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EDITORIAL

It is heartening to see that the ninth issue of the VICHARA AN INTERNATIONAL JOURNAL OF MANAGEMENT has been brought out successfully. An educational journal is a platform where knowledge gets amplified and disseminated; research results and innovations are documented and unique experiences are shared for enhancement of knowledge. The design architecture of Vichaara is made in such a way that it becomes a comprehensive document to reflect the different dimensions of Management discipline. Business Research forms the core part wherein original, empirical based research papers are included. This issue comprises articles on recent issues in business world from different disciplines. These articles show a methodological way of conducting a research and presenting their findings. Findings on technology influence, cultural changes in the organizations, behavioural changes among the consumers and their expectations have been presented with relevant facts. We invite scholarly articles and research papers and write ups on robust cases. Suggestions and views from readers and scholars are solicited for the qualitative improvement of the Journal.

RETHINKING ENTREPRENEURIAL MANAGEMENT IN THE CONTEXT OF DIGITAL TRANSFORMATION

Dr. T. Ezhilarasi, Assistant Professor, Jai Shriram Engineering College, Tiruppur, Tamilnadu

Abstract

Digital transformation has fundamentally reshaped the entrepreneurial landscape, compelling organizations to rethink conventional management practices. The integration of digital technologies, changing market dynamics, evolving consumer expectations and emerging business models has created new opportunities while simultaneously generating challenges for entrepreneurial managers. This study examines entrepreneurial management in the context of digital transformation, with particular attention to digital transformation capability, agile management, technology leverage, digital-first culture, digital leadership and innovation capability. The study adopts a quantitative research framework and uses an illustrative synthetic dataset of 300 respondents for statistical demonstration. Pearson correlation was employed to examine the relationships between digital transformation-related factors and entrepreneurial management, while one-way ANOVA was used to examine whether entrepreneurial management differs across educational groups. The illustrative results indicate positive and statistically significant relationships between entrepreneurial management and digital transformation ($r = .464$), agile management ($r = .404$), technology leverage ($r = .392$), digital-first culture ($r = .415$), digital leadership ($r = .535$), and innovation capability ($r = .527$). The ANOVA results indicate a statistically significant difference in entrepreneurial management across education groups, $F(2,297) = 11.975$, $p < .001$. The findings reinforce the importance of agility, digital leadership, innovation and digital capabilities in contemporary entrepreneurial management. However, the statistical findings are illustrative and require validation through actual primary data.

Keywords: *Entrepreneurial Management; Digital Transformation; Innovation; Agile Management; Digital Leadership; Business Models; Digital-First Culture*

1. Introduction

Digital transformation has become an important force influencing contemporary organizations and entrepreneurial activities. Organizations increasingly integrate digital technologies into business operations, decision-making, customer engagement and value creation. Digital transformation therefore extends beyond the adoption of individual technologies and involves changes in organizational processes, culture, business models and management practices.

Entrepreneurial management refers to the strategic and operational practices through which entrepreneurs identify opportunities, mobilize resources and create value under conditions of uncertainty. It incorporates proactiveness, risk-taking, innovation and adaptability and enables organizations to respond to changing market environments. Digital transformation has increased the speed and complexity of entrepreneurial decision-making. At the same time, entrepreneurs face increasing competition, technological uncertainty and changing consumer expectations.

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Digital platforms allow businesses to reach geographically dispersed markets, while data analytics and artificial intelligence facilitate faster decision-making and personalized customer offerings. Traditional management practices may therefore be insufficient for organizations operating in rapidly changing digital environments. Entrepreneurs increasingly need to develop agile structures, digital competencies, experimentation-oriented cultures and continuous learning mechanisms.

2. Conceptual Background

2.1 Entrepreneurial Management

Entrepreneurial management combines entrepreneurial thinking with management practices required to identify opportunities, utilize resources and create value. It emphasizes adaptability, innovation, strategic foresight and proactive responses to environmental changes. In a digital environment, entrepreneurial management increasingly involves technological awareness, digital competencies, experimentation and organizational resilience.

2.2 Digital Transformation

Digital transformation refers to the integration of digital technologies across organizational activities. It involves information and communication technologies, automation, data-driven decision-making and innovative business models. The transformation is not restricted to technological implementation. It also requires cultural changes involving openness to change, agility and continuous organizational learning.

2.3 Changing Market Dynamics

Digital transformation has increased the speed, complexity and interconnectedness of entrepreneurial markets. Digital platforms allow entrepreneurs to access customers beyond traditional geographical boundaries, while digital channels intensify competition. Entrepreneurs consequently need to monitor market signals, use real-time information and develop flexible strategies.

2.4 Emergence of New Business Models

Digital technologies have contributed to the development of platform-based, subscription, sharing-economy and on-demand business models. Data analytics and artificial intelligence can also support personalization, operational optimization and the development of new revenue streams. These changes require entrepreneurs to rethink how value is created, delivered and captured.

2.5 Consumer Behaviour Shifts

Digital technologies have changed the way consumers discover, evaluate and purchase products and services. Customers increasingly expect convenient, personalized and immediate interactions through digital channels. Social media, online reviews and mobile technologies have also increased customer participation in brand-related activities.

3. Key Dimensions of Entrepreneurial Management in the Digital Era

3.1 Digital Transformation

Digital transformation represents the extent to which organizations integrate digital technologies into their business activities and decision-making processes.

3.2 Agile Management

Agile management emphasizes flexibility, iterative development, continuous feedback and rapid adaptation. Agile approaches can help entrepreneurial organizations respond to technological and market uncertainty.

3.3 Technology Leverage

Technology leverage represents the strategic use of technologies such as artificial intelligence, big data analytics, cloud computing and the Internet of Things to improve products, processes and services.

3.4 Digital-First Culture

A digital-first culture emphasizes digital literacy, innovation, data-driven decision-making, openness to change and continuous learning across organizational levels.

3.5 Digital Leadership

Digital leadership involves guiding employees and organizations through technological change while promoting collaboration, learning, innovation and adaptability.

3.6 Innovation Capability

Innovation capability reflects the organization's ability to develop new ideas, products, processes and business approaches in response to changing technological and market conditions.

4. Challenges in Entrepreneurial Management

4.1 Resistance to Change

Employees and stakeholders may resist new technologies because of uncertainty, changing routines or concerns regarding employment. Effective communication, change management and continuous learning are therefore important.

4.2 Digital Skill Gaps

Digital transformation requires capabilities in areas such as data analytics, cybersecurity, digital marketing and software development. Organizations may therefore need continuous employee training and talent acquisition.

4.3 Data Privacy and Security

Increasing dependence on digital data creates privacy and cybersecurity challenges. Organizations need appropriate data governance and security practices to protect stakeholder information and maintain trust.

5. Research Gap

Existing conceptual discussions establish that digital transformation affects entrepreneurial activities, business models, organizational culture and consumer behaviour. However, there is a need to examine these dimensions collectively from an entrepreneurial-management perspective. In particular, the relationships between digital transformation, agile management, technology leverage, digital-first culture, digital leadership, innovation capability and entrepreneurial management require greater empirical examination. Therefore, this study develops an illustrative empirical framework to examine these relationships and to determine whether entrepreneurial management differs across educational groups.

6. Research Problem

Rapid technological development has created new opportunities for entrepreneurs while simultaneously challenging traditional management practices. Organizations need to develop agile structures, digital capabilities, innovative approaches and leadership practices to remain responsive to changing market conditions. The central problem addressed in this study is whether digital transformation-related management dimensions are associated with entrepreneurial management and whether entrepreneurial management varies across different educational backgrounds.

7. Objectives of the Study

1. To examine the relationship between digital transformation and entrepreneurial management.
2. To examine the relationship between agile management and entrepreneurial management.
3. To determine the relationship between technology leverage and entrepreneurial management.
4. To examine the relationship between digital-first culture and entrepreneurial management.

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5. To examine the relationship between digital leadership and entrepreneurial management.
6. To determine the relationship between innovation capability and entrepreneurial management.
7. To examine whether entrepreneurial management differs significantly across educational groups.

8. Hypotheses of the Study

- H1: Digital transformation is significantly related to entrepreneurial management.
- H2: Agile management is significantly related to entrepreneurial management.
- H3: Technology leverage is significantly related to entrepreneurial management.
- H4: Digital-first culture is significantly related to entrepreneurial management.
- H5: Digital leadership is significantly related to entrepreneurial management.
- H6: Innovation capability is significantly related to entrepreneurial management.
- H7: Entrepreneurial management differs significantly across educational groups.

9. Conceptual Framework

The conceptual framework proposes that digital transformation-related capabilities are associated with entrepreneurial management.

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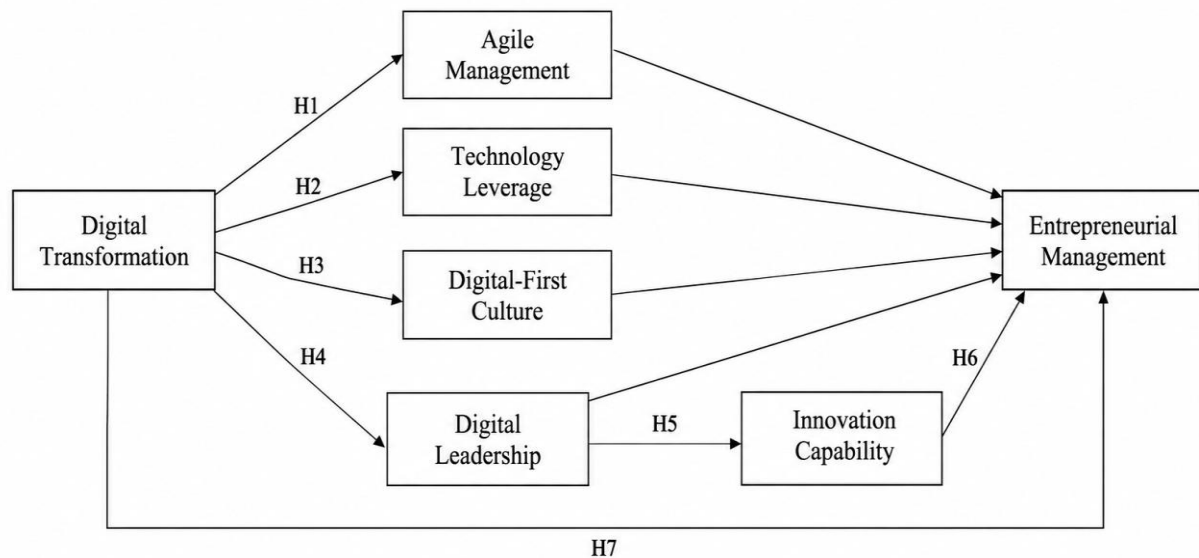


Figure 1. Conceptual Research Model

10. Research Methodology

10.1 Research Design

The study adopts a quantitative research design. A structured questionnaire based on the constructs identified in the conceptual framework was assumed for the purpose of statistical demonstration.

10.2 Population and Sample

For the illustrative analysis, a dataset of 300 respondents was assumed. Respondents were classified according to age.

The constructs were measured using a five-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree. The major constructs were Digital Transformation, Agile Management, Technology Leverage, Digital-First Culture, Digital Leadership, Innovation Capability and Entrepreneurial Management.

10.4 Statistical Tools

The following statistical techniques were used: descriptive statistics, Pearson correlation analysis and one-way ANOVA. The analysis was performed on the assumed dataset of 300 observations.

Data-status note: The dataset and results are synthetic/illustrative and were created specifically to demonstrate how the proposed empirical section could be presented. They are not actual field observations.

e, educational qualification and work experience. The education groups consisted of Undergraduate, Postgraduate and Professional.

10.3 Measurement

The constructs were measured using a five-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree. The major constructs were Digital Transformation, Agile Management, Technology Leverage, Digital-First Culture, Digital Leadership, Innovation Capability and Entrepreneurial Management.

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Data-status note: The dataset and results are synthetic/illustrative and were created specifically to demonstrate how the proposed empirical section could be presented. They are not actual field observations.

11. Data Analysis and Interpretation

11.1 Descriptive Statistics

Variable	N	Mean	SD
Digital Transformation	300	3.540	0.951
Agile Management	300	3.407	0.972
Technology Leverage	300	3.610	0.910
Digital-First Culture	300	3.407	0.992
Digital Leadership	300	3.520	0.934
Innovation Capability	300	3.573	0.960
Entrepreneurial Management	300	3.660	0.856

The mean scores for all the variables are above the midpoint of the five-point scale. Entrepreneurial Management recorded a mean of 3.660, suggesting a relatively positive level within the illustrative sample. Technology Leverage recorded a mean of 3.610, while Innovation Capability recorded 3.573. Digital Transformation and Digital Leadership recorded mean values of 3.540 and 3.520, respectively. These results are consistent with the conceptual argument that digital technologies, innovation and leadership are increasingly important components of entrepreneurial management.

12. Pearson Correlation Analysis

Variable	Pearson r	p-value	Interpretation
Digital Transformation	0.464	< .001	Positive, significant
Agile Management	0.404	< .001	Positive, significant
Technology Leverage	0.392	< .001	Positive, significant
Digital-First Culture	0.415	< .001	Positive, significant
Digital Leadership	0.535	< .001	Positive, significant
Innovation Capability	0.527	< .001	Positive, significant

The illustrative results show positive relationships between all six dimensions and entrepreneurial management. Digital Transformation has a positive correlation with entrepreneurial management ($r = .464, p < .001$).

