perceptions about older or younger workers can lead to discrimination and reduced collaboration.

Researchers have focused on the role of every single factor in relation to the multigenerational workforce in isolation. Studies have focused on the outcome of team collaboration and the role of leadership in ensuring that the team functions better. There are studies about the need and challenges of having a multigenerational workforce and how that brings in versatility in cross-generational working. The present study identifies the role of team communication and collaboration amongst a multigenerational workforce, which may directly influence team performance.

Research Design

This study employs quantitative approaches to thoroughly examine the effect of age diversity on team performance and collaboration in multigenerational workplaces. The quantitative part is based on a survey questionnaire that gathers demographic information (*e.g.*, age, gender, role), perceptions of age diversity, levels of collaboration, leadership styles, and communication barriers. These variables are assessed using closed-ended questions and Likert-scale items, allowing for statistical analysis through descriptive statistics and regression modelling to identify correlations and potential causal relationships.

The study uses a stratified random sampling method to ensure proportional representation across different generational groups (Baby Boomers, Gen X, Millennials, Gen Z) and organisational roles. A sample size of 100 respondents was utilised for the purpose of data collection, and it was carried out through structured questionnaires. The questionnaire's design closely aligns with the research aims, capturing key constructs such as team dynamics, leadership effectiveness, and perceived barriers to collaboration. This solid design improves both the internal and external validity of the study, making sure that the findings are both relevant in context and applicable across various organisational settings.

Research Gap

Existing literature review suggests that while earlier work highlights the benefits and drawbacks of age diversity, it works on individual variables like communication or leadership in isolation. There are very few integrated research studies that explore the moderating effect of leadership styles, task complexity, and organisational culture on team performance and teamwork in age-diverse teams. Empirical work is lacking in offering practical recommendations for effective management of multi-generational teams. The present study attempts to fill this void by carrying out an integrated analysis among these variables in organisational settings.

Problem Statement

The study addresses the challenge of managing age diversity in today's multi-generational workplaces, where employees from different age groups often face communication gaps, work style differences, and value conflicts. These differences, if unmanaged, can hinder team collaboration and performance. However, with inclusive leadership and effective communication, age diversity can be turned into

a strength, enhancing creativity, innovation, and team success.

Objectives of the Study

(i) To examine how age diversity affects team collaboration dynamics, such as communication patterns and work processes.
(ii) To examine the impact of age diversity on team performance in a multi-generational work environment.
(iii) To determine the relationship between communication patterns and team collaboration in terms of team performance.
(iv) To provide practical recommendations to organisations to improve team composition, leadership approaches, and collaboration methods in age-diverse teams.

Hypotheses

H_1: Age Diversity has a positive and significant relationship with Team Collaboration

H_2: Age Diversity has a significant effect on Team Performance

H_3: Communication Pattern has a mediating effect on Team Collaboration and Team Performance

Table 1. Reliability statistics

Cronbach's Alpha	No. of Items
0.829	14

Source: Desk Research

H_4: Team Collaboration has a mediating effect on Age diversity and Team Performance

Data Analysis

The reliability test showed that the 14-item questionnaire came through as solid and consistent, with a Cronbach's Alpha of 0.829 (Table 1). That's well above the usual cutoff of 0.7, so the tool works well for analysing the study's variables.

H1 is accepted, Age Diversity has a significant relationship with Team Collaboration.

When you look at the model summary, there's a weak but positive link between age diversity and team collaboration (R = 0.205) (Table 2). Age diversity accounts for 4.2% of the difference in collaboration (R^2 = 0.042). The model checks out statistically (F = 4.241, p = 0.042) and is stable (Durbin-Watson = 1.731). So, age diversity doesn't blow the doors off, but it does have a small, real impact on how teams work together.

Table 2. Model summary: Age diversity and team collaboration

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson Statistic
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.205[a]	0.042	0.032	0.90097	0.042	4.241	1	97	0.042	1.731

a. Predictors: (Constant), AgeCo

Source: Desk Research

Table 3. ANOVA Summary: Age diversity and team collaboration

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.443	1	3.443	4.241	0.042[b]
	Residual	78.739	97	0.812		
	Total	82.182	98			

b. Dependent Variable: Team Collaboration

Source: Desk Research

Table 4. Model summary: Age diversity and team performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson Statistic
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.111[a]	0.012	0.002	0.98848	0.012	1.210	1	97	0.274	1.735

a. Predictors: (Constant), AgeCo

Source: Desk Research

The ANOVA backs this up: age diversity matters for team collaboration (F = 4.241, p = 0.042) (Table 3). The effect isn't huge (regression SS = 3.443 vs. residual SS = 78.739), but age diversity still gives a positive, significant boost to how well employees collaborate. Since the data shows a clear connection, H1 gets the green light.

H2 is rejected, Age Diversity has no significant effect on Team Performance.

Switching to team performance, the model summary tells a different story. There's barely a positive link between age diversity and team performance (R = 0.111), and age diversity only explains about 1.2% of the change (R^2 = 0.012) (Table 4). The stats don't support a real relationship here (F = 1.210, p = 0.274), and the adjusted R^2 of 0.002 pretty much says the same. The Durbin-Watson value (1.735) shows the model's steadiness, but overall, there's just not much of a connection between age diversity and team performance.

The ANOVA results don't show much of a link between age diversity and team performance (F = 1.210, p = 0.274) (Table 5). Age diversity explains just a tiny fraction of the differences in performance (regression SS = 1.182 vs. residual SS = 94.777), so something else is clearly driving team results. In short, age diversity isn't the main factor here, so we're rejecting the alternate hypothesis H2.

When we bring in age diversity perception as the independent variable, team performance as the dependent one, and toss in communication patterns as a mediator (set at 4 or above, so people who agreed or strongly agreed on the Likert scale), the picture changes (Table 6). The R value jumps to 0.641, which points to a pretty solid positive relationship

Table 5. ANOVA summary: Age diversity and team performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.182	1	1.182	1.210	0.274[b]
	Residual	94.777	97	0.977		
	Total	95.960	98			

b. Dependent Variable: Team Collaboration

Source: Desk Research

Table 6. Model summary: Mediating effect of communication pattern on age diversity perception and team performance

					Change Statistics					Durbin-Watson Statistic
Model	CP >= 4.00 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	CP >= 4.00 (Selected)
1	0.641[a]	0.411	0.403	0.61831	0.411	52.319	1	75	0	2.214

a. Dependent Variable: TP; b. Selecting only cases for which CP >= 4.00; c. Predictors: (Constant), ADP2, ADP1

Source: Desk Research

between how people see age diversity and how the team performs. The R^2 is 0.411, so age diversity perception accounts for 41.1% of performance variation when communication is strong. The F-change is 52.319, with a p-value way below 0.001, so the model holds up statistically. The Durbin-Watson statistic at 2.214 tells us the residuals are independent with no autocorrelation issues, so the model is reliable. The takeaway? When teams communicate well, a positive view of age diversity really does boost performance.

H3 is accepted. Communication Pattern has a mediating effect on Team Collaboration and Team Performance.

Looking at the group with high team collaboration scores (TC ≥ 4.00), the regression model shows a decent but not overwhelming predictive relationship (Table 7). Correlation comes in at R = 0.529, so there's a noticeable positive link between the predictors and the outcome. The R^2 sits at 0.280 (adjusted R^2 = 0.261), meaning these factors together explain 28% of the variation in team performance, dropping a bit after adjusting for model complexity. The standard error of 0.68816 suggests the predictions are fairly tight. Adding both age diversity and team collaboration as predictors makes the model fit much better (R^2 change = 0.280, F-change = 14.393, p = 0.000). The Durbin-Watson value is 1.621, close enough to 2 to rule out major autocorrelation.

Table 7. Model summary: Team collaboration as a mediating factor on age diversity perception and team performance

					Change Statistics					Durbin-Watson Statistic
Model	TC >= 4.00 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	TC >= 4.00 (Selected)
1	0.529[a]	0.28	0.261	0.68816	0.28	14.393	2	74	0	1.621

a. Dependent Variable: TP; b. Selecting only cases for which CP >= 4.00; c. Predictors: (Constant), ADP2, ADP1

Source: Desk Research

So, the model is statistically sound and shows that for teams with strong collaboration, age diversity perception has a moderately strong, positive effect on performance (R = 0.529), with age diversity explaining 28% of the variance. The bottom line: age-diverse teams with good collaboration tend to perform better, probably because they're drawing from a wider range of experiences and perspectives. There's still unexplained variance, but the impact is real.

Hence, H4 is accepted, Team Collaboration has a mediating effect on Age diversity and Team Performance

Findings

This analysis digs into how age diversity, team collaboration, and team performance all connect at work. First off, the questionnaire passed the reliability test with flying colours. Cronbach's Alpha came in at 0.829 for 14 items. So, the data is solid and ready for deeper analysis. Looking at the numbers, age diversity does have a positive effect on team collaboration, but it's pretty weak ($R = 0.205$, $R^2 = 0.042$, $F = 4.241$, $p = 0.042$). Basically, age differences only explain about 4% of how well teams work together. The effect is small, but statistically, it's real. It looks like teams with a mix of ages communicate a bit better and understand each other more, but it's not a dramatic shift. Other dynamics in the team probably matter just as much, maybe even more.

Now, when it comes to team performance, age diversity isn't doing much on its own ($R = 0.111$, $R^2 = 0.012$, $F = 1.210$, $p = 0.274$). Teams with a wide age range don't automatically perform better. Clearly, other things are driving results.

But here's where it gets interesting: Once you factor in collaboration, things change. Teams that are both age-diverse and work well together perform noticeably better ($R = 0.529$, $F = 14.393$, $p < 0.001$). So, it's not just having a mix of ages; it's how those people actually work together that makes the difference. When collaboration clicks, teams tap into different perspectives and experiences, and that really boosts performance.

The big picture is that age diversity by itself doesn't move the needle much on performance.

But when you combine it with strong teamwork, it starts to matter. Teams with a good mix of ages who know how to collaborate get better results and help organisations succeed.

Suggestions

(i) Organisations should promote collaboration among employees of different age groups through mentoring programs, diverse project teams, and inclusive engagement initiatives that utilise the varied strengths of all generations.

(ii) Regular team-building activities, effective communication channels, and recognition of collective achievements should be emphasised to strengthen teamwork and mutual understanding.

(iii) Management should cultivate a work environment that values respect, equality, and inclusion, ensuring that employees from all age brackets feel valued and supported.

(iv) Age diversity and collaboration should be strategically incorporated into HR and Green HRM policies to improve overall team performance, innovation, and organisational sustainability.

Conclusion

The present study aimed to examine the relationship between age diversity, team collaboration, and team performance within organisational settings. The study concludes that age diversity can help team collaboration, but it does not directly lead to better team performance. Teams made up of members from different age groups show slightly better collaboration because of their varied experiences and perspectives. However, any performance improvements mainly come from strong collaboration, which includes effective communication, coordination, and mutual trust. When age diversity exists alongside a cooperative environment, team outcomes improve significantly. These findings highlight the need to promote inclusive teamwork practices to unlock the potential of age-diverse teams. This aligns with the aims of sustainable and strategic human resource management. The study concludes that fostering collaboration within age-diverse teams can enhance performance, productivity, and innovation, thereby supporting the principles of sustainable and strategic human resource management.

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Moving Towards Effective IP Protection for India's Traditional Wisdom

M. G. Kodandaram

Introduction

India holds a vast and remarkable repository of Traditional Knowledge (TK) and Traditional Cultural Expressions (TCE), which the author collectively terms as Traditional Wisdom (TW). This wisdom is intricately woven into the country's rich ecological diversity and cultural plurality. These systems encompass a wide spectrum, like Ayurveda, Siddha, tribal healing methods, oral traditions, folk music, dance, and artisanal crafts, each representing living, evolving traditions that are integral to the identity, spirituality, and livelihoods of indigenous and local communities. Far from being relics of the past, these practices continue to thrive as dynamic expressions of collective heritage, sustained through oral transmission, ritual, mentorship, and communal memory.

India's current Intellectual Property (IP) regime, rooted in Western legal principles, inadequately protects TW. It emphasises individual authorship and commercialisation, conflicting with the collective, spiritual, and intergenerational nature of TW, leaving indigenous systems marginalised and vulnerable to misappropriation. India has introduced mechanisms like the Geographical Indications of Goods (Registration and Protection) Act 1999 and the Traditional Knowledge Digital Library (TKDL), which have offered some degree of defensive protection. However, these initiatives are narrowly tailored and reactive in nature. They do not constitute a holistic or forward-looking legal response capable of addressing the complex realities and evolving needs of TW holders across the country.

In the absence of a comprehensive and culturally rooted legal framework, traditional systems continue to be exploited and embezzled, often without consent, benefit-sharing, or acknowledgement of source communities. This gap in legislative design perpetuates historical injustices and deepens the marginalisation of the very communities that have nurtured these knowledge systems for generations.

This article explores the philosophical and structural gaps between India's current IP regime and the values of its TK systems. Through analysis of legal gaps, case studies on cultural misappropriation, and policy flaws, it advocates for a transformative reform based on a '*sui generis*' legal framework that reflects India's pluralistic context, upholds community rights, and ensures fair recognition and benefit-sharing for TW holders.

Nature of Traditional Knowledge

The TK and TCE are dynamic systems of knowledge and expression that guide and sustain the social, spiritual, and ecological lives of the

M. G. Kodandaram

IRS, Assistant Director of Customs and Central Excise (Retd.), Advocate and Consultant; mgkodandarm@gmail.com; ORCID ID: https://orcid.org/0009-0004-1324-8272

communities that embody them. According to the World Intellectual Property Organisation (WIPO)[1], TK refers to "*know-how, skills, innovations, and practices that are developed, sustained, and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity*."

In the Indian context, the National Intellectual Property Rights Policy, 2016[2] also recognises TK as knowledge developed over generations in a particular community and often held collectively, particularly in fields such as traditional medicine, agriculture, and artisanal practices. Categories of TK could include, but are not limited to, agricultural knowledge, scientific knowledge, technical knowledge, ecological knowledge, medicinal knowledge, including related medicines and remedies, and biodiversity-related knowledge.

TK is holistic, experiential, and context-specific. Unlike modern scientific systems that rely on replicable experiments and empirical verification, TK evolves through a deep, symbiotic interaction with local ecosystems. For instance, indigenous methods of weather forecasting, water conservation, and herbal medicine are intimately tied to seasonal cycles, local biodiversity, and cultural rituals. It is knowledge born not in isolation, but through centuries of cumulative interactions between humans and nature. Importantly, this knowledge is transmitted through oral traditions, rituals, storytelling, apprenticeship, and communal practices, often without formal documentation. This absence of written records, however, does not diminish its sophistication or validity.