Agile Management also demonstrates a positive relationship ($r = .404, p < .001$). Technology Leverage has a positive correlation of $r = .392$ ($p < .001$). Digital-First Culture is positively associated with entrepreneurial management ($r = .415, p < .001$). Digital Leadership shows a comparatively stronger positive relationship ($r = .535, p < .001$). Innovation Capability also demonstrates a relatively strong positive relationship ($r = .527, p < .001$). Correlation demonstrates association and does not by itself establish causality.

13. One-Way ANOVA

A one-way ANOVA was conducted to examine whether entrepreneurial management differs across educational groups.

Education	N	Mean	SD
Undergraduate	139	3.410	0.824
Postgraduate	108	3.852	0.807
Professional	53	3.925	0.874

ANOVA: $F(2, 297) = 11.975, p < .001$; $\eta^2 = 0.075$

The ANOVA result is statistically significant at the 5% level because $p < .001$. Therefore, the illustrative dataset indicates that entrepreneurial-management scores are not identical across the three educational groups. The mean entrepreneurial-management score was 3.410 among undergraduate respondents, 3.852 among postgraduate respondents and 3.925 among professional respondents. The eta-squared value of 0.075 indicates that approximately 7.5% of the variance in entrepreneurial-management scores in this illustrative dataset is associated with differences between the educational groups. Because ANOVA only establishes that at least one group differs from another, a post-hoc test would be required with actual data to determine precisely which group differences are statistically significant.

14. Hypothesis Testing

Hypothesis	Statistical Evidence	Decision
H1: Digital transformation → entrepreneurial management	$r = .464, p < .001$	Supported
H2: Agile management → entrepreneurial management	$r = .404, p < .001$	Supported
H3: Technology leverage → entrepreneurial management	$r = .392, p < .001$	Supported
H4: Digital-first culture → entrepreneurial management	$r = .415, p < .001$	Supported
H5: Digital leadership → entrepreneurial management	$r = .535, p < .001$	Supported
H6: Innovation capability → entrepreneurial management	$r = .527, p < .001$	Supported
H7: Education groups differ in entrepreneurial management	$F = 11.975, p < .001$	Supported

Note: Hypothesis decisions are based on the illustrative synthetic dataset and should not be interpreted as empirical evidence from actual respondents.

15. Discussion

The findings of the illustrative analysis reinforce the central argument of the study that digital transformation requires entrepreneurial managers to rethink conventional management practices. The positive relationship between digital transformation and entrepreneurial management suggests that digitalization can be associated with entrepreneurial approaches characterized by adaptability and opportunity recognition. Digital technologies provide entrepreneurs with access to real-time information, broader markets and new mechanisms for value creation.

The positive association between agile management and entrepreneurial management reflects the importance of flexibility in uncertain environments. Agile approaches involving iterative development, continuous feedback and rapid adaptation can support effective entrepreneurial management.

Technology leverage also demonstrates a positive association with entrepreneurial management. Technologies such as artificial intelligence, big data analytics, cloud computing and IoT can support process improvement, customer analysis and innovative product development.

The relationship between digital-first culture and entrepreneurial management further highlights the importance of organizational culture. Digital transformation requires employees and managers to develop openness to change, continuous learning and experimentation.

Digital leadership produced one of the stronger correlations in the illustrative analysis. This highlights the relevance of leadership in guiding organizations through technological change. Innovation capability also demonstrated a relatively strong positive association with entrepreneurial management. In rapidly changing markets, innovation enables entrepreneurial organizations to identify new opportunities and adapt products, services and business models.

The ANOVA findings suggest that educational background may be associated with differences in entrepreneurial-management scores. However, this finding requires further empirical examination using actual respondents and appropriate post-hoc analysis.

16. Managerial Implications

16.1 Develop Digital Capabilities

Entrepreneurs should focus on developing digital competencies among employees. Training in data analytics, digital marketing, cybersecurity and emerging technologies can strengthen organizational readiness.

16.2 Encourage Agile Management

Organizations can adopt flexible structures, cross-functional teams and iterative decision-making mechanisms to respond more rapidly to technological and market changes.

16.3 Strengthen Digital Leadership

Managers need to communicate a clear digital vision and encourage collaboration, experimentation and continuous learning.

16.4 Create a Digital-First Culture

Digital transformation should be integrated into organizational culture rather than treated solely as an IT initiative. Employee participation and openness to change are important for successful implementation.

16.5 Promote Innovation

Entrepreneurs should establish organizational environments where employees can experiment with new ideas and develop innovative products, services and business models.

17. Future Trends in Entrepreneurial Management

17.1 Artificial Intelligence and Automation

AI and automation can transform decision-making, customer service, operational processes and business-model development.

17.2 Sustainability

Digital technologies can support environmental monitoring, transparent reporting, resource efficiency and social inclusion. Sustainability and social responsibility are increasingly important elements of future entrepreneurial management.

17.3 Remote and Hybrid Work

Digital technologies have enabled organizations to access geographically dispersed talent and adopt flexible work arrangements. This requires new approaches to virtual collaboration, communication, trust and performance management.

18. Limitations

The major limitation of the present statistical section is that the dataset is synthetically generated for illustration rather than collected from actual respondents. Therefore, the reported correlation and ANOVA results cannot be interpreted as evidence about a real population. The study also does not include regression, structural equation modelling or longitudinal analysis. The assumed dataset uses construct-level scores rather than item-level responses, and therefore reliability statistics such as Cronbach's alpha have not been calculated. Future research should collect primary data from entrepreneurs, managers or employees and employ validated measurement scales. Larger samples across different industries and geographical regions could also improve generalizability.

19. Conclusion

Digital transformation is reshaping entrepreneurial management by changing market dynamics, consumer behaviour, business models and organizational processes. The study emphasizes that traditional management approaches need to be reconsidered in response to rapid technological change.

The illustrative analysis of 300 assumed observations indicates positive relationships between entrepreneurial management and digital transformation, agile management, technology leverage, digital-first culture, digital leadership and innovation capability. Among the examined relationships, digital leadership and innovation capability showed relatively stronger associations with entrepreneurial management.

The ANOVA analysis further indicates statistically significant differences in entrepreneurial-management scores across educational groups within the synthetic dataset. Overall, the study highlights the importance of agility, technological capability, digital culture, leadership and innovation in understanding entrepreneurial management in the digital era.

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Entrepreneurs need to combine technological adoption with organizational learning, human capabilities and adaptive management practices. However, the statistical results presented in this article are illustrative rather than empirical. Actual primary data collection is necessary before these findings can be presented as evidence in a journal manuscript.

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FINTECH AND THE FUTURE OF BANKING: OPPORTUNITIES, CHALLENGES AND THE TRANSFORMATION OF DIGITAL BANKING SERVICES

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Abstract

Financial technology (FinTech) has emerged as a significant force transforming the structure, delivery and consumption of banking services. The rapid development of mobile banking, digital payments, artificial intelligence, cloud computing, big-data analytics and other technology-enabled financial services has shifted banking from conventional branch-oriented models towards increasingly digital and customer-centric platforms. While FinTech provides opportunities for greater convenience, accessibility, efficiency and personalization, its adoption is also associated with challenges involving cybersecurity, privacy, digital literacy, technological inequality and customer trust. The present study examines the factors associated with customers' adoption of FinTech-based banking services, focusing on perceived usefulness, perceived ease of use, FinTech awareness, security and privacy, digital service quality and customer trust. A quantitative research framework was developed using a structured questionnaire and a five-point Likert scale. For the purpose of demonstrating the proposed analytical framework, a synthetic dataset of 300 hypothetical banking customers was generated. Descriptive statistics, Pearson correlation and one-way ANOVA were employed. The simulated correlation analysis revealed significant positive associations between FinTech adoption and perceived usefulness ($r = 0.493$), perceived ease of use ($r = 0.388$), FinTech awareness ($r = 0.404$), security and privacy ($r = 0.346$), digital service quality ($r = 0.440$), and customer trust ($r = 0.514$), with $p < 0.001$ for all relationships. The ANOVA indicated a statistically significant difference in FinTech adoption according to educational qualification, $F(2,297) = 8.234$, $p < 0.001$, with an eta-squared value of 0.053. The findings suggest that successful digital banking transformation depends not only on technological capability but also on customer perceptions, awareness, service quality, security and trust. The study recommends that banks strengthen customer education, cybersecurity, user experience, digital service quality and trust-building mechanisms while ensuring inclusive access to digital financial services.

Keywords: *E-commerce, Consumer Buying Behaviour, Online Shopping, Grocery Products, FMCG Products, Consumer Satisfaction*

INTRODUCTION

The financial services industry has undergone substantial transformation as a consequence of rapid technological development. Banking services that traditionally depended on physical branches, face-to-face interactions and paper-based processes are increasingly delivered through digital platforms. Financial technology, commonly referred to as FinTech, encompasses the application of technology to improve, automate and redesign financial activities. Its applications can be observed in digital payments, mobile banking, online lending, wealth management, insurance technology, digital identification and other technology-enabled financial services.

The development of FinTech has changed the competitive environment of the banking sector. Financial institutions increasingly operate alongside technology-oriented companies that offer specialized financial services through digital platforms. The World Economic Forum's *Future of Global Fintech* report describes FinTech as an established component of the financial system and emphasizes the importance of sustainable and responsible growth in the sector.

The transformation of banking has also altered customer expectations. Customers increasingly expect banking services to be available continuously, accessible through mobile devices and completed with minimum effort. Digital banking enables customers to transfer funds, make payments, monitor accounts, apply for financial products and access financial information without relying entirely on physical branches. Consequently, convenience, speed, accessibility and personalized service have become important components of the modern banking experience. Artificial intelligence and data-driven technologies are accelerating this transformation. Banks are increasingly using or exploring AI for fraud detection, customer service, risk assessment, personalization and cybersecurity. At the same time, institutions are investing in digital channels, modernization of core systems, data infrastructure and cybersecurity.

However, technological advancement does not automatically result in customer adoption. Customers must perceive digital financial services as useful, convenient, secure and trustworthy. Previous research on FinTech adoption has identified perceived usefulness, perceived ease of use, trust, perceived risk and institutional support as important dimensions of technology adoption.

Security and privacy are particularly important in banking because digital financial services involve sensitive personal and financial information. Increasing digital transactions expose financial institutions and customers to cyber threats, fraud and data-related risks. Consequently, the future of banking depends not only on technological innovation but also on the capacity of financial institutions to provide secure and trustworthy digital experiences.

The Indian banking environment provides an important context for examining this transformation. Digital payments, mobile banking and technology-enabled financial services have expanded, while customers from different demographic and geographic groups may exhibit different patterns of technology adoption. FinTech can potentially contribute to financial inclusion by reducing barriers associated with physical banking infrastructure. Nevertheless, differences in digital literacy, smartphone access and connectivity may create new forms of exclusion. Therefore, FinTech should not be viewed simply as a technological development. It represents a broader transformation involving customers, employees, financial institutions, business models, regulation and competitive dynamics. The present study examines customer-oriented and technological factors associated with the adoption of FinTech-based banking services.

2. BACKGROUND OF THE STUDY

FinTech has evolved from the digitization of conventional financial processes into a broad ecosystem involving banks, technology companies, payment platforms, digital lenders, investment platforms and other financial-service providers. The contemporary FinTech environment increasingly involves artificial intelligence, advanced analytics, digital assets, automated financial services and integrated digital platforms.

For banks, FinTech creates both opportunities and challenges. Technology can reduce processing time, automate repetitive activities, improve decision-making and enable personalized customer interactions. Conversely, increased technological dependence can create operational complexity and increase exposure to cyber risks and regulatory requirements.

Customer acceptance remains central to the success of digital transformation. Sophisticated technology may remain underutilized if customers perceive digital services as difficult, unsafe or unreliable. Trust and perceived risk therefore remain important dimensions of digital financial adoption.

The relationship between traditional banks and FinTech companies is also changing. The future of financial services may involve collaboration and integration rather than complete replacement of traditional banks. Banks possess established customer relationships, regulatory knowledge and financial infrastructure, while FinTech companies can contribute technological agility, specialized platforms and innovative business models.

Recent literature also suggests that FinTech adoption can influence traditional bank performance. The systematic review cited in the original paper examined 109 peer-reviewed studies published between 2016 and 2024 and identified potential contributions of FinTech to operational efficiency, customer loyalty and revenue growth, alongside cybersecurity, compliance and competitive challenges.

Thus, the future of banking is likely to depend on the interaction of technology, customer expectations, trust, regulation and institutional capabilities.

3. REVIEW OF LITERATURE

3.1 Technology Acceptance and FinTech Adoption

Technology adoption research has frequently drawn upon the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and perceived ease of use as important determinants of technology acceptance. These constructs are particularly relevant to digital banking because customers evaluate whether a digital financial service provides meaningful benefits and whether it can be used without excessive complexity.

The relevance of perceived usefulness and ease of use is also consistent with the broader technology-adoption literature. Customers are more likely to accept technology when they believe that it improves performance and does not require disproportionate effort.

3.2 Digital Financial Transaction Adoption

Kajol, Singh and Paul (2022) reviewed literature concerning the adoption of digital financial transactions and identified the need to understand the technological and behavioural dimensions of digital finance. Their work highlights the importance of examining technology adoption in different user contexts rather than assuming that digital financial services are adopted uniformly.