Nature of Traditional Cultural Expressions

Parallelly, TCE, also referred to as "expressions of folklore", represents the outward, performative, and aesthetic manifestations of collective creativity. WIPO[3] defines TCE as "*tangible and intangible forms in which traditional culture is expressed," including "music, dance, art, designs, names, signs and symbols, performances, ceremonies, architectural forms, handicrafts and narratives.*"

In India, TCE spans a vast spectrum, ranging from tribal murals, folk dances like Garba and Bihu, and regional weaving techniques such as Kanchipuram and Pochampally, to spiritual chants and oral epics. These expressions are not merely artistic pursuits; they are often interwoven with religious beliefs, moral values, and community governance structures, forming the soul of cultural continuity.

The TK and TCE, collectively referred to as Traditional Wisdom (TW) for ease of reference, are fundamentally collective and passed down through generations. This communal authorship is further reinforced by the non-commercial and often spiritual value attributed to them.

For example, a ritual dance or medicinal chant is regarded as sacred and inseparable from the community's identity, rather than as a commercial product subject to copyright or trade.

[1] https://www.wipo.int/en/web/traditional-knowledge/tk/index (accessed on 10 Aug 2025)

[2] https://www.ipindia.gov.in/writereaddata/Portal/Images/pdf/2016-_National_IPR_Policy-2016__English_and_Hindi.pdf (accessed on 8 Aug 2025)

[3] https://www.wipo.int/en/web/traditional-knowledge/traditional-cultural-expressions/index (accessed on 10 Aug 2025)

Consequently, commodifying or licensing these expressions without the community's consent raises serious ethical and cultural concerns. This essential nature of TW creates deep structural conflicts with contemporary intellectual property frameworks, both globally and within India.

WIPO on the Protection of TK and TCE

The WIPO has been instrumental in developing international strategies to safeguard TK and TCE, recognising their communal ownership, cultural significance, and intergenerational transmission. WIPO's framework addresses the limitations of conventional intellectual property systems, which often overlook the collective and evolving nature of TK and TCE, making them susceptible to misappropriation, biopiracy, and unauthorised commercialisation. Its approach is twofold: Defensive protection and positive protection.

Defensive protection aims to prevent outsiders from wrongfully obtaining IP rights over TK and TCEs by documenting them as "prior art," thereby blocking illegitimate patents. India's TKDL exemplifies this, compiling traditional medicinal knowledge in formats accessible to patent examiners worldwide to prevent patents lacking novelty. Defensive measures also protect sacred symbols, motifs, and culturally significant terms from misuse in trademarks or commercial branding, preserving the integrity of cultural heritage.

Positive protection, by contrast, empowers Indigenous and local communities as rightful custodians of their TK and TCEs, granting them legal authority to control access, usage, and benefit-sharing. This can be achieved through adapting existing IP systems, creating *sui generis* legal frameworks tailored to community needs, and implementing regulations for equitable royalties, benefit-sharing agreements, and access protocols. Positive protection also ensures legal remedies against unauthorised exploitation and supports the documentation, revitalisation, and promotion of TK in ways that respect cultural values and sovereignty.

Together, these strategies form a holistic, WIPO-endorsed approach that balances the prevention of misuse with the active empowerment of communities, ensuring that TK and TCE are preserved, respected, and fairly rewarded, while contributing to cultural diversity, sustainable development, and the protection of intangible heritage in the global IP landscape.

UNESCO on TK and TCE

The United Nations Educational, Scientific and Cultural Organisation (UNESCO), drawing from Article 8(j) of the Convention on Biological Diversity[4], defines TK as the collective knowledge, innovations, and practices

[4] https://www.cbd.int/convention/articles/default.shtml?a=cbd-08 (accessed on 8 Aug 2025)

Article 8(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices;

of Indigenous and local communities that are intrinsically linked to their cultural, ecological, and spiritual life, and vital for biodiversity conservation and sustainable use. The 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage[5] broadens this perspective by recognising intangible heritage as evolving practices, expressions, and skills that foster identity, continuity, and cultural diversity. Similarly, Article 4(3) of the UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions[6] situates cultural expressions within the symbolic, artistic, and value-laden dimensions of cultural identity. Through its Local and Indigenous Knowledge Systems (LINKS)[7] programme, UNESCO supports Indigenous peoples and local communities in documenting, transmitting, and revitalising their unique knowledge systems, while nurturing transdisciplinary collaboration between fields such as ecology, anthropology, law, and cultural studies. This approach affirms that TCE are not mere artistic products but deeply rooted embodiments of community identity, environmental stewardship, and social governance. LINKS facilitates respectful dialogue between traditional and scientific knowledge, generating hybrid solutions to pressing global issues like climate change and biodiversity loss. In doing so, UNESCO emphasises that TW are indispensable not only to cultural diversity but also to ecological sustainability, ensuring their continued vitality as dynamic, living systems that enrich humanity's shared heritage and guide sustainable futures.

Limitations within the Existing IP Framework

The existing IPR framework poses significant limitations when it comes to protecting the TW. At its core, the conventional IPR system is designed to grant exclusive, privatised rights to identifiable individuals or corporate entities, reflecting a model of ownership based on singular authorship or inventorship. This stands in stark contrast to TK, which is collectively owned and nurtured by communities over many generations. The limitations of the existing IPR framework make it fundamentally ill-suited to safeguard TK and TCE, as it is built on principles that conflict with the nature of such knowledge.

Traditional Knowledge Digital Library (TKDL)

India's Traditional Knowledge Digital Library (TKDL)[8] is a pioneering initiative aimed at preventing the misappropriation of traditional medicinal knowledge on international patent platforms. Jointly developed by the Council of Scientific and Industrial Research (CSIR) and the Ministry of AYUSH, the TKDL documents, digitises, and translates traditional medicinal practices, primarily from Ayurveda, Unani,

[5] https://ich.unesco.org/doc/src/15164-EN.pdf (accessed on 10 Aug 2025)

[6] https://www.unesco.org/en/legal-affairs/convention-protection-and-promotion-diversity-cultural-expressions (accessed on 12 Aug 2025)

[7] https://www.unesco.org/en/links (accessed on 10 Aug 2025)

[8] https://www.tkdl.res.in/tkdl/langdefault/common/Home.asp?GL=Eng (accessed on 8 Aug 2025)

Siddha, and Yoga, into languages and formats accessible to global patent examiners. While the TKDL has been effective in challenging wrongful patents abroad and serves as a valuable defensive tool, its scope remains fundamentally limited within the prevailing IP framework.

Fundamentally, the TKDL does not grant any positive rights or legal entitlements to the indigenous communities who are the true custodians of this knowledge. It focuses solely on preventing patent grants, offering no mechanisms for benefit-sharing, prior informed consent, or community control over how their knowledge is accessed or used. As such, the TKDL operates within a defensive, state-centric model that reinforces the disconnect between community-held TK and IP law's emphasis on individual rights and commercial exploitation. In its current form, the TKDL reflects the broader limitations of the existing IP regime and underlines the urgent need for a more inclusive and community-driven legal framework.

Biological Diversity Act, 2002

The Biological Diversity Act, 2002, represents a significant legislative effort by India to regulate access to biological resources and associated TK, while ensuring Prior Informed Consent (PIC) and Fair and Equitable Benefit Sharing (FEBS) with local communities. The National Biodiversity Authority (NBA)[9], along with State Biodiversity Boards, is tasked with overseeing the implementation of these provisions. On paper, the Act aligns with global commitments under the Convention on Biological Diversity (CBD) and aims to protect the rights of indigenous and local communities over their biological heritage. However, in practice, the Act suffers from serious limitations. Implementation is often hampered by bureaucratic delays, unclear procedures, and overlapping jurisdictions among central, state, and local authorities. Many communities remain unaware of their rights under the law, and the procedural complexities discourage participation. Moreover, benefit-sharing agreements, when they occur, are rarely transparent, and enforcement mechanisms remain weak and inconsistent. This has led to limited real-world impact in terms of ensuring community control or meaningful compensation for the use of their resources or knowledge.

Protection of Plant Varieties and Farmers' Rights Act, 2001

The Protection of Plant Varieties and Farmers' Rights PPVFR) Act 2001 is a landmark legislation that seeks to strike a balance between the rights of plant breeders and the traditional rights of farmers. Unlike conventional IP laws, the PPVFR Act[10] uniquely acknowledges the invaluable contribution of farmers in conserving, improving, and preserving genetic plant resources. It grants farmers the right to save, use, sow, re-sow, exchange, and sell farm-saved seeds, including registered varieties, thereby safeguarding age-old agricultural practices. Moreover, the Act provides for benefit sharing when commercial breeders utilise traditional or farmer-developed varieties as the genetic basis for new plant varieties.

[9] http://nbaindia.org/ (accessed on 8 Aug 2025)

[10] https://plantauthority.gov.in/ (accessed on 8 Aug 2025)

Despite its progressive spirit, the Act's implementation faces several significant hurdles. One major challenge is the increasing consolidation of corporate power in the seed sector, which undermines the practical autonomy of farmers despite their formal rights. The complexity of the registration and benefit-sharing processes, coupled with bureaucratic red tape, further alienates rural communities. Most critically, a vast number of small and marginal farmers remain unaware of their rights under the Act and lack the legal literacy or institutional support necessary to assert them. Consequently, benefit-sharing claims are rarely initiated or pursued, and farmers are often excluded from the economic value derived from their contributions.

Patents, Trademarks, Copyrights, and GIS

India's IP regime, comprising the Patents Act, 1970[11]; the Copyright Act, 1957[12]; the Trademarks Act, 1999[13]; and the Geographical Indications of Goods (Registration and Protection) Act, 1999[14] remains structurally unsuited to protect TK and TCEs, which are communal, intergenerational, and often spiritual in nature.

Patent law, despite excluding TK from patentability under Section 3(p), requires novelty, inventive step, and industrial applicability criteria that ancient, collectively generated knowledge rarely meets. Copyright law, which demands fixation in a tangible form and identifiable authorship, similarly fails, as TCEs are often orally transmitted, fluid, and communally created. Trademarks can brand traditional products but cannot safeguard the underlying cultural meaning or knowledge, and they impose ongoing commercial and administrative obligations beyond many communities' capacities. Geographical Indications (GIs) have offered some protection for products like Darjeeling tea or Pashmina wool, but they secure only the product name and reputation, not the intangible heritage or practices behind them, and the costly, complex registration process often benefits traders over knowledge holders.

Across these regimes, the emphasis on individual ownership, commercial exploitation, and time-bound protection clashes with TK and TCEs' collective, non-commercial, and perpetual character. The fixation, disclosure, and registration requirements embedded in conventional IP law are alien to oral traditions, ritual practices, and ecological stewardship systems. India lacks a comprehensive *sui generis* framework tailored to these realities, one that could recognise community custodianship, ensure benefit-sharing, and prevent misappropriation.

As a result, communities remain vulnerable to cultural appropriation and biopiracy, often without the legal or financial means to seek redress. Without urgent reform, India risks

[11] https://ipindia.gov.in/writereaddata/portal/ipoact/1_31_1_patent-act-1970-11march2015.pdf (accessed on 8 Aug 2025)

[12] https://www.copyright.gov.in/Documents/Copyrightrules1957.pdf (accessed on 8 Aug 2025)

[13] https://ipindia.gov.in/Trademarks/about_us_tm (accessed on 8 Aug 2025)

[14] https://ipindia.gov.in/writereaddata/Portal/IPORule/1_27_1_gi-rules.pdf (accessed on 8 Aug 2025)

not only the erosion of its cultural heritage but also the loss of an opportunity to lead globally in crafting inclusive, culturally sensitive IP protections.

Instances of Misappropriation and Cultural Exploitation

Turmeric Patent Case

The Turmeric Patent Case[15] is a landmark instance of biopiracy, underscoring the vulnerability of TK to misappropriation under Western intellectual property regimes. In 1995, the United States Patent and Trademark Office (USPTO) granted a patent to American researchers for turmeric's wound-healing properties—knowledge deeply embedded in Indian Ayurveda and household practice for centuries. Turmeric (*Curcuma longa*), valued for its anti-inflammatory and antiseptic qualities, was widely documented in ancient texts and folk medicine, making the patent an unjust privatisation of public-domain knowledge. The Indian government, through the CSIR, contested the patent, presenting extensive documentary evidence that turmeric's medicinal uses were neither novel nor inventive but part of a living heritage. This challenge highlighted a fundamental disconnect between Western patent criteria—novelty, inventive step, industrial applicability—and TK's collective, cumulative, and ancient character. In 1997, the USPTO revoked the patent, marking one of the first major victories against the wrongful appropriation of indigenous knowledge in a global forum. Beyond its immediate legal significance, the case catalysed broader reforms in India's TK protection strategies, leading to initiatives like the TKDL to document prior art and prevent similar misappropriations. Internationally, it strengthened calls for ethical bioprospecting, prior informed consent, and equitable benefit-sharing under the Convention on Biological Diversity and the Nagoya Protocol. Ultimately, the turmeric case stands as both a cautionary tale and a precedent, demonstrating the urgent need for proactive, culturally sensitive, and legally robust mechanisms to safeguard indigenous heritage from exploitation in a globalised IP landscape.

Neem Patent Controversy

The Neem Patent Controversy is one of the most cited examples of biopiracy, illustrating how TK can be wrongfully appropriated under Western IP regimes. Neem (*Azadirachta indica*), native to the Indian subcontinent, has for centuries been integral to Indian agriculture, medicine, and culture. Its seeds, leaves, and bark have long been used as natural pesticides, antiseptics, and skin treatments—knowledge preserved in Ayurvedic texts and rural oral traditions. In 1994, the European Patent Office (EPO)[16] granted European Patent No. 0436257 to W.R. Grace & Co. and the United States Department of Agriculture for a method of extracting and stabilising neem oil for fungicidal use. To Indian farmers and scientists, this "invention" was nothing new. Neem-based pest control had been

[15] https://www.wipo.int/export/sites/www/tk/en/docs/use-of-turmeric-in-wound-healing-e.pdf (accessed on 8 Aug 2025)

[16] https://patents.google.com/patent/EP0436257A1/en (accessed on 8 Aug 2025)

part of community practice for generations. The patent thus exemplified biopiracy: claiming monopoly rights over communal knowledge without consent or benefit-sharing.

In 1995, a coalition including the Indian government, environmental activist Vandana Shiva, the International Federation of Organic Agriculture Movements (IFOAM), and Non-Government Organisations (NGO) challenged the patent, arguing it lacked novelty and inventive step. They presented extensive prior art, from Sanskrit scriptures to colonial botanical records and modern agricultural manuals, showing that neem's fungicidal properties were long known. In 2000, the EPO revoked the patent, a decision upheld in 2005, affirming that the claimed use was part of the public domain.