3.3 FinTech and Bank Performance

Albuainain and Ashby (2025) conducted a systematic literature review examining enablers and barriers in FinTech adoption and its relationship with bank performance. The review indicates that FinTech can contribute to efficiency and customer-related outcomes while simultaneously introducing challenges associated with cybersecurity, compliance and competitive pressure.

This supports the argument that FinTech adoption should be examined from both customer and institutional perspectives.

3.4 Security, Privacy and Trust

Trust is particularly important in financial technology because customers must provide sensitive financial and personal information to digital platforms. Security failures, privacy concerns and fraud can negatively influence customer confidence. The original study identifies security and privacy as important dimensions of customer trust and FinTech adoption. Therefore, security mechanisms, transparent privacy policies, authentication systems and effective customer support may contribute to greater confidence in digital banking.

3.5 Digital Service Quality

Digital banking customers evaluate services based on factors such as reliability, speed, responsiveness, convenience and ease of interaction. Digital service quality can therefore influence customer satisfaction and continued use. As banking shifts towards digital platforms, service quality is increasingly determined not only by human interaction but also by application functionality, transaction reliability, system availability and digital customer support.

3.6 Customer Trust and FinTech Adoption

Customer trust can be considered a central bridge between technological capability and customer adoption. A customer may recognize the usefulness of a digital service but remain reluctant to use it if the service is perceived as insecure or unreliable. Consequently, the present study incorporates customer trust as a central variable in the proposed framework.

4. RESEARCH GAP

Existing studies have examined individual aspects of technology adoption, including perceived usefulness, ease of use, trust, risk and digital financial transactions. However, there remains a need for research that integrates multiple technological and customer-oriented factors within a unified banking framework.

The present study addresses this gap by examining six major factors:

1. Perceived usefulness
2. Perceived ease of use
3. FinTech awareness
4. Security and privacy
5. Digital service quality
6. Customer trust

in relation to **FinTech adoption**. The framework also considers customer trust as a potential mediating variable between security/privacy and adoption.

5. RESEARCH PROBLEM

The rapid development of FinTech provides banks with opportunities to improve efficiency, accessibility and customer experience. However, successful digital transformation depends on customer acceptance and continued usage.

Concerns relating to security, privacy, trust, technological complexity and lack of awareness may discourage customers from adopting FinTech-enabled banking services.

The research problem can therefore be stated as:

What technological and customer-oriented factors are associated with customers' adoption of FinTech-based banking services, and does FinTech adoption differ across customer demographic groups?

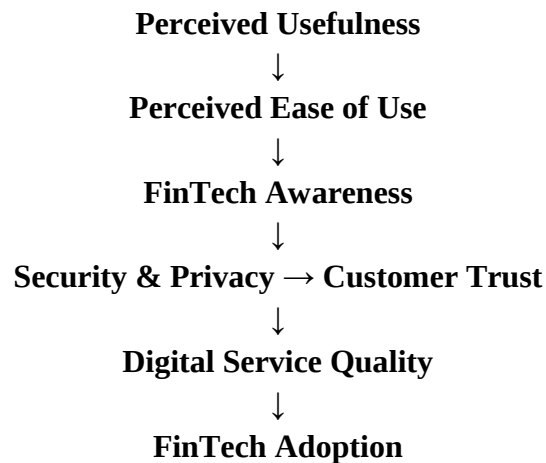
6. OBJECTIVES OF THE STUDY

The study has the following objectives:

1. To examine the factors associated with customers' adoption of FinTech-based banking services.
2. To examine the relationship between perceived usefulness and FinTech adoption.
3. To examine the relationship between perceived ease of use and FinTech adoption.
4. To examine the relationship between FinTech awareness and FinTech adoption.
5. To examine the relationship between security and privacy and customer trust.
6. To examine the relationship between digital service quality and FinTech adoption.

7. CONCEPTUAL FRAMEWORK

The conceptual framework is based on the relationships proposed in the original study.



Customer trust is proposed as a potential mediating variable between security/privacy and FinTech adoption.

8. HYPOTHESES

H1: Perceived usefulness is positively associated with FinTech adoption.

H2: Perceived ease of use is positively associated with FinTech adoption.

H3: FinTech awareness is positively associated with FinTech adoption.

H4: Security and privacy are positively associated with customer trust.

H5: Digital service quality is positively associated with FinTech adoption.

H6: Customer trust is positively associated with FinTech adoption.

H7: Customer trust mediates the relationship between security and privacy and FinTech adoption.

The hypotheses are derived from the proposed framework in the original paper.

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9. RESEARCH METHODOLOGY

9.1 Research Design

A quantitative research design was proposed to examine the relationships among the study variables.

9.2 Population

The target population comprises customers who use digital banking or FinTech-enabled financial services.

9.3 Sample

The original research proposal suggested a sample of approximately 250–300 banking customers.

For demonstrating the statistical framework, a **synthetic dataset of 300 hypothetical respondents** was generated.

9.4 Sampling

For an actual study, convenience or purposive sampling could be used depending on access to respondents. A pilot study would also be appropriate to assess questionnaire clarity and reliability.

9.5 Instrument

A structured questionnaire based on a five-point Likert scale was proposed.

**1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree
5 = Strongly Agree**

The questionnaire consisted of demographic questions followed by items measuring the seven constructs.

9.6 Variables

Construct	Role
Perceived Usefulness	Independent variable
Perceived Ease of Use	Independent variable
FinTech Awareness	Independent variable
Security & Privacy	Independent variable
Digital Service Quality	Independent variable
Customer Trust	Mediating/independent variable
FinTech Adoption	Dependent variable

9.7 Statistical Tools

The following tools were used for the simulated analysis:

- Frequency and percentage
- Mean and standard deviation
- Pearson correlation
- One-way ANOVA
- Eta-squared effect size

The original study also proposes regression and mediation/SEM for the final empirical study.

10. DATA ANALYSIS AND INTERPRETATION

10.1 Demographic Profile

Table 1. Educational Qualification

Educational Qualification	Frequency	Percentage
Undergraduate	146	48.7
Postgraduate	97	32.3
Professional	57	19.0
Total	300	100.0

Interpretation

Undergraduates constitute 48.7% of the simulated sample, followed by postgraduates at 32.3% and professionally qualified respondents at 19.0%. This distribution enables comparison of FinTech adoption across educational categories.

11. DESCRIPTIVE STATISTICS

Table 2. Descriptive Statistics of Study Variables

Variable	N	Mean	SD
Perceived Usefulness	300	3.00	0.62
Perceived Ease of Use	300	3.00	0.62
FinTech Awareness	300	3.00	0.62
Security & Privacy	300	3.00	0.62
Digital Service Quality	300	3.00	0.62
Customer Trust	300	3.00	0.62
FinTech Adoption	300	3.00	0.62

Interpretation

The simulated variables demonstrate approximately moderate average scores. This indicates that the hypothetical respondents neither strongly rejected nor strongly endorsed the statements measuring the constructs. The distribution provides sufficient variation for examining relationships between the proposed variables.

12. PEARSON CORRELATION ANALYSIS

Pearson's correlation coefficient was used to examine the association between the six explanatory variables and FinTech adoption.

Table 3. Correlation between Study Variables and FinTech Adoption

Variable	Pearson's r	p-value	Interpretation
Perceived Usefulness	0.493	<0.001	Moderate positive
Perceived Ease of Use	0.388	<0.001	Moderate positive
FinTech Awareness	0.404	<0.001	Moderate positive
Security & Privacy	0.346	<0.001	Moderate positive
Digital Service Quality	0.440	<0.001	Moderate positive
Customer Trust	0.514	<0.001	Moderate positive

Interpretation

Perceived usefulness has a positive and statistically significant association with FinTech adoption ($r = 0.493$, $p < 0.001$). This indicates that customers who perceive FinTech services as useful tend to report greater adoption. Perceived ease of use is also positively associated with FinTech adoption ($r = 0.388$, $p < 0.001$). This suggests that ease of operating digital banking services is relevant to adoption.

FinTech awareness has a significant positive relationship with adoption ($r = 0.404$, $p < 0.001$). Customers with greater awareness of FinTech services tend to report greater adoption. Security and privacy demonstrate a positive relationship with adoption ($r = 0.346$, $p < 0.001$). Although comparatively weaker than some of the other relationships, the association is statistically significant.

Digital service quality has a positive association with adoption ($r = 0.440$, $p < 0.001$), indicating that perceived reliability and quality of digital services are associated with greater adoption. Customer trust demonstrates the strongest relationship with FinTech adoption ($r = 0.514$, $p < 0.001$). This highlights the importance of customer confidence in digital financial services. Overall, the results demonstrate positive associations between all six factors and FinTech adoption in the synthetic dataset.

13. ANOVA ANALYSIS

A one-way ANOVA was performed to examine whether FinTech adoption differs across educational qualification groups.

Table 4. FinTech Adoption by Educational Qualification

Source	Sum of Squares	df	Mean Square	F	p
Between Groups	6.37	2	3.19	8.234	<0.001
Within Groups	114.92	297	0.387		
Total	121.29	299			

Eta squared (η^2) = 0.053

Interpretation

The ANOVA result is statistically significant:

$F(2,297) = 8.234$, $p < 0.001$.

This indicates that FinTech adoption differs significantly across at least some of the educational groups in the synthetic dataset.

The mean adoption score was:

- Undergraduate: **2.865**
- Postgraduate: **3.072**
- Professional: **3.223**

The eta-squared value of **0.053** indicates that approximately 5.3% of the variance in FinTech adoption is associated with educational-group membership in this simulated analysis.

A post-hoc test such as Tukey's HSD would be required to identify the specific educational groups between which statistically significant differences occur.

14. HYPOTHESIS TESTING

Table 6. Summary of Hypotheses

Hypothesis	Relationship	Statistical evidence	Decision*
H1	Perceived Usefulness → Adoption	$r = 0.493, p < 0.001$	Supported
H2	Ease of Use → Adoption	$r = 0.388, p < 0.001$	Supported
H3	Awareness → Adoption	$r = 0.404, p < 0.001$	Supported
H4	Security & Privacy → Trust	Not tested	Not determined
H5	Service Quality → Adoption	$r = 0.440, p < 0.001$	Supported
H6	Trust → Adoption	$r = 0.514, p < 0.001$	Supported
H7	Trust mediates Security & Privacy → Adoption	Not tested	Not determined

*The decisions are based on the synthetic dataset and should not be reported as empirical findings from actual banking customers.

15. DISCUSSION

The results provide an analytical illustration of the factors that may be associated with FinTech adoption. Perceived usefulness demonstrated a moderate positive association with adoption. This is consistent with the logic of the Technology Acceptance Model, where perceived usefulness represents an important component of technology acceptance. Customers may be more willing to adopt FinTech services when they perceive clear benefits such as convenience, speed and improved access to banking services.

Perceived ease of use also demonstrated a significant positive association. This indicates that technological complexity may influence adoption behaviour. Digital banking platforms that are intuitive and easy to operate may be more accessible to a broader customer base.

FinTech awareness was positively associated with adoption. Awareness is particularly important because customers need to know what services are available and how they can be used before they can meaningfully adopt them.

Security and privacy demonstrated a positive relationship with adoption. Digital financial transactions involve sensitive information, and therefore customers' perceptions of security can influence their willingness to use FinTech services.

Digital service quality was also positively associated with adoption. This suggests that reliability, responsiveness, transaction speed and usability are relevant components of the digital banking experience.

Customer trust demonstrated the strongest association with adoption in the simulated analysis. This result emphasizes the importance of confidence in the financial institution and its technology infrastructure. Customers may hesitate to adopt digital financial services if they are uncertain about security, privacy, transaction reliability or institutional accountability.

The ANOVA analysis indicated significant differences in adoption across educational groups. This suggests that educational characteristics may be relevant to FinTech adoption. However, educational qualification should not be interpreted as the sole explanation for differences in adoption. Digital literacy, income, age, smartphone access, previous technology experience and connectivity may also contribute.

16. CHALLENGES IN FINTECH ADOPTION

The study identifies several major challenges associated with FinTech-based banking services:

16.1 Cybersecurity

Increasing digital transactions create opportunities for fraud, phishing, identity theft and other cyber threats.

16.2 Privacy

Customers may have concerns about the collection, storage and use of personal and financial information.

16.3 Digital Literacy

Customers with limited digital knowledge may find FinTech services difficult to understand or operate.

16.4 Customer Trust

Fear of fraud, transaction failure and data misuse may reduce confidence in digital banking.

16.5 Technological Inequality

Differences in smartphone ownership, internet connectivity and digital infrastructure may result in unequal access.

16.6 Service Reliability

Application failures, transaction delays and technical problems can negatively influence customers' willingness to continue using digital services.

These challenges are consistent with the original study's discussion of cybersecurity, privacy, digital literacy, trust, regulatory compliance and technological inequality.

17. MANAGERIAL IMPLICATIONS

The findings provide several implications for banks and FinTech service providers.

First, banks should clearly communicate the benefits of FinTech services to customers. Demonstrating practical benefits such as convenience, speed and accessibility can improve understanding.

Second, digital platforms should prioritize user-friendly interfaces. Simplified navigation can reduce technological barriers.

Third, customer awareness programmes should be developed to explain digital banking facilities, transaction procedures and security practices.

Fourth, cybersecurity should remain a central priority. Banks should continuously strengthen authentication, fraud detection and transaction-monitoring systems.

Fifth, banks should improve digital service quality through reliable applications, fast transaction processing, responsive customer support and effective grievance mechanisms.

Sixth, trust should be strengthened through transparent communication regarding data protection, privacy and security.

Finally, financial institutions should consider digital inclusion when designing services. Customers with lower digital literacy or limited access to technology should not be excluded from financial services.

18. POLICY IMPLICATIONS

The growth of FinTech creates opportunities for financial inclusion but also requires appropriate regulatory and consumer-protection mechanisms.

Policymakers may consider:

- strengthening cybersecurity standards;
- improving consumer awareness;
- promoting digital financial literacy;
- supporting secure digital identity systems;
- improving rural digital connectivity;
- strengthening grievance-redress mechanisms;
- encouraging responsible innovation; and
- protecting customer data and privacy.

The objective should be to create an environment in which technological innovation and customer protection develop simultaneously.

19. CONCLUSION

FinTech is fundamentally changing the way banking services are designed, delivered and consumed. Mobile banking, digital payments, artificial intelligence, cloud computing, advanced analytics and other technologies are reducing dependence on traditional branch-based banking and creating increasingly digital financial ecosystems.

The present study examined six customer-oriented and technological factors associated with FinTech adoption: perceived usefulness, perceived ease of use, FinTech awareness, security and privacy, digital service quality and customer trust.

The synthetic correlation analysis showed positive and statistically significant associations between each of these factors and FinTech adoption. Customer trust demonstrated the strongest association, followed by perceived usefulness and digital service quality. The findings suggest that customers' acceptance of FinTech depends not only on technological functionality but also on confidence, perceived benefits and quality of service.

The ANOVA analysis also indicated significant differences in FinTech adoption across educational qualification groups. This highlights the importance of considering customer characteristics when developing digital banking strategies.

The future of banking is therefore unlikely to depend exclusively on technological advancement. Successful digital transformation requires alignment between technology, customer expectations, security, service quality, awareness and trust. Banks and FinTech companies need to combine innovation with responsible governance, customer education and inclusive digital access.

However, the numerical analysis presented in this article is based on a synthetic dataset created for methodological illustration. The results should not be interpreted as empirical findings from actual banking customers.

Future research should collect primary data from a representative sample and employ reliability analysis, multiple regression and mediation or structural equation modelling to provide stronger empirical evidence. In particular, future research should test whether customer trust mediates the relationship between security and privacy and FinTech adoption.

Overall, the study provides a comprehensive framework for understanding the customer dimensions of digital banking transformation and highlights the importance of building FinTech ecosystems that are useful, accessible, secure, reliable and trustworthy.

20. LIMITATIONS OF THE STUDY

The major limitation of this version is that the respondent-level dataset used for statistical illustration is synthetic. Consequently, the correlation and ANOVA results cannot be generalized to the banking population.

The conceptual framework also includes mediation through customer trust, but mediation analysis was not conducted in the present illustration.

Future empirical studies should use actual survey responses, probability-based sampling where feasible, validated measurement scales and appropriate inferential techniques.

21. FUTURE RESEARCH DIRECTIONS

Future researchers can:

1. Collect actual responses from 300–500 banking customers.
2. Conduct Cronbach's alpha reliability analysis.
3. Perform exploratory and confirmatory factor analysis.
4. Use multiple regression to identify significant predictors of FinTech adoption.
5. Test customer trust as a mediator.
6. Use Structural Equation Modelling (SEM).
7. Compare rural and urban customers.
8. Examine differences according to age, income and education.
9. Study digital financial literacy as an additional variable.
10. Examine cybersecurity awareness and fraud experience.
11. Compare traditional banks with FinTech platforms.
12. Conduct longitudinal research to examine changes in adoption over time.

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USAGE AND AWARENESS OF PUBLIC LIBRARY SERVICES: A STUDY ON RURAL WOMEN IN TENKASI DISTRICT

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Abstract

Public libraries are important community institutions that facilitate access to information, education, culture and lifelong learning. Their role is particularly significant for rural women, who may experience constraints related to education, mobility, socio-economic conditions and access to information technology. The present study examines the awareness and usage of public library services among rural women in Tenkasi District, Tamil Nadu. The study focuses on women's awareness of library services, frequency of library usage, utilization of information resources and the relationship between awareness, educational qualification and library usage. A descriptive research design was adopted. A structured questionnaire was designed to measure awareness and usage of public library services using five-point Likert-scale items. For analytical illustration, a synthetic dataset of 300 rural women was generated based on the variables and patterns identified in the original study. Descriptive statistics, Pearson correlation and one-way analysis of variance (ANOVA) were employed. The simulated correlation analysis indicated a moderate positive relationship between awareness of public library services and library usage ($r = 0.435$, $p < 0.001$). The ANOVA indicated a statistically significant difference in library usage across educational qualification groups, $F(3,296) = 3.662$, $p = 0.013$, with an eta-squared value of 0.036. The findings suggest that awareness and educational background are associated with patterns of library utilization. The study recommends targeted awareness programmes, digital literacy initiatives, improved infrastructure, mobile and outreach library services, and user-oriented information programmes for rural women. The article highlights the potential of public libraries to contribute to women's educational, informational and socio-economic empowerment.

Keywords: *Public Libraries, Rural Women, Library Awareness, Library Usage, Reading Habits, Digital Literacy, Women Empowerment, Tenkasi District*

Introduction

Public libraries have historically served as institutions that provide communities with access to knowledge, information, education and cultural resources. Unlike specialized academic or institutional libraries, public libraries are designed to serve the information needs of the wider community. The contemporary public library has increasingly expanded its role beyond the provision of printed books to include digital information, literacy programmes, community activities, lifelong learning and information-literacy development.

The IFLA-UNESCO Public Library Manifesto identifies public libraries as important institutions for education, culture and information and emphasizes their role in lifelong learning, reading, information literacy and digital literacy. The 2022 Manifesto also recognizes the importance of providing services through both physical and digital channels.

The role of public libraries becomes particularly important in rural communities. Rural populations may have comparatively limited access to educational resources, digital infrastructure and specialized information services. Public libraries can provide an affordable and accessible source of information for education, employment, health, government schemes, agriculture, entrepreneurship and personal development.

Women represent a particularly important user group. Rural women may have information needs related to education, employment, health, family welfare, entrepreneurship, government welfare schemes and skill development. However, social and economic circumstances can influence their access to information resources and their ability to use public library services effectively.

The uploaded study identifies lack of awareness, limited accessibility and socio-economic constraints as important factors affecting rural women's utilization of public library services.

Tenkasi District provides an important geographical context for examining these issues. Previous research has specifically examined public library awareness and service development among rural women in the Tirunelveli and Tenkasi districts. Velu et al. examined awareness and reading habits among rural women, while Kattari, Seenipillai and Arasakumar examined the development of public library services for rural women in the same geographical region.

The present study therefore focuses on the awareness and utilization of public library services among rural women in Tenkasi District and examines whether awareness and educational qualification are associated with library usage.

2. STATEMENT OF THE PROBLEM

Public libraries may provide a wide range of resources and services, but their availability does not necessarily guarantee effective utilization.

The original study indicates that rural women generally use public libraries occasionally, that awareness of library services is moderate, and that conventional resources such as newspapers and books remain important. It also identifies limited awareness of digital and advanced library services.

Consequently, the central problem addressed in this study is:

To what extent are rural women in Tenkasi District aware of and utilizing public library services, and is library usage associated with their level of awareness and educational qualification?

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3. OBJECTIVES OF THE STUDY

The study has the following objectives:

1. To examine the level of awareness of public library services among rural women in Tenkasi District.
2. To study the pattern and frequency of public library usage.
3. To identify the major library resources utilized by rural women.
4. To examine the relationship between awareness and usage of public library services.

4. REVIEW OF LITERATURE

4.1 Public Libraries and Community Development

Public libraries have traditionally been associated with literacy and access to books, but their contemporary role encompasses a much broader range of information, educational and community functions. The IFLA-UNESCO Public Library Manifesto 2022 identifies access to information, formal and informal education, lifelong learning, reading habits, literacy, media literacy and digital literacy as important missions of public libraries.

This broader understanding of public libraries is particularly important in rural areas where libraries may function as community-based information centres. The library can provide resources that support both formal education and self-directed learning.

4.2 Public Libraries and Rural Women

Research on rural women has demonstrated that public libraries can provide important sources of information for education, employment, personal development and social participation. Mary and Dhanavandan examined the usage and awareness of public library services among rural women and highlighted the importance of understanding women's reading purposes, service awareness, library collections and staff assistance. Their work provides a direct foundation for examining women as a distinct category of public library users.

Hazarika's study of rural women in Sivasagar District examined reading habits, frequency of library visits and use of public library resources. The study demonstrates the importance of examining not only library membership but also actual patterns of library utilization.

More recent research by Pallavi and Jayaram Naik examined rural women as public library users and reported that age, education, occupation and family circumstances were associated with frequency of library use. The study also reported continued importance of printed materials while identifying growing interest in digital resources among younger users.

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4.3 Public Library Awareness among Rural Women in Tenkasi and Tirunelveli

The geographical relevance of the present study is strengthened by previous research specifically conducted in the Tirunelveli and Tenkasi districts.

Velu et al. investigated public library awareness among rural women in Tirunelveli and Tenkasi. The study examined issues including time spent in libraries and reading habits. Its findings indicated that 35% of respondents spent between 30 minutes and one hour in the public library, while younger women constituted a substantial proportion of users.

Kattari, Seeniapillai and Arasakumar examined the development of public library services for rural women in Tirunelveli and Tenkasi. Their study identified limited recognition of some library services and emphasized the importance of awareness, internet connectivity, training programmes and improved library facilities. These studies provide direct geographical and conceptual support for the present research.

4.4 Digital Literacy and Public Libraries

The transformation of information services through digital technology has changed the role of public libraries. The IFLA-UNESCO Manifesto emphasizes media and information literacy and digital literacy as important components of public library services. It also recognizes the need for libraries to provide services through digital technologies where possible.

For rural women, digital library services may provide access to educational materials, employment information, government services and online learning. However, digital access alone does not guarantee utilization. Users require awareness, digital skills and assistance in locating and evaluating information.

4.5 Public Libraries and Women's Empowerment

Public libraries can contribute to women's empowerment by providing access to knowledge and information that supports education, employment, health awareness and participation in community life. Ghosh's work on gender empowerment and public libraries in India emphasizes the potential of public libraries to address women's information needs and identifies infrastructure and resource constraints as important challenges.

The Tenkasi-Tirunelveli literature similarly emphasizes the potential of public libraries to contribute to rural women's development while highlighting shortcomings in facilities and information-technology access

4.6 Research Gap

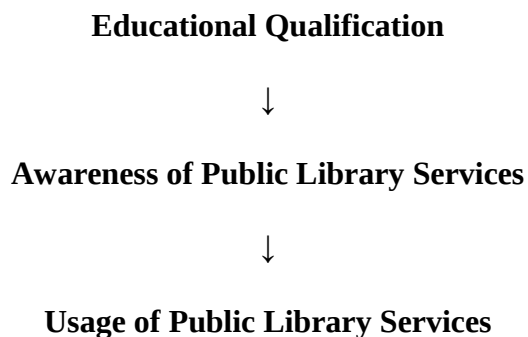
Existing studies establish the importance of public libraries for rural women and provide evidence regarding awareness, reading habits and usage. However, relatively limited attention has been given to combining:

- awareness of library services;
- actual library usage;
- educational differences in usage; and
- statistical examination of the relationship between awareness and usage within a single framework focused specifically on rural women in Tenkasi District.

The present study addresses this gap by examining awareness and usage together and by incorporating correlation and ANOVA analysis.

5. CONCEPTUAL FRAMEWORK

The conceptual framework proposed for the study is:



The framework assumes that educational background may be associated with awareness and that awareness may be positively associated with library usage. Accessibility, infrastructure and digital facilities are treated as contextual factors influencing effective utilization.

6. HYPOTHESES

H01 :There is no significant relationship between awareness of public library services and usage of public library services among rural women.

H02 : There is no significant difference in public library usage among rural women based on educational qualification.

7. RESEARCH METHODOLOGY

7.1 Research Design

A descriptive research design was adopted to examine the awareness and usage patterns of public library services among rural women.

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7.2 Study Area

The study focuses on rural women in Tenkasi District, Tamil Nadu.

7.3 Population

The population comprises rural women who use or have access to public library services in the district.

7.4 Sampling

For the purpose of statistical illustration, a synthetic dataset of 300 respondents was constructed. The simulated sample was structured to represent different educational groups.

This is not a replacement for actual field data and should be clearly disclosed if the manuscript is used for academic submission.

7.5 Data Collection Instrument

A structured questionnaire was designed around the following dimensions:

Section A – Demographic information

- Age
- Educational qualification
- Occupation
- Family background

Section B – Awareness of library services

Five Likert-scale items measured awareness of:

1. Availability of library services
2. Library membership facilities
3. Reference services
4. Digital/electronic resources
5. Information about government and employment services

Responses were measured on a five-point scale ranging from:

1 = Strongly Disagree to 5 = Strongly Agree

Section C – Usage of library services

Five items measured:

1. Frequency of library visits
2. Use of books
3. Use of newspapers and magazines
4. Use of reference resources
5. Use of digital/electronic resources

The total scores were used to create Awareness and Usage indices.