The case spurred systemic reforms, most notably the creation of India's TKDL in 2001, which digitises and translates ancient medical and agricultural knowledge for global patent examiners to prevent similar misappropriations. Internationally, it influenced discussions under the CBD and WIPO's Intergovernmental Committee, strengthening calls for *sui generis* TK protection and equitable benefit-sharing. While the Neem victory was historic, it also revealed that defensive protection alone is insufficient. Proactive recognition of community custodianship remains essential to prevent future exploitation.

Basmati Rice Dispute

The Basmati Rice Dispute is a prominent example of biopiracy, highlighting the vulnerability of traditional agricultural heritage under global IP systems. Basmati, a fragrant long-grain rice cultivated for centuries in the Indian subcontinent, is prized worldwide for its aroma, texture, and cultural significance. In the late 1990s, Texas-based RiceTec Inc. secured a U.S. patent on certain "Basmati rice lines and grains," seeking exclusive rights over a crop deeply tied to Indian farming traditions. These moves sparked outrage, as they attempted to monopolise centuries-old knowledge and genetic resources without recognition or benefit-sharing.

India mounted a strong legal challenge, arguing that Basmati's unique qualities were the result of traditional cultivation in specific regions, making RiceTec's claims neither novel nor inventive. The dispute also raised issues of GIs, as Basmati is officially recognised under India's GI registry. While India succeeded in narrowing or invalidating parts of the patent, the case underscored the heavy costs, time, and expertise required to defend heritage in foreign jurisdictions.

Ultimately, the Basmati case revealed structural flaws in the global IP regime, which often overlooks the communal nature of traditional products. It reinforced the need for stronger GI protection, *sui generis* TK laws, and proactive international measures to prevent similar acts of misappropriation.

Cultural Appropriation in Fashion and Media

Cultural appropriation in fashion and media refers to the unacknowledged or inappropriate adoption of elements from a marginalised culture by members of a dominant culture, often for profit or aesthetic appeal. In the realm of TK and TCEs, it occurs when sacred, symbolic, or identity-rich designs, motifs,

garments, music, or performances are taken from their original cultural context and repurposed in ways that distort or commodify their meaning. The fashion industry has frequently been criticised for incorporating traditional Indian textiles, tribal embroidery, and indigenous patterns such as Rajasthani Bandhani, Kutch embroidery, or Warli art into global collections marketed as "exotic" or "bohemian," without credit or compensation. This strips such works of their ritual and historical significance, reducing heritage to a fleeting style trend.

In the media, appropriation is amplified by global reach. Films, advertising, and music often borrow indigenous songs, dances, and attire for visual effect, misrepresenting or trivialising their original meaning. Sacred performances may be reduced to entertainment, and traditional chants sampled in music without consent, as seen in cases involving Gond and Khasi folk traditions.

Legally, both Indian and international IP systems struggle to protect communal, intergenerational creativity lacking identifiable authorship. While GI safeguard certain goods, many art forms fall outside its scope. WIPO discussions on protecting TCEs remain inconclusive, leaving room for exploitation.

Addressing this issue requires more than legal fixes—it demands ethical reform. Respectful cultural exchange must involve prior informed consent, fair compensation, and genuine collaboration with source communities. Representation should move beyond tokenism, ensuring narratives are shaped by cultural custodians themselves. Only then can fashion and media engage with heritage in a way that enriches rather than exploits.

Need for *sui generis* Legislation

The TW holds immense cultural, ecological, and economic significance, making its recognition and protection a matter of urgent priority. Safeguarding TW is essential to ensure the active participation of indigenous communities in decision-making processes, uphold their cultural rights, and promote the sustainable use of natural resources for future generations. The value of TW is multifaceted, encompassing cultural heritage preservation, sustainable development, economic empowerment, scientific advancement, and biodiversity conservation.

From a cultural perspective, TW embodies the heritage and identity of indigenous communities, reinforcing social cohesion and continuity. It is deeply embedded in their way of life, rituals, and governance structures, acting as a living record of their history and worldview. Without adequate protection, the erosion of TW risks dismantling the very foundations of indigenous cultural identity. TW also plays a pivotal role in sustainable development. It encompasses centuries-old practices in agriculture, medicine, environmental stewardship, and natural resource management that promote ecological balance and social inclusion. Such knowledge can inform climate adaptation strategies, sustainable farming methods, and community-based conservation models, providing solutions that are both cost-effective and culturally appropriate.

Economically, TW can empower communities through the commercialisation of traditional arts, crafts, music, and medicinal practices, fostering entrepreneurship and creating

livelihood opportunities. These cultural products, when marketed ethically and with proper benefit-sharing arrangements, can help indigenous groups achieve financial independence without compromising their traditions.

The scientific value of TW is equally significant. Developed over generations through empirical observation and experimentation, it offers insights into plant-based medicines, soil management, weather prediction, and other domains. TW often complements modern science, offering alternative or supplementary approaches to innovation, healthcare, and environmental management. Moreover, TW is integral to biodiversity conservation. Indigenous practices often emphasise the sustainable use of resources, protection of endangered species, and maintenance of ecosystem integrity. Such knowledge systems have historically sustained biodiversity hotspots and can inform global conservation strategies.

However, existing IPR regimes are ill-suited to protect TK due to a fundamental philosophical and structural mismatch. Conventional IPR frameworks emphasise individual ownership, require fixed and tangible expressions of creativity, and operate on a limited-term exclusivity model. TW, by contrast, is inherently communal, collectively owned by communities, and evolves dynamically through oral traditions, intergenerational transfer, and collective practice rather than static documentation.

This misalignment underscores the urgent need for *sui generis* legislation, a tailor-made legal framework designed to address the distinct nature of TK and TCEs. Such laws would recognise communal ownership, establish collective rights management systems, and respect the oral and evolving nature of TW. Importantly, they would incorporate mechanisms that protect not only the economic value of TW but also its cultural integrity and spiritual significance. By embedding cultural sensitivity into legal protection, sui generis frameworks can bridge the gap between indigenous epistemologies and modern legal systems, ensuring that TW thrives as a living, evolving heritage rather than a commodified relic.

International Developments

Internationally, the need for *sui generis* protection has been acknowledged in various fora, such as the WIPO, Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore, as well as the Convention on Biological Diversity (CBD), the Nagoya Protocol and UNESCO's Local and Indigenous Knowledge Systems[17] (LINKS), which emphasise prior informed consent and benefit-sharing. Several countries, including India, have begun to experiment with *sui generis* models, such as the Protection of Plant Varieties and Farmers' Rights Act and the Traditional Knowledge Digital Library. However, these remain partial steps, and a comprehensive global framework tailored for TK and TCEs is urgently required. Only through *sui generis* legislation can the inherent communal, evolving, and spiritual nature of traditional knowledge be adequately safeguarded, preventing exploitation while empowering indigenous communities to control and benefit from their cultural heritage

[17] https://www.unesco.org/en/links (accessed on 8 Aug 2025)

in a manner consistent with their values and worldviews.

For India, these developments offer both moral impetus and legal guidance to establish a robust *sui generis* framework that aligns with global standards. While India's TKDL is a significant step in preventing wrongful patents, comprehensive legislation is needed to ensure indigenous communities' ownership, benefit-sharing, and cultural integrity, positioning India as a leader in safeguarding TK and TCE.

India's Legislative Progress: Towards a *Sui-generis* System

India has made notable preliminary strides towards establishing a *sui generis* legal framework to protect TK and TCEs, recognising the inadequacy of conventional intellectual property laws to safeguard its vast and diverse indigenous heritage.