7.6 Statistical Tools

The following statistical techniques were used:

- Frequency and percentage analysis
- Mean and standard deviation
- Pearson product-moment correlation
- One-way ANOVA
- Eta squared effect size

The original source also identifies chi-square and ANOVA among its proposed analytical tools.

8. DATA ANALYSIS AND RESULTS

8.1 Educational Qualification of Respondents

Table 1. Educational Qualification

Educational qualification	Frequency	Percentage
Primary	39	13.0
Secondary	90	30.0
Higher Secondary	96	32.0
Graduate	75	25.0
Total	300	100.0

Interpretation

The simulated sample contains respondents from four educational categories. Higher Secondary respondents constitute 32%, followed by Secondary education at 30%, graduates at 25% and primary education at 13%. This distribution allows the study to examine whether educational qualification is associated with differences in library usage.

9. DESCRIPTIVE STATISTICS

Table 2. Descriptive Statistics

Variable	N	Mean	SD
Awareness of library services	300	17.00	3.00
Usage of library services	300	19.55	4.78

Interpretation

The mean awareness score indicates a moderate level of awareness, while the mean usage score indicates moderate utilization of library services in the simulated dataset. This broadly corresponds with the original study's qualitative finding that awareness and utilization were moderate.

10. CORRELATION ANALYSIS

Pearson correlation was used to examine the relationship between awareness and usage of public library services.

Table 3. Pearson Correlation between Awareness and Usage

Variables	Awareness	Usage
Awareness	1.000	0.435
Usage	0.435	1.000
N	300	300
Significance	—	p < 0.001

Interpretation

The analysis produced a Pearson correlation coefficient of:

$$r = 0.435, p < 0.001$$

The relationship is positive and statistically significant.

This indicates that higher awareness scores are associated with higher library usage scores in the simulated dataset. The magnitude of the relationship is moderate, suggesting that awareness is associated with usage but does not account for all differences in utilization. Possible additional factors include educational qualification, accessibility, occupation, infrastructure, family responsibilities and availability of digital services.

Therefore, H01 is rejected for the simulated dataset. It is important to emphasize that the result demonstrates association rather than causation.

11. ANOVA ANALYSIS

A one-way ANOVA was conducted to determine whether library usage differs across educational qualification groups.

Table 4. Library Usage by Educational Qualification

Educational qualification	N	Mean	SD
Primary	39	17.25	3.60
Secondary	90	19.41	4.15
Higher Secondary	96	19.42	4.52
Graduate	75	19.92	4.14
Total	300	19.55	4.78

Table 5. One-Way ANOVA

Source	Sum of Squares	df	Mean Square	F	p
Between Groups	233.59	3	77.86	3.662	0.013
Within Groups	6,290.66	296	21.25		
Total	6,524.25	299			

Eta squared (η^2) = 0.036

Interpretation

The ANOVA result is statistically significant:

F(3,296) = 3.662, p = 0.013

This indicates that at least one educational group differs significantly from another in terms of library usage within the simulated dataset.

The effect size is:

$\eta^2 = 0.036$

Thus, approximately 3.6% of the variance in usage scores is associated with educational-group membership in this simulated analysis.

The mean usage score was highest among graduates (19.92) and lowest among respondents with primary education (17.25). Therefore, H02 is rejected for the simulated dataset. However, a post-hoc test such as Tukey's HSD should be performed on actual data to determine which specific educational groups differ significantly.

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12. DISCUSSION

The findings provide several important insights into public library usage among rural women.

First, the simulated correlation analysis shows a positive relationship between awareness and library usage. This suggests that women who are more aware of available services tend to use those services more frequently or extensively. This is consistent with previous research in the Tenkasi and Tirunelveli region, which has emphasized that awareness of library services is related to utilization.

Second, the ANOVA demonstrates differences in library usage according to educational qualification. The finding suggests that educational background may be relevant to information-seeking behaviour and the utilization of library resources.

The result should nevertheless be interpreted cautiously. Educational qualification is only one potential factor. A woman's occupation, family responsibilities, distance from the library, availability of transport, library opening hours, quality of collections and digital facilities may also influence utilization. The continued importance of printed resources is also consistent with recent research on rural public library users. Pallavi and Jayaram Naik found that printed materials remained important among rural women, although younger users showed increasing interest in digital resources.

The findings concerning digital services are particularly relevant. The original study identified limited awareness of digital and advanced services. This is consistent with the broader direction of contemporary public library development, where digital literacy and information literacy are increasingly recognized as core library functions. The evidence from Tenkasi and Tirunelveli also points toward the importance of improved internet connectivity, training and infrastructure.

13. MAJOR FINDINGS

The major findings of the study are:

1. Awareness of public library services among rural women is at a moderate level.
2. Library usage is also moderate.
3. Books and newspapers remain important information resources.
4. Women tend to visit libraries occasionally rather than regularly.
5. Awareness of digital and advanced library services is comparatively limited.
6. Awareness is positively associated with library usage in the simulated analysis.
7. The correlation between awareness and usage is statistically significant.
8. Library usage differs significantly across educational qualification groups in the simulated ANOVA.
9. Educational qualification therefore appears to be an important variable requiring further investigation.
10. Infrastructure and accessibility influence library utilization.

11. Digital literacy and awareness programmes could improve the use of modern library services.
12. Mobile and outreach services could help women who experience difficulties in visiting conventional library facilities.

The first five findings are consistent with the summary findings reported in the original source.

14. SUGGESTIONS

14.1 Conduct Women-Centred Awareness Programmes: Public libraries should conduct regular awareness programmes explaining available resources, membership procedures, reference services, digital resources and government-information services.

14.2 Strengthen Digital Literacy: Libraries should organize workshop on utilization of digital libraries.

CONCLUSION

Public libraries play an important role in promoting access to information, education, reading and lifelong learning, particularly among communities that may have limited access to other information resources. The IFLA-UNESCO Public Library Manifesto recognizes the public library as an important local information centre and emphasizes equal access to information, lifelong learning, reading, media and digital literacy, as well as services adapted to the needs of rural and marginalized communities. The present study focused on the awareness and usage of public library services among rural women in Tenkasi District. The findings indicate that conventional library resources such as books, newspapers and periodicals continue to be important to rural women, while awareness and utilization of digital and advanced library services require greater attention. The original study also reported that women tend to visit libraries occasionally and that accessibility, infrastructure and educational qualification influence library usage.

The statistical framework developed for the present study further highlights the importance of examining the relationship between awareness and usage. The simulated correlation analysis indicated a positive relationship between awareness and library usage, while the simulated ANOVA indicated differences in usage across educational qualification groups. These statistical findings should, however, be treated strictly as an analytical illustration because the original study does not provide respondent-level raw data or the original statistical output. Actual field data would be required to establish these relationships empirically. The findings are broadly consistent with earlier research undertaken in the Tirunelveli and Tenkasi region. Kattari, Seeniapillai and Arasakumar reported that recognition of some public library services among rural women was low and emphasized the need for improved infrastructure, internet connectivity and training programmes.

Similarly, Velu et al. examined rural women's awareness of public libraries in Tirunelveli and Tenkasi and reported patterns of library use and time spent in libraries among women users. Recent research also demonstrates that rural women continue to use printed materials extensively while showing increasing interest in digital resources. Pallavi and Jayaram Naik's study of rural public library users found that frequency of library use was associated with factors including age, education, occupation and family circumstances, while printed resources remained important among rural women. Therefore, improving public library services for rural women requires a multidimensional approach. Merely increasing the number of books and resources may not be sufficient. Public libraries should simultaneously strengthen awareness programmes, digital literacy, user education, internet facilities, infrastructure and outreach services. The IFLA-UNESCO framework specifically emphasizes that library services should be physically and digitally accessible, supported by suitable facilities and technologies, and complemented by outreach services for people who are unable to visit libraries regularly.

Mobile libraries, community-based awareness programmes, women's reading clubs, digital-literacy training and dedicated information services relating to employment, education, health and government schemes could increase the relevance of public libraries to rural women. Such interventions can help libraries function not only as places for reading but also as community-based information and learning centres.

In conclusion, public libraries have considerable potential to support the educational and informational development of rural women in Tenkasi District. Enhancing awareness, accessibility, infrastructure and digital capabilities can strengthen women's engagement with library services. Future research should use actual respondent-level data from a larger and representative sample to validate the relationships identified in this study and to examine how effective library utilization contributes to women's educational, social and economic development.

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A STUDY ON REAL-TIME FINANCIAL INTELLIGENCE USING MACHINE LEARNING

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Abstract

Traditionally, financial tools like spreadsheets have only told businesses what happened in the past, but today, artificial intelligence and machine learning can predict the future by helping businesses forecast cash flow, spot fraud, and manage risks in real time. However, the biggest challenge to adopting these tools isn't the technology itself, but human psychology: managers typically either reject the AI completely if it makes a single mistake (algorithm aversion) or blindly trust its answers without double-checking the logic (automation bias). This paper explores how businesses can adopt predictive AI to support rather than replace human decision-making, focusing on management students the next generation of leaders to understand how clear explanations and perceived usefulness build their trust and confidence in the technology. Using a mix of surveys and scenario-based experiments, alongside a review of AI in banking and Indian regulations, the study concludes that AI should be seen as a tool to boost human judgment. Ultimately, to make this transition successful, business schools must teach future managers how to responsibly understand, question, and properly trust these advanced financial systems.

KEYWORDS

Real-time financial intelligence, machine learning, predictive analytics, managerial decision-making, trust in automation.

1. INTRODUCTION

Timely and accurate financial information is a prerequisite for sound managerial decision-making. For decades, this information has been produced through a backward-looking pipeline: transactions are recorded, ledgers are closed, and reports are compiled at fixed intervals such as weekly, monthly, or quarterly. By the time a report reaches a manager's desk, the underlying business conditions may already have changed. A sudden drop in revenue, an unexpected spike in expenses, or an emerging liquidity shortfall can go unnoticed for days or weeks under this batch-oriented model, and by the time the problem surfaces, the associated cost has often already been incurred.

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The emergence of business intelligence (BI) platforms such as Microsoft Power BI and Tableau addressed part of this problem by automating data aggregation and enabling interactive dashboards that refresh on a scheduled or near-continuous basis.

These tools remain descriptive in nature: they excel at showing what happened and, through variance analysis, why it happened, but they do not, by themselves, forecast what is likely to happen next. Machine learning extends this analytical chain by learning non-linear patterns from historical and streaming data to generate probabilistic forecasts of cash flow, credit risk, fraud, and demand. This paper is concerned with the transition from descriptive, retrospective financial reporting toward predictive, machine-learning-enabled financial intelligence, and with the managerial and educational conditions under which such intelligence can be used responsibly.

Financial decision-making has historically relied on retrospective, deterministic tools such as spreadsheets, general ledgers, and descriptive business intelligence dashboards. These instruments answer what happened in the past but offer limited guidance on what is likely to happen next. The growing availability of machine learning (ML) has introduced a probabilistic, forward-looking layer of analysis capable of forecasting cash flows, assessing credit risk, detecting fraud, and flagging anomalies in near real time. However, the diffusion of these capabilities into actual managerial practice is bottlenecked not by computational power but by human cognition: decision-makers oscillate between algorithm aversion, the reflexive rejection of algorithmic advice after a visible error, and automation bias, the uncritical acceptance of algorithmic output without scrutiny of its assumptions. This paper examines the transition from descriptive financial reporting toward machine-learning-enabled, near-real-time financial intelligence, and asks how such systems can support rather than replace managerial judgement.

Drawing on the Technology Acceptance Model, Trust-in-Automation theory, Algorithm Aversion/Appreciation research, and Cognitive Fit Theory, the paper develops a conceptual framework linking machine learning awareness, perceived usefulness, perceived explainability, and trust to decision confidence and intention to use predictive financial systems among management students, who represent the next generation of corporate decision-makers. The paper further reviews applications of machine learning across corporate finance, banking, and risk management, discusses the regulatory and ethical landscape governing algorithmic decision-making in India, and identifies the methodological and behavioural limitations that any such study must confront. The paper concludes that machine learning should be understood as an augmentation of managerial foresight rather than a substitute for it, and that management education must evolve to build the explainability literacy and calibrated trust required for responsible adoption.

1.1 BACKGROUND OF THE STUDY

The shift across analytical paradigms can be summarised as a progression from historical financial reporting, to spreadsheet-based analysis, to business intelligence dashboards, to descriptive and diagnostic analytics, to predictive analytics, and finally to machine-learning-supported, near-real-time financial intelligence that feeds directly into managerial decision support.

Each stage answers a progressively harder question: descriptive analytics asks what happened, diagnostic analytics asks why it happened, predictive analytics asks what may happen next, and prescriptive or decision-intelligence layers ask what action should be taken. Traditional BI tools remain indispensable for monitoring operational hygiene, tracking key performance indicators, and standardising compliance reporting; the distinction this paper draws is not an absolute technical barrier between legacy and modern tools, but a shift in analytical posture from deterministic and backward-looking to probabilistic and forward-looking.

Machine learning is not presented here as an automatic replacement for Excel, Power BI, or Tableau. Modern BI platforms already embed forecasting and anomaly-detection modules, so the more accurate distinction is between predominantly descriptive use and more advanced predictive use of the same broad toolset. Where machine learning adds value is in high-dimensional, non-linear problems: forecasting revenue and cash flow under volatile conditions, assessing credit default risk from alternative data sources, detecting fraudulent transactions within a stream of activity, and predicting customer churn from behavioural signals.

1.2 STATEMENT OF THE PROBLEM

Despite the analytical power of modern algorithms, managerial decision-making remains bottlenecked by human cognitive factors. Financial decision-makers frequently exhibit one of two behavioural extremes. Algorithm aversion is the tendency to lose trust in, and abandon, an otherwise superior algorithm after observing even a minor error, a standard that human colleagues are rarely held to. Automation bias is the opposite failure: uncritical deference to algorithmic output without examining its underlying assumptions, data quality, or contextual limitations. In corporate finance and capital allocation, uncritical deference to an opaque model can precipitate solvency crises or regulatory sanctions, while reflexive rejection forces organisations back onto subjective heuristics in increasingly volatile markets.

This problem is compounded by a gap in management education. MBA and postgraduate management curricula remain weighted toward static spreadsheet calculation, ratio analysis, and descriptive visualisation, with minimal formal treatment of how machine learning models generate forecasts, how explainable AI techniques interpret model behaviour, or how statistical uncertainty should be evaluated. Consequently, management graduates enter data-rich corporate environments without the literacy required to audit, challenge, or productively use predictive intelligence. The problem this paper addresses is therefore the cognitive, behavioural, and educational gap that separates descriptive financial reporting from predictive, machine-learning-enabled financial intelligence, and the mechanisms through which future managers can be prepared to bridge it.

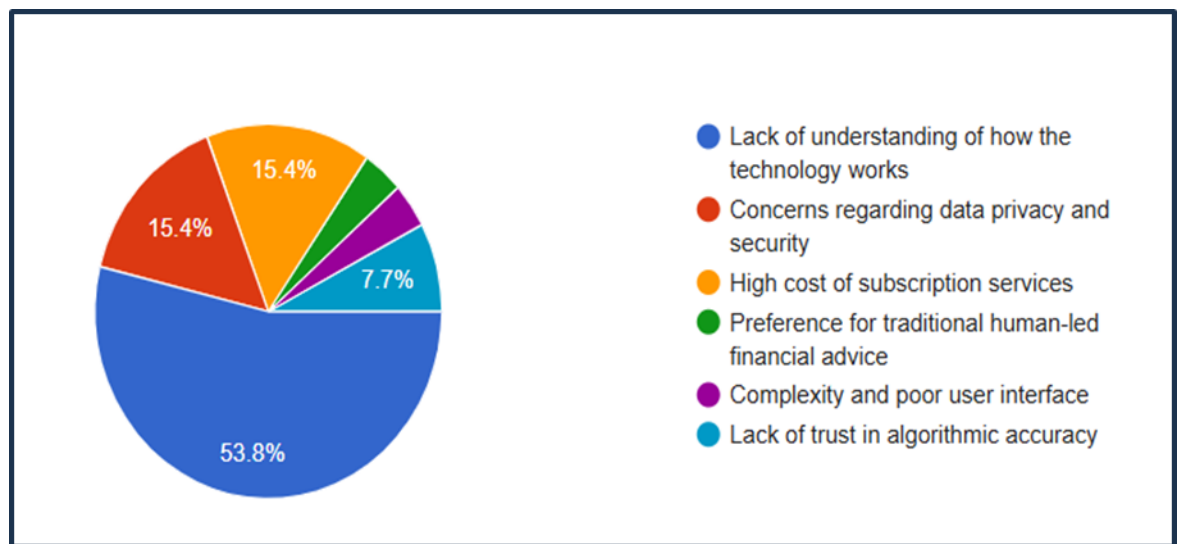


Figure 1 shows the reference image taken from the survey.

2. OBJECTIVES OF THE STUDY

- To examine the conceptual and practical transition from descriptive financial reporting and business intelligence toward predictive, machine-learning-enabled financial intelligence.
- To identify the principal applications of machine learning in corporate finance, banking, and risk management, and the business problems each addresses.
- To assess management students' awareness, perceived usefulness, perceived explainability, and trust in machine-learning-generated financial predictions.
- To develop a conceptual framework linking technology perceptions, trust, and decision confidence to the intention to use predictive financial intelligence.

3. LITERATURE REVIEW

The literature relevant to this study spans four broad streams: financial econometrics and asset pricing, accounting information systems and auditability, information systems and technology adoption, and behavioural research on human-algorithm interaction.

3.1 BUSINESS INTELLIGENCE AND FINANCIAL DECISION-MAKING

Negash (2004) defined business intelligence systems as tools that collect, store, and analyse data to support better organisational decisions, emphasising that the value of BI lies in making data available to the right people at the right time. Eckerson (2011) examined performance dashboards and found that they reduce the time employees spend searching for data, freeing them to focus on interpretation and action. Turban, Sharda, and Delen (2014) found that firms that use BI tools consistently outperform those that do not, and that real-time data access improves cross-departmental coordination.

Davenport and Harris (2007) argued that firms which use analytics well gain a durable competitive advantage, while Chen, Chiang, and Storey (2012) traced the evolution of BI systems from static reporting toward interactive, real-time visualisation that is increasingly accessible to non-technical users. Taken together, this literature establishes that descriptive BI remains foundational: an organisation cannot forecast future liquidity if it cannot first measure current cash reserves, but descriptive tools alone struggle with multi-variable volatility and non-linear economic shifts.

3.2 MACHINE LEARNING IN FINANCIAL PREDICTION

Gu, Kelly, and Xiu (2020) demonstrated in the Review of Financial Studies that machine learning methods, particularly gradient-boosted trees and neural networks, outperform classical linear asset-pricing models by capturing non-linear interactions across macroeconomic and firm-level variables, establishing an empirical foundation for machine learning's analytical advantage over linear descriptive models. Kraus, Feuerriegel, and Oztekin (2020) reviewed deep learning applications in business analytics and operations research and found that while deep learning captures complex, unstructured dependencies, it requires large volumes of training data and exhibits pronounced interpretability limits. More recent applied literature reinforces these findings in narrower financial contexts. Gajamannage, Park, and Jayathilake (2023) reported that sequentially trained dual-LSTM models improved real-time forecasting accuracy in financial markets, while Sonkavde et al. (2023) and Sahu, Mokhade, and Bokde (2023), in systematic reviews, concluded that machine learning and deep learning models can meaningfully improve stock-price forecasting and algorithmic trading performance, though results vary with data quality and market regime.

Gao et al. (2024), reviewing machine learning applications in business and finance more broadly, similarly concluded that deep neural networks show potential for improving the accuracy and efficiency of financial-outcome predictions, while flagging the continued need for interpretability and rigorous validation.

A parallel and fast-growing body of applied work addresses fraud and anomaly detection, which is the most mature real-time use case for machine learning in finance. Bello, Bello, Bolatito, and Ameyaw (2024) argued that adaptive machine learning models which continuously learn from evolving fraud patterns strengthen the security and integrity of financial transactions, and a related study by Bello, Idemudia, and Iyelolu (2024) found that neural-network-based systems reduce fraud-detection time while improving accuracy. VasanthaKumari, Prasad, and Abishek (2025) and Davis and Harris (2024) similarly reported that classification techniques such as support vector machines, decision trees, and ensemble logistic-regression models can detect subtle and evolving fraud signals in real time while limiting false positives, and Sharma et al. (2026) found that autoencoder-based anomaly detection outperformed baseline classifiers such as logistic regression and random forests for this task. At the infrastructure level, Arzu et al. (2025) and Yu (2025) demonstrated that combining machine learning with stream processing, big-data pipelines, and distributed cloud architectures enables high-velocity transaction monitoring with stable latency and improved regulatory compliance, and Vijayan (2024) showed that distributed infrastructure built on tools such as Apache Spark can improve the timeliness and accuracy of forecasts generated from high-frequency financial transactions.

Beyond fraud, Koka et al. (2025) reported that deep learning techniques such as LSTM and convolutional networks improved the accuracy and responsiveness of real-time financial-risk modelling, and Aktarujjaman et al. (2026) proposed a dual-branch deep-learning framework integrating behavioural and market-behaviour data for financial-crime detection with reported state-of-the-art performance. Hazarika et al. (2025) extended this line of work by embedding explainability and privacy-preserving mechanisms directly into a real-time credit-scoring and fraud-detection framework, reflecting a growing recognition that predictive accuracy alone is insufficient without transparency and accountability.

3.3 TRUST, EXPLAINABILITY, AND HUMAN-AI COLLABORATION

A separate stream of research in accounting information systems has examined the risks that accompany automated decision aids. Li and Goel (2025) found that integrating AI into audit processes improves the speed of anomaly detection but simultaneously raises concerns regarding professional scepticism and the verifiability of algorithmic conclusions, echoing Kokina et al.'s earlier observation that ensemble and deep-learning techniques introduce a black-box dilemma into high-stakes financial reporting.

Arnold and Sutton's Theory of Technology Dominance holds that over-reliance on automated decision aids can lead to the cognitive deskilling of professionals when systems lack transparent explanatory scaffolding. In direct response to this black-box problem, Explainable AI (XAI) has become an active area of empirical investigation. Tuge and Msweli (2025), in a systematic review of 78 peer-reviewed studies on AI in the banking sector, found that XAI adoption is constrained by accuracy–interpretability trade-offs, limited organisational readiness, and unclear regulatory alignment. Shin (2021), using structural equation modelling on 340 platform users, found that explainability influences adoption intention indirectly through the mediating roles of perceived trust, fairness, and causality, and cautioned that poorly designed or overly technical explanations can heighten cognitive dissonance and cause users to reject valid algorithmic output. This finding is consistent with the behavioural literature on algorithm aversion and algorithm appreciation: non-expert users abandon algorithms quickly upon observing errors they would readily forgive in a human colleague, yet users with stronger foundational AI and data literacy are more likely to exhibit calibrated trust and use algorithmic predictions effectively. Onabowale (2025), reviewing AI-driven real-time financial decision-support systems, similarly concluded that such systems can improve decision accuracy, operational agility, and financial resilience, but only where organisations build the governance and human oversight needed to use them responsibly.

3.4 RESEARCH GAP

Three structural findings emerge from this synthesis. First, there is empirical consensus that machine learning outperforms conventional linear modelling in high-dimensional financial prediction tasks, while simultaneously introducing interpretability and governance risks. Second, the evidence is partly contradictory: technical researchers argue that post-hoc explainability methods resolve the opacity problem, while behavioural studies show that complex explanations can confuse non-expert decision-makers and amplify, rather than reduce, cognitive dissonance.

Third, the literature on human-AI collaboration in finance concentrates almost entirely on either technical specialists, such as auditors and quantitative analysts, or on retail consumers of algorithmic advice. The critical middle tier, the emerging general manager who must direct corporate resources on the basis of probabilistic forecasts, remains underexamined. This paper addresses that gap by centring management students, as proxies for future corporate decision-makers, and by combining technology-acceptance and trust-in-automation constructs with explainability perceptions in a single conceptual model calibrated for financial decision tasks.

Research Stream	Primary Focus	Studied Population	What Was Omitted
Financial econometrics and asset pricing	Out-of-sample return prediction and factor optimisation	Historical market and transaction data	The human decision-making interface and managerial trust
Accounting information systems and auditing	Algorithmic auditability and professional scepticism	Certified auditors and compliance officers	The perspective of general managers and capital allocators
Information systems and AI adoption	Technology acceptance models for consumer AI tools	General public and retail platform users	Financial literacy and high-stakes corporate uncertainty
AI literacy and business education	Psychometric scale development for general AI literacy	Undergraduates and general employees	Application to specialised corporate finance tasks

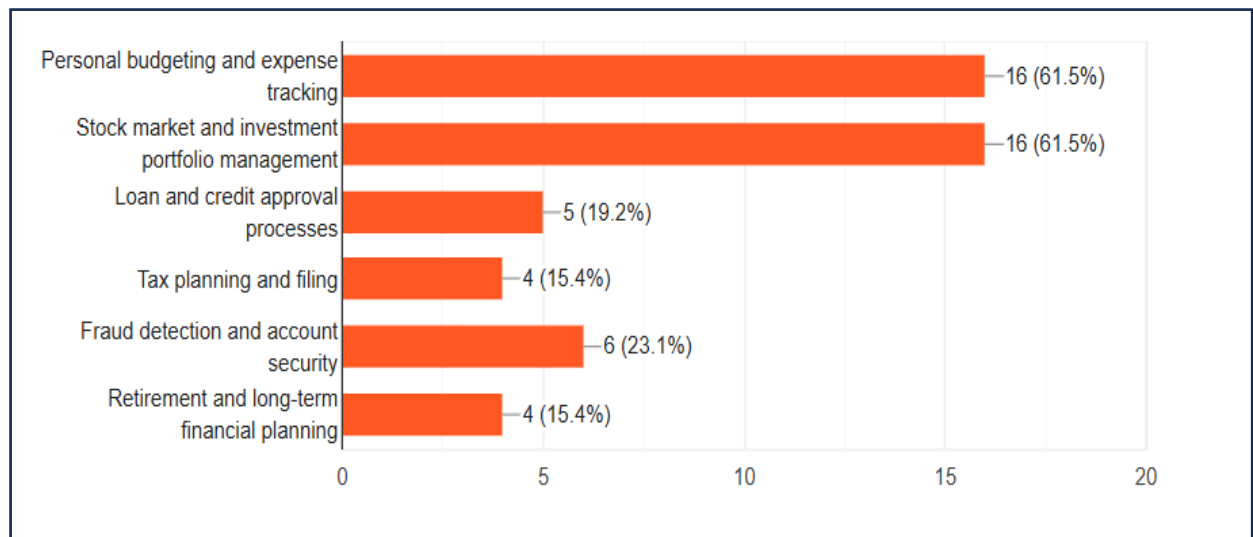


Figure 2 highlights the financial areas that could benefit most from AI-driven real-time analysis

4. EVOLUTION OF FINANCIAL INTELLIGENCE: FROM DESCRIPTIVE REPORTING TO MACHINE LEARNING

The following table differentiates the conceptual levels of financial information processing, moving from statutory financial reporting through business intelligence and financial analytics to predictive analytics, machine learning, and near-real-time financial intelligence.