One of the earliest formal attempts was the drafting of the Traditional Knowledge Bill in 2016[18], which sought to create a comprehensive institutional and legal mechanism to document, protect, and regulate the use of TK. The bill proposed the establishment of a National Authority on Traditional Knowledge, tasked with overseeing the registration and management of TK-related rights, and emphasised community participation through the creation of community-run knowledge trusts. These trusts were envisioned as local bodies responsible for documentation, preservation, and granting prior informed consent before the use or commercialisation of traditional knowledge could occur. This decentralised approach was designed to empower indigenous communities at the grassroots level, recognising their role as custodians of TK. However, despite its innovative framework, the bill failed to progress beyond the drafting stage[19], stalling in the legislative process due to political and administrative challenges, and concerns about implementation logistics.

More recently, in 2022, a significantly forward-thinking initiative was introduced by Dr Shashi Tharoor in the form of the Protection of Traditional Knowledge Bill[20]. This proposed legislation reflects a deeper understanding of the distinctive nature of TK and aligns more closely with international developments, particularly the principles emerging from the WIPO and the UNDRIP. The bill recognises "Knowledge Societies" — defined as indigenous and local communities who are the original custodians of traditional knowledge — as legal entities vested with the rights to protect, control, and manage their heritage. Crucially, it dispenses with traditional IP requisites such as fixation, registration, or novelty, which are inherently incompatible with the oral, evolving, and collective character of TK. Instead, it prioritises community ownership, mandating prior informed consent before any use, research,

[18] https://shashitharoor.in/private_member_bills_details/9%22 (accessed on 12 Aug 2025)

[19] https://ijirl.com/wp-content/uploads/2023/08/PROTECTING-INDIGENOUS-CULTURAL-HERITAGE-A-COMPARATIVE-STUDY-OF-THE-TRADITIONAL-KNOWLEDGE-BILL-OF-2016-AND-2022.pdf(accessed on 12 Aug 2025)

[20] https://sansad.in/getFile/BillsTexts/LSBillTexts/Asintroduced/87%20of%202022%20AS.pdf? source=legislation (accessed on 12 Aug 2025)

or commercial exploitation of TK. The bill also emphasises fair and equitable benefit-sharing arrangements, ensuring that communities derive tangible advantages from the use of their knowledge.

Furthermore, the Protection of Traditional Knowledge Bill innovatively addresses the complex realities of TK that span across multiple states or communities by proposing mechanisms for shared ownership and collective management. This recognises that traditional knowledge and cultural expressions are often not confined within rigid territorial boundaries but are part of dynamic cultural landscapes shared by diverse groups. By providing legal recognition to such collective and overlapping rights, the bill attempts to resolve conflicts and ensure inclusive protection. The approach is also sensitive to the spiritual and cultural dimensions of TK, aiming to preserve the integrity of indigenous traditions alongside their economic value.

India's legislative progress towards a *sui generis* system thus marks a significant shift from fragmented, reactive protection efforts to a holistic, community-empowering model that respects the unique characteristics of traditional knowledge. While challenges remain in translating these draft bills into enacted law and in designing effective institutional mechanisms, these proposals offer a promising foundation for India to assert its leadership in safeguarding TK. Aligning domestic legislation with international norms not only strengthens India's legal arsenal against biopiracy and cultural appropriation but also empowers indigenous communities to reclaim ownership of their heritage on their own terms. This legislative evolution is essential for preserving India's rich intangible heritage while promoting equitable and sustainable cultural and economic development.

Recommendations for a Holistic Legal Framework

Protecting India's TW calls for a comprehensive, culturally rooted approach that goes beyond piecemeal reforms under existing intellectual property laws. A truly effective framework must recognise TW as communal, dynamic, and spiritual in nature, ensuring that protection mechanisms align with indigenous worldviews.

First, India should enact dedicated *sui generis* legislation that formally acknowledges collective custodianship, eliminates restrictive criteria like fixation or registration, grants perpetual rights, safeguards both material and intangible values, and provides culturally sensitive conflict resolution mechanisms.

Second, the scope of protection must extend well beyond medicinal plants, encompassing oral traditions, rituals, folk arts, textile patterns, agricultural methods, music, dances, and even dialects—ensuring no cultural domain is left vulnerable.

Third, community-led documentation is vital, allowing indigenous groups to control how their heritage is recorded, preserved, and shared, while protecting sacred or confidential elements from misuse.

Fourth, mandatory PIC and equitable benefit-sharing must be legal requirements before any commercial or research use of TW, with benefits provided in both monetary and non-monetary forms, such as capacity-building and infrastructure development.

Fifth, protection must also guard against internal cultural appropriation, preventing dominant groups from commodifying marginalised

communities' heritage without credit or fair compensation.

Finally, building capacity through legal literacy, training in preservation and enforcement, and leveraging digital tools is essential, supported by specialised IP tribunals and cooperation with online platforms to curb digital misappropriation.

In today's digital age, misappropriation often occurs online, with traditional art, music, medicine, and cultural expressions reproduced and commercialised through digital platforms without authorisation. India must invest in advanced digital surveillance and enforcement strategies to combat such violations. Deploying AI-enabled tools capable of detecting copyright infringements and tracking unauthorised uses in real-time can greatly enhance enforcement capabilities. Collectively, these measures can establish a strong, inclusive, and lasting framework to safeguard India's cultural heritage.

Parting Thoughts

India's IP regime continues to be inadequate for effectively protecting TK and TCEs, collectively referred to as Traditional Wisdom (TW). Defensive measures alone cannot secure community ownership or protect the spiritual, collective and oral dimensions that conventional patent and copyright systems ignore. What is needed is a *sui generis* framework co-designed with indigenous custodians that recognises communal ownership, customary governance and the non-economic values attached to cultural practices. Such a model should dispense with rigid novelty and fixation requirements, provide flexible perpetual protection, equitable benefit-sharing mechanisms and mandatory prior informed consent provisions, preventing exploitation and promoting respect for indigenous sovereignty.

The silence of the law cannot continue in the face of cultural loss and exploitation. The time has come for India to give voice to its Traditional Wisdom through laws that protect, honour, and celebrate its unparalleled cultural legacy. Only through comprehensive, rights-based, timely reform can India honour its Traditional Wisdom. Such a legislative action will also significantly strengthen India's credibility in global forums.

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Mahabharata – A Management Guide for Millennials

Gowtham S.

Overview

The *Mahabharata* is one of the oldest and greatest epics of Hindu mythology that the world has ever witnessed. It revolves around complex human emotions and family relationships that culminated in a great battle between the *Kauravas* and the *Pandavas* for the throne of *Hastinapura*. Beyond its dramatic storyline, the epic holds immense moral and ethical wisdom that can inspire today's youth to move in a righteous direction and achieve their goals.

The *Mahabharata* is filled with numerous instances that can enrich and transform the way people and organisations function. Management, as we know, involves functions such as planning, organising, leading, controlling, and coordinating. Ancient Indian sages, in their guidance to kings, emphasised proper planning, strategy formulation, decision-making, and efficient management of human and natural resources, agriculture, and trade. People were also advised to live in harmony with nature and maintain balance in their communities and organisations. The moral virtues and self-confidence of the leaders, administrators, and policymakers of that era continue to guide us in uplifting both society and the business world today.

Guiding Principles

Preparation

Preparation leads to quality. As the army saying goes, "The more you sweat in peace, the less you bleed in war."