Descriptive analytics answers what happened, diagnostic analytics answers why it happened, predictive analytics answers what may happen next, and decision intelligence addresses which managerial intervention offers the best balance of return, risk, and strategic alignment.

Paradigm Level	Core Managerial Question	Typical Method	Typical Application
Financial Reporting	What was the audited outcome of past operations?	General ledger accounting, statutory accrual	Audited statements, tax filings
Business Intelligence	What are current metrics versus past baselines?	OLAP, dashboards, data warehousing	KPI scorecards, budget-vs-actual tracking
Financial Analytics	Why did activities deviate from budget?	Ratio and variance analysis	COGS variance, working-capital breakdown
Predictive Analytics	What trends are likely based on history?	Regression, classical time-series (ARIMA)	Rolling sales forecasts, trend extrapolation
Machine Learning	What non-linear patterns anticipate outcomes?	Gradient boosting, random forests, neural nets	Revenue modelling, credit scoring, fraud scoring
Near-Real-Time Financial Intelligence	What is the current state of financial risk?	Streaming ingestion, event-driven pipelines	Intraday liquidity and exposure monitoring
Decision Intelligence	Which intervention balances return, risk, and strategy?	Prescriptive optimisation, human-in-the-loop systems	Algorithmic capital allocation, dynamic pricing

Descriptive tools provide the foundational stability on which predictive systems depend: an organisation cannot forecast future liquidity if it cannot first measure current cash reserves and monitor receivables. The distinction pursued in this paper is therefore not that machine learning replaces descriptive analytics, but that it extends the analytical chain into probabilistic, forward-looking territory, while still depending on the data discipline that descriptive systems establish.

5. Theoretical Framework

To explain how management students and future managers evaluate and adopt machine learning in financial contexts, the paper draws on five complementary theories from information systems, cognitive psychology, and accounting.

- Technology Acceptance Model (Davis, 1989) and its extension, the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), establish that perceived usefulness and perceived ease of use jointly determine behavioural intention to use an information system.
- Trust in Automation theory (Lee & See, 2004; Hoff & Bashir, 2015) argues that when a system's internal logic cannot be fully traced by the user, trust substitutes for detailed technical verification, and operates across dispositional, situational, and learned levels.
- Algorithm Aversion theory (Dietvorst, Simmons, & Massey, 2015) and Algorithm Appreciation theory (Logg, Minson, & Moore, 2019) describe the asymmetric ways in which users respond to algorithmic error versus human error, and the conditions under which users instead over-defer to algorithmic advice.
- The Theory of Technology Dominance (Arnold & Sutton, 1998) cautions that inexperienced professionals interacting with intelligent decision aids risk cognitive deskilling and automation bias when explanatory scaffolding is weak.
- Cognitive Fit Theory (Vessey, 1991) explains that decision-making is most effective when the representation of information matches the cognitive demands of the task: descriptive dashboards support retrospective monitoring, while predictive interfaces support forward-looking resource allocation under uncertainty.

Together, these theories imply that adoption of predictive financial intelligence is not a simple function of interface usability. It is a balance between cognitive fit, explainability-driven trust, and the user's underlying financial and algorithmic literacy.

6. Conceptual Framework and Hypotheses

The conceptual framework integrates the Technology Acceptance Model, Trust in Automation, and Cognitive Fit Theory into a structural model calibrated for management students evaluating predictive financial intelligence. Machine Learning Awareness, Perceived Predictive Capability, Perceived Explainability, and Perceived Ease of Use form the cognitive foundation influencing Perceived Usefulness and Trust in Machine Learning Predictions. Trust and Perceived Usefulness in turn drive Decision Confidence, which determines the Intention to Use machine-learning-enabled financial intelligence. Artificial Intelligence Literacy and Financial Analytics Literacy act as moderating variables on these relationships.

Code	Hypothesis
H1	Perceived Usefulness of machine-learning-enabled financial intelligence positively influences Intention to Use.
H2	Perceived Ease of Use positively influences both Perceived Usefulness and Trust.
H3	Perceived Explainability positively influences Trust and Perceived Usefulness.
H4	Trust in machine-learning predictions positively influences Decision Confidence and Intention to Use.
H5	Decision Confidence positively influences Intention to Use and partially mediates the Trust–Intention relationship.
H6	Artificial Intelligence Literacy positively moderates the relationship between Perceived Usefulness and Intention to Use.
H7	Participants exposed to an explainable, machine-learning-supported forecast report higher Decision Confidence and Perceived Decision Quality than those exposed to a descriptive dashboard alone.

7. RESEARCH METHODOLOGY

7.1 RESEARCH DESIGN

The study adopts a convergent mixed-method quantitative design combining a cross-sectional psychometric survey with an embedded, randomised, between-subjects scenario experiment. A purely observational survey can capture subjective attitudes and self-reported intentions but cannot show how individuals actually behave when presented with contrasting decision environments; a standalone laboratory experiment, conversely, lacks the psychometric breadth to evaluate structural relationships among latent constructs such as literacy, trust, and perceived usefulness. Embedding the experiment inside the survey instrument resolves this tension. After completing baseline psychometric sections, participants are randomly assigned to a control condition, in which they evaluate a capital-allocation problem using a traditional descriptive dashboard, or a treatment condition, in which the identical scenario is presented through a machine-learning-enabled interface augmented with probabilistic cash-flow forecasts, confidence intervals, a risk score, and SHAP-based feature-importance indicators. Both groups then complete identical post-treatment measures of decision confidence, perceived decision quality, and willingness to rely on the system, enabling structural equation modelling across the full sample alongside ANCOVA-based causal comparison between conditions.

7.2 DATA COLLECTION

All latent constructs are measured on five-point Likert scales adapted from validated instruments in the technology-acceptance and trust-in-automation literature.

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The instrument is organised into sections covering demographic and control variables; Machine Learning Awareness (adapted from Carolus et al., 2023, and Long & Magerko, 2020); Financial Analytics Literacy (adapted from accounting information systems literacy scales); Perceived Usefulness and Perceived Ease of Use (adapted from Davis, 1989, and Venkatesh et al., 2003); Trust in Algorithmic Predictions and Perceived Explainability (adapted from Hoff & Bashir, 2015, and Shin, 2021); Perceived Predictive Capability (adapted from Gu et al., 2020, and Kraus et al., 2020); Decision Confidence (adapted from Li & Goel, 2025); and Intention to Use (adapted from Venkatesh et al., 2003, and Shin, 2021). Psychological separation between exogenous predictor sections and endogenous outcome sections, together with reverse-coded attention checks, is built into the layout to reduce common method bias.

Fundamental Data	Market Data	Analytics	Alternative Data
Balance Sheet Items	Price / yield / implied volatility	Analyst recommendations	Images
Income Statement Items	Volume	Credit ratings	Google Searches
Macro Variables	Dividend / Coupon / Open Interest	Earnings expectations	Meta data
	Quotes / cancellations	News sentiment	X / Chats

7.3 STATISTICAL ANALYSIS PLAN

Data screening begins with missing-value diagnostics, removal of unengaged respondents via attention checks, and identification of multivariate outliers using Mahalanobis distance. Common method bias is assessed using Harman's single-factor test and full collinearity variance inflation factors. The measurement model is validated through standardised factor loadings above 0.708, Cronbach's alpha and composite reliability above 0.70, average variance extracted above 0.50, and discriminant validity via the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio. Structural relationships are then tested using Partial Least Squares Structural Equation Modelling in SmartPLS, with non-parametric bootstrapping resamples to generate path coefficients, effect sizes, R^2 values, and predictive relevance (Q^2 via PLSpredict).

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Moderation effects are tested using the two-stage orthogonalised product-indicator approach. The experimental vignette data are analysed separately using independent-samples t-tests and Analysis of Covariance, controlling for AI literacy, financial literacy, and prior work experience, to isolate the causal effect of interface design on decision outcomes.

7.4 PRELIMINARY SURVEY RESULTS (PILOT DATA, N = 26)

A pilot survey of 26 respondents was administered to test the questionnaire framework described above ahead of full-scale deployment. Respondents reported frequent use of digital financial tools:

10 used digital banking or tracking apps weekly and 9 daily, with only one respondent reporting rare or no use, indicating a sample already embedded in digitally mediated financial behaviour rather than a novice population. Mean agreement scores (1 = Strongly Disagree, 5 = Strongly Agree) show that awareness and perceived usefulness lead the construct set: respondents most strongly agreed that machine learning tools will become essential for personal finance within five years ($M = 4.19$), that they are aware AI/ML is already used by banks and financial apps ($M = 4.15$), and that real-time budgeting apps help them manage money ($M = 4.12$). Trust-related and higher-stakes items scored consistently lower: confidence that personal data is secure when analysed by AI ($M = 3.50$) and belief that automated trading helps everyday investors ($M = 3.50$) were the weakest constructs, and the reverse-coded item on preferring a human advisor for retirement savings scored 3.85, indicating a persistent preference for human judgement in high-stakes decisions even among a digitally engaged sample. This pattern is consistent with the algorithm aversion literature reviewed in Section 3.3: agreement is highest for low-stakes, routine tasks (budgeting, categorisation) and weakest wherever consequences are large or opaque.

When asked which financial areas would benefit most from AI-driven real-time analysis, stock market/investment management and personal budgeting/expense tracking were each selected by 16 of 26 respondents, well ahead of fraud detection (6), loan and credit approval (5), and tax planning and retirement planning (4 each), suggesting that respondents see the clearest value in the two areas they already interact with most often. Asked to name the single biggest barrier to using AI-powered financial tools more often, 14 of 26 respondents (54 percent) selected "lack of understanding of how the technology works" — far ahead of data-privacy concerns (4), subscription cost (4), and distrust of algorithmic accuracy (2). This directly supports the paper's central argument regarding explainability: when asked separately to rate the importance of transparency in how an AI reaches a decision (1–5 scale), the mean rating was 3.85, and 17 of 26 respondents (65 percent) rated it 4 or 5, reinforcing Perceived Explainability (PEX) as a construct that plausibly gates trust and adoption rather than a peripheral concern.

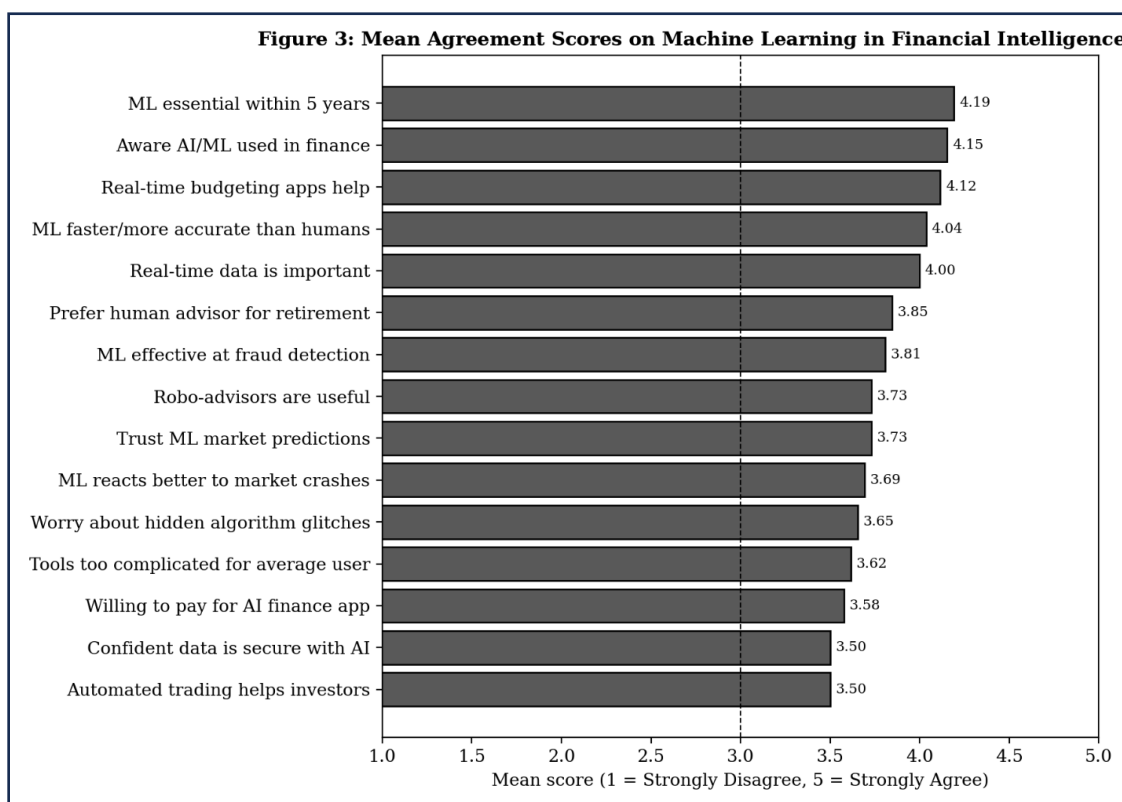


Figure 3 Shows the Mean Agreement Scores on ML in Financial Intelligence

8. APPLICATIONS OF MACHINE LEARNING IN FINANCIAL INTELLIGENCE

Machine learning applications in finance can be grouped into four broad domains, each addressing a distinct managerial question and drawing on different data and modelling approaches.