Before the war, the *Pandavas* prepared thoroughly and turned their weaknesses into strengths. For example, Arjuna went on a mission to acquire divine weapons (*Divyastras*), while Yudhishthira learned the art of spear fighting. Similarly, in management, preparation is the key to achieving goals. Without preparation, success is impossible. Therefore, always strive to "Turn your weakness into your strength."

Concurrence

Concurrence relates to interpersonal relationships — maintaining harmonious relations within the organisation. Healthy relationships lead to better networking and encourage sustained growth.

For instance, despite limited resources, the *Pandavas* effectively managed their allies to fight against a powerful enemy. Their unity and coordination became their greatest asset.

Gowtham S.

Research Scholar, Assistant Professor, Seshadripuram College, Bengaluru City University, Bengaluru-560020, India; govetham@gmail.com;
ORCID ID: https://orcid.org/0009-0003-6050-8850

Team Spirit

To achieve synergy and common organisational goals, employees must work together in a unified direction. Team spirit fosters sustained growth and collective success.

The *Kauravas*, however, lacked this spirit. Each fought for personal reasons. *Bhishma* fought to uphold his vow, Karna fought to prove his worth against *Arjuna*, and *Duryodhana* fought to retain power. Without team unity, even a mighty force can fail.

The Right Manager

The *Mahabharata* teaches us the qualities of a right manager through the examples of Krishna and Yudhishthira.

A good manager understands competitors' weaknesses and converts challenges into opportunities through a Strengths, Weaknesses, Opportunities, Challenges (SWOC) analysis. A good manager takes calculated risks, inspires and counsels the team in moments of need, and provides clarity by answering why, when, and how. Effective managers analyse every aspect before taking decisive action.

Sharing Responsibility

When pursuing large goals, sharing responsibilities is crucial.

A decentralised system with clearly defined roles ensures timely and efficient task completion. Unity of command and proper delegation not only enhance confidence and learning among staff but also lay the foundation for long-term growth and effective succession planning within the organisation.

Commitment over Competence

When selecting a team, it is often better to choose members who are passionate and committed rather than merely skilled.

The best person for a job is not always the most competent, but the one with the strongest commitment. A striking example is Abhimanyu, a 16-year-old warrior who fearlessly entered the *Chakravyuha*. It took the combined might of seven great warriors to defeat this single committed soldier. His dedication exemplifies the power of commitment over mere competence.

Conclusion

The *Mahabharata* continues to serve as a timeless management guide, offering lessons on leadership, ethics, teamwork, and resilience. Its teachings remind millennials that success is not only about strategy and skill but also about moral strength, preparation, unity, and unwavering commitment to purpose.

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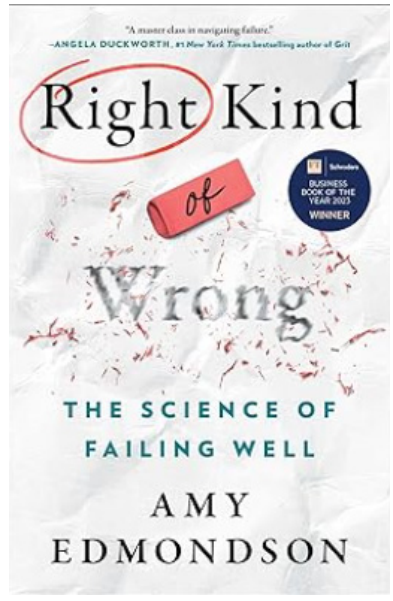
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Book Review
Right Kind of Wrong – The Science of Failing Well (2023, ISBN10: 1982195061)

Author: Amy Edmondson; Published by: Simon Acumen

Reviewer: S. Sathyanarayana

Amy Edmondson's *Right Kind of Wrong* is a timely contribution to the management and leadership literature, particularly in an era where "fail fast, fail often" has become a fashionable mantra. As a professor at Harvard Business School and a leading scholar on psychological safety, Edmondson brings both intellectual authority and practical insight to a subject that is often oversimplified. Rather than glorifying all types of failure, she distinguishes between harmful failures that should be minimized and "intelligent" failures that should be encouraged. While the book has strong conceptual clarity and practical utility, its arguments also raise important questions about applicability, cultural fit, and the risk of managerial rhetoric outpacing real organisational change.



Strengths of the Book

One of the book's most compelling contributions is its classification of failures into three categories: basic, complex, and intelligent. Basic failures are preventable and often result from carelessness or lack of preparation; complex failures arise when multiple factors interact unpredictably; intelligent failures occur in new territory, where experiments and risk-taking are necessary to generate new knowledge.

S. Sathyanarayana
Professor, M P Birla Institute of Management, Bangalore - 560001, Karnataka, India;
principal@mpbim.com; ORCID ID: https://orcid.org/0000-0002-1552-9762

This taxonomy brings nuance to discussions of failure, allowing managers to differentiate between errors that reveal negligence and those that foster innovation. Unlike much management literature that reduces failure to either "good" or "bad," Edmondson offers a more sophisticated framework for thinking about when failure should be avoided and when it should be embraced.

Another strength lies in her integration of research on psychological safety with the theme of failure. Edmondson has long argued that environments where people feel safe to speak up and make mistakes without fear of punishment are more innovative and resilient. *Right Kind of Wrong* extends this line of thought, showing how leaders can intentionally cultivate cultures where intelligent failures are recognized as valuable learning opportunities. The book is filled with case studies from business, healthcare, and science that illustrate how organisations that normalise experimentation tend to outperform those that stigmatize mistakes. This emphasis on culture, leadership, and interpersonal dynamics grounds the book in the messy realities of organisational life rather than abstract theory alone.

Finally, Edmondson succeeds in bridging theory with practice. She does not simply argue that failures should be accepted; she provides actionable strategies for leaders to frame failures constructively, distinguish learning opportunities from negligence, and design "safe-to-fail" experiments. In this way, the book resists the trap of being purely conceptual. It offers a practical toolkit for managers, educators, and leaders navigating environments where uncertainty and complexity are unavoidable.

Critical Reflections and Limitations

Despite these strengths, the book is not without limitations. A key issue is its organisational bias. Much of the evidence and examples are drawn from large, resource-rich organisations, many of which are in Western contexts. While this makes the book appealing to corporate executives, it raises questions about applicability in less privileged contexts. Small firms, educational institutions, or non-profit organizations may lack the resources to create controlled "intelligent failures" without incurring serious risk. The optimistic framing of failure as a learning tool may not resonate in environments where failure carries existential consequences.

Another critique concerns the overlap with Edmondson's earlier work. Readers familiar with her influential research on psychological safety may find parts of *Right Kind of Wrong* repetitive. While the taxonomy of failure is new, the central message that organisations must cultivate safe spaces for risk-taking and learning feels like an extension rather than a radical departure from her previous books and articles. For some readers, this may reduce the sense of novelty. The book also underestimates the deep cultural and emotional resistance to embracing failure. Edmondson acknowledges the role of shame, fear, and blame in preventing openness to failure, but the strategies she offers sometimes appear overly rationalistic. Telling leaders to "frame failures as learning opportunities" or to "reward intelligent risks" is important but does not fully address entrenched norms, power dynamics, or cultural traditions that stigmatize mistakes. In hierarchical or collectivist cultures, where "saving face" is critical, the transition toward embracing intelligent failure may be far

more complex than Edmondson suggests. The emotional and cultural labour required for such a shift is downplayed.

Additionally, while Edmondson distinguishes intelligently between types of failure, the practical boundary between them can blur. For instance, a failure may be classified as "intelligent" by one leader but as "negligent" by another, depending on how expectations and accountability are defined. This raises the risk that the taxonomy, while elegant in theory, could be inconsistently applied in practice. Without robust safeguards, organisations might use the language of "intelligent failure" to mask recklessness or excuse poor planning.

Broader Implications

The critical strength of Edmondson's book lies in its relevance to contemporary challenges. In a world of rapid technological change, uncertainty, and disruption, the ability to experiment and learn from mistakes is crucial. Her arguments resonate not only in corporate management but also in fields like education, healthcare, and scientific research. For higher education, for example, the book has important implications: universities often penalize failure through rigid grading systems and research cultures that reward only "positive" results. Adopting Edmondson's framework could allow institutions to reimagine failure as an essential part of learning and discovery.

However, this also highlights the book's broader dilemma: embracing failure sounds attractive in theory, but translating it into practice requires shifts in incentives, structures, and cultural norms that are difficult to achieve. Without these systemic changes, there is a risk that "failing well" becomes a managerial slogan rather than a lived reality.

Conclusion

Right Kind of Wrong is an insightful, accessible, and relevant book that makes a strong case for rethinking how individuals and organisations approach failure. Edmondson's nuanced taxonomy, combined with her emphasis on psychological safety, gives leaders a powerful framework for separating destructive mistakes from valuable experiments. At the same time, the book invites critical reflection about its applicability across contexts, the challenges of cultural resistance, and the risk of rhetorical adoption without substantive change. For readers seeking a balanced perspective on failure neither demonising it nor glorifying it Edmondson's book is an excellent resource. Yet, as with any management trend, the challenge lies not in the elegance of the concept but in the messy realities of practice.

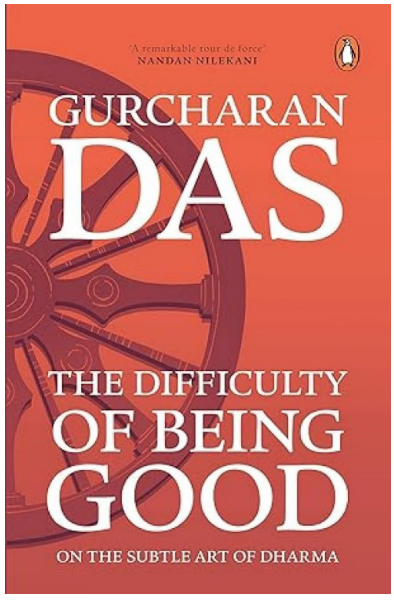
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Book Review
The Difficulty of Being Good: On the Subtle Art of Dharma

Author: Gurcharan Das; Published by: Penguin Books India, 2009; Oxford University Press (US), 2010. 488 pp.

Reviewer: Pushpa B. V.



Gurcharan Das's *The Difficulty of Being Good* is a deeply reflective and engaging study of the Mahābhārata, presented as a reflection and an extended inquiry into the problem of dharma: what it means to be "good". This is relevant mainly in present times where moral obligations collide, roles and duties conflict, and reason and emotion point in different directions. Rather than retelling the Mahābhārata in full, the author selects pivotal anecdotes and principal characters (Yudhiṣṭhira, Kṛṣṇa, Arjuna, Kārṇa and others) from the epic, using their stories as case studies and narratives that provoke questions rather than provide orderly answers. This in turn invites readers to question, reflect, and interpret rather than accept ready-made answers.

He uses a character-centric and comparative approach, linking the ancient moral struggles of the Mahābhārata to today's complex world of success and failures in business, economics and politics. Each chapter explores traits and decisions, weakness and courage, fidelity and betrayal, pragmatism and principle, and traces how characters' actions illuminate the contingent and context-sensitive nature of dharma. The author very well links the classical world of Hastināpura to the ethical failures and issues like corruption, leadership and integrity. He makes timeless lessons of dharma relevant for today's readers.

Pushpa B. V.

Associate Professor, M P Birla Institute of Management, Race Course Road, Bengaluru – 560001, Karnataka, India; pushpabv@mpbim.com; ORCID ID: https://orcid.org/0000-0002-2469-0937

Strengths

The most compelling achievement of the book is its insistence that moral reasoning is an art. Das encourages readers towards critical thinking rather than following prescriptions. This transforms the epic into a guide to ethical thinking. The use of lucid language, deep research, thought-provoking insights make the book suitable for general readers and scholars alike.

Critique

While the book comes with extensive research, its scope seems restricted. The author's focus on select anecdotes leaves the broader background of the epic underexplored. Sometimes the parallels drawn with modern corporate life may seem too moralistic. Readers seeking deeper engagement may find the analysis more interpretive and insufficiently grounded to textual criticism. However, this orientation also makes the work more readable and reflective and encourages readers to engage in broader ethical reflection.

Contemporary relevance

In an era of rapid technological change, when "created minds" such as artificial intelligence pose new ethical dilemmas. Das's emphasis on mindful action, moral balance and empathy are highly relevant.

For general readers the book functions as a guide of moral choice, encouraging self-reflection on ethical dilemmas. For ethicists and scholars, it offers engaging case studies that promotes effective dialogue and discussions on values, ethics, leadership and decision-making.

Conclusion

In summary, the book, *The Difficulty of Being Good is more than a philosophical commentary on the Mahābhārata* is a timeless guide to understand the moral complexity of human life. The book makes the readers pause, question and rediscover the meaning of dharma in their own circumstances. Whether it is for personal reflection or academic discussion, it leaves the readers with a deeper appreciation of how difficult yet relevant it is to strive towards being good which makes the book intellectually rewarding. It is a reminder that the pursuit of goodness is an ongoing dialogue between tradition and modernity.

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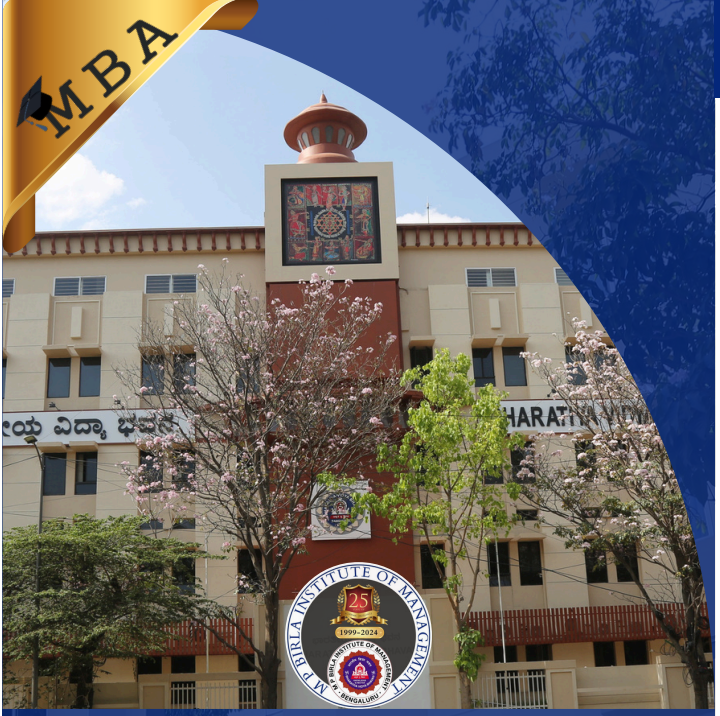
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