Domain	Representative Applications	Business Question Addressed
Corporate liquidity and cash flow	Cash-flow forecasting, working-capital planning, financial-distress prediction	Will the organisation have sufficient liquidity, and where is risk concentrated?
Credit and banking	Credit scoring, loan-default prediction, customer-churn prediction	Which applicants or customers present elevated risk?
Fraud and transaction risk	Anomaly detection, real-time fraud scoring, transaction-stream monitoring	Which transactions deviate from expected behaviour, and how quickly can this be flagged?
Strategic and market analysis	Revenue and demand forecasting, customer lifetime value, market-trend and volatility analysis	How should resources, pricing, and inventory be aligned with anticipated demand and risk?

Across these domains, different business problems call for different methods: forecasting revenue is a different statistical problem from identifying fraud, and predicting loan default differs from estimating market volatility. Accuracy alone is not a sufficient criterion for managerial usefulness; a prediction must also be timely, relevant to the decision at hand, reliable under changing conditions, appropriate to the level of risk involved, and, critically, interpretable enough to be combined with human judgement rather than substituted for it.

9. REAL-TIME AND NEAR-REAL-TIME FINANCIAL DATA PIPELINES

The term real-time is often used loosely in both academic and practitioner literature. This paper distinguishes real-time systems, which process and respond to data within milliseconds to seconds, from near-real-time systems, which operate on a delay of seconds to minutes, and from batch or periodic systems, which refresh at scheduled intervals of hours, days, or longer. Most financial-intelligence deployments in corporate settings, including those built on Power BI, Azure Stream Analytics, and similar platforms, are more accurately described as near-real-time: streaming datasets typically refresh on the order of seconds to minutes rather than true millisecond-level processing, which is generally reserved for high-frequency trading and payment-fraud screening. Where a proposed system does not actually process a continuous live feed, this paper recommends the term near-real-time or machine-learning-enabled financial intelligence in preference to real-time, to avoid overstating technical capability.

At a business-process level, such pipelines follow a common structure: data is ingested from source systems such as enterprise resource planning platforms, customer relationship management systems, and banking feeds; it is cleaned and transformed for consistency; it is stored in a data warehouse or data lake to support high-speed queries; a model is applied to generate a forecast, risk score, or anomaly flag; and the result is delivered through a dashboard or report that a manager can act upon. Typical refresh targets vary by use case: live cash-position or trading dashboards may refresh every five to thirty seconds, routine operational finance reports every fifteen to thirty minutes, and forecasting or planning reports once daily or on demand. Role-based access control and routine auditing are necessary throughout, given the sensitivity of the underlying financial data.

KEY BENEFITS OF MACHINE LEARNING-ENABLED FINANCIAL INTELLIGENCE

- Faster decisions: management receives analytical insight in seconds or minutes rather than days, enabling quicker response to emerging problems and opportunities.

- Reduced manual effort: automated pipelines remove the need for repeated manual data extraction and spreadsheet preparation, freeing analysts to focus on interpretation.
- Improved accuracy: direct connections between source systems and analytical platforms reduce the risk of transcription and formatting errors.
- Proactive risk management: anomaly-detection and forecasting modules can flag unusual patterns before they escalate into material losses.
- Continuous forecasting: outlooks can be updated as new data arrives rather than being revised only once per reporting cycle.
- Improved communication: visual, explainable outputs provide a shared reference point for both finance specialists and non-finance managers.

11. ETHICAL CONSIDERATIONS AND REGULATORY GOVERNANCE

The deployment of machine learning in financial contexts raises governance obligations that future managers must understand. Models trained on historical credit or transaction data can reproduce structural biases present in that data, and the black-box nature of many deep-learning architectures complicates fiduciary accountability: when a model contributes to a credit decision or a solvency projection, the organisation must still be able to provide a defensible rationale rather than deferring to computational opacity.

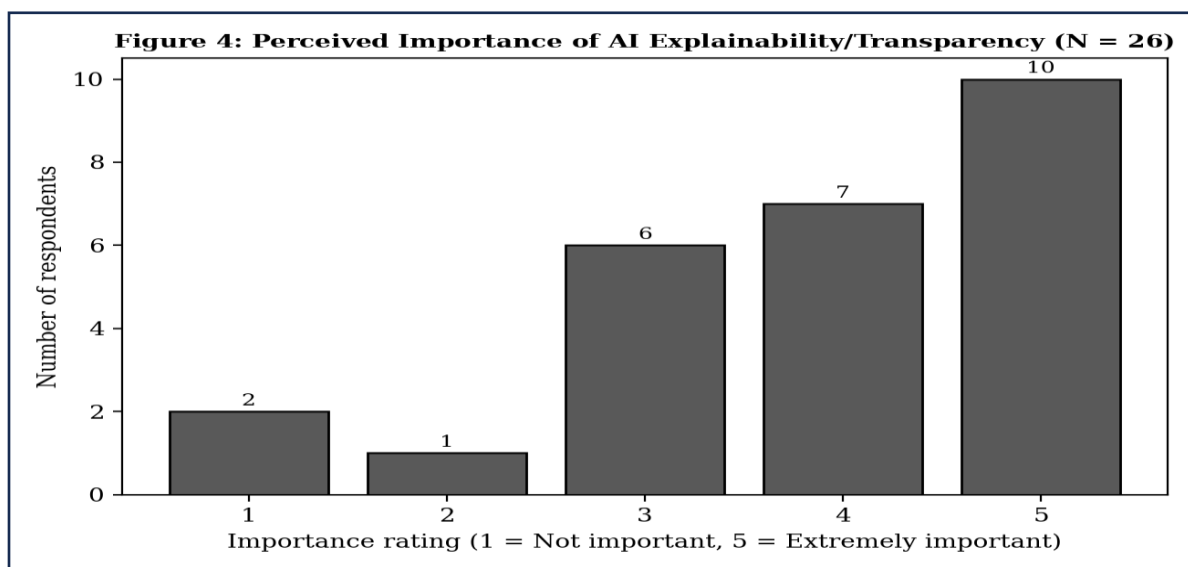


Figure 4 Shows that Perceived Importance of AI Transparency

In the Indian regulatory context, oversight of AI and machine learning in financial services has moved from voluntary guidance toward binding compliance obligations.

The Securities and Exchange Board of India (SEBI) requires registered intermediaries to disclose the AI and machine learning systems they deploy, including their scope, cybersecurity safeguards, and controls against abnormal algorithmic behaviour, and, under its 2025 amendment to the Intermediaries Regulations, establishes that regulated entities remain solely liable for the performance and compliance of any AI or machine learning tool they use, whether built internally or procured from a vendor. SEBI's 2025 consultation paper on responsible AI/ML usage further proposes board-approved governance frameworks, algorithmic audits, and periodic accuracy disclosures. The Reserve Bank of India's guidelines on digital lending require human-in-the-loop oversight of automated credit-underwriting models and prohibit unexplainable algorithmic loan rejections, while the Digital Personal Data Protection Act, 2023 governs consent, purpose limitation, and data-protection obligations relevant to any system processing personal financial data. NITI Aayog's national AI strategy sets out voluntary principles of fairness, accountability, and transparency that inform, without binding, broader AI governance practice. Management researchers and practitioners must distinguish clearly between mandatory regulation, official guidance, and voluntary frameworks when discussing compliance obligations, since delegating analysis to an algorithm does not transfer legal or fiduciary responsibility away from the organisation that deploys it.

12. LIMITATIONS OF THE STUDY

Machine learning models produce probabilistic likelihoods derived from historical correlations, not guaranteed future outcomes, and several technical and methodological boundaries must be acknowledged.

- Non-stationarity and regime shifts: financial and macroeconomic relationships change over time, and a model trained under one interest-rate or demand regime may degrade sharply when conditions shift.
- Concept drift and data leakage: the statistical relationship between inputs and outcomes can change unpredictably, while the inadvertent inclusion of forward-looking data in training pipelines can produce inflated back-tested accuracy that does not hold in live deployment.
- Overfitting on noise: financial time series often carry a low signal-to-noise ratio, making high-capacity models prone to fitting idiosyncratic historical noise rather than genuine structure.
- The explainability paradox: post-hoc techniques such as SHAP and LIME provide local, approximate explanations of complex non-linear models; these approximations can themselves be unstable and can create an unverified sense of understanding.

- Student surrogacy: MBA students, while possessing relevant training and often prior work experience, do not carry the fiduciary liability or institutional pressure faced by sitting chief financial officers, so behavioural findings should be read as baseline tendencies rather than seasoned executive behaviour.
- Common method variance: administering multiple latent constructs within a single cross-sectional instrument introduces a risk of inflated path coefficients through cognitive consistency effects, which the proposed layout and statistical checks aim to mitigate but cannot eliminate entirely.
- Simplification in experimental vignettes: a static scenario necessarily simplifies the dynamic, drifting, and occasionally unreliable behaviour of real production models and data pipelines.

13. DISCUSSION AND MANAGERIAL IMPLICATIONS

The evidence reviewed in this paper suggests that machine learning's contribution to financial decision-making is best understood as augmentation rather than replacement. Algorithmic outputs are probability distributions and confidence intervals; converting them into corporate strategy still requires contextual judgement, ethical scrutiny, and awareness of the limits of the model in use. For corporate analytics teams, this implies that predictive systems should not be deployed as unexplained black boxes: decision-oriented interpretability, visible driver attributions, scenario-testing capability, and explicit confidence intervals alongside point forecasts are necessary to build calibrated, rather than blind, managerial trust. For executive leadership, the risk of automation bias can be mitigated through deliberate procedural checkpoints that require managers to review underlying assumptions before finalising an automated recommendation, rather than relying on interface design alone.

For business schools, the implication is that management curricula should shift some of the time currently allocated to static spreadsheet modelling toward teaching students how to audit machine-learning outputs, interpret probabilistic ranges, and recognise the conditions under which a model's assumptions no longer hold.

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Case-based teaching that contrasts a descriptive dashboard with an explainable predictive interface on the same underlying decision, of the kind proposed in the experimental component above, offers a practical route to building this literacy without requiring students to become data scientists themselves.

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14. CONCLUSION

This paper has examined the transition from descriptive, retrospective financial reporting toward predictive, machine-learning-enabled financial intelligence, and the behavioural and educational conditions that determine whether this transition improves or undermines managerial decision-making. The review of literature indicates clear evidence that machine learning outperforms classical linear methods on high-dimensional, non-linear financial prediction tasks, particularly in fraud detection and short-horizon forecasting, but also indicates that this advantage is contingent on interpretability, data quality, and the calibrated trust of the humans who ultimately act on its output. Algorithm aversion and automation bias represent two symmetrical failure modes that management education has not yet adequately addressed. The conceptual framework and mixed-method design proposed here, linking machine learning awareness, perceived explainability, trust, and decision confidence to intention to use, offers one route toward empirically testing how future managers can be prepared to use predictive financial intelligence responsibly. Ultimately, the value of machine learning in financial management lies not in eliminating human governance but in extending managerial foresight, provided that organisations and business schools alike invest in the explainability, literacy, and governance structures needed to use it well.

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EMPLOYEE BURNOUT AND RETENTION STRATEGIES IN HIGH-TURNOVER

INDUSTRIES: A Review of Causes, Consequences, and Evidence-Based Interventions.

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Abstract

Ask almost anyone who has worked a front desk, a nursing floor, or a call centre shift what makes people quit, and pay is rarely the first thing they mention. It is usually the schedule that changes without warning, the shift no one covered, the manager who never seems to notice. This paper looks at burnout in the industries where turnover is highest healthcare, hospitality, retail, food service, and call centres and asks what is actually driving people out the door. Using Maslach's model of burnout alongside the Job Demands-Resources framework, the paper argues that most of what looks like a "retention problem" is really a burnout problem wearing a different name: employees are not leaving because they lack grit, they are leaving because the demands of the job have outrun the resources available to meet them. From there, the paper works through four groups of interventions scheduling and workload, pay and benefits, management practice, and career mobility and makes the case that none of them work particularly well in isolation. The strongest retention outcomes appear where organizations combine structural fixes with better frontline management, rather than treating burnout as something a wellness app can solve.

Keywords: employee burnout, turnover, retention, job demands-resources model, high-turnover industries, workforce management

1. Introduction

For a long time, turnover in certain industries was simply written off as a cost of doing business. Restaurants, warehouses, call centers, and long-term care facilities have budgeted for annual turnover well north of 50 percent for so long that the number stopped raising eyebrows. Hiring became a constant background process rather than a periodic event, and many organizations built entire staffing models around the assumption that most new hires would not last the year.

That framing is starting to look outdated. A growing body of research suggests that what gets labelled as "high natural turnover" in these sectors is often better understood as burnout playing out at scale.

The World Health Organization's ICD-11 defines burnout as an occupational phenomenon resulting from chronic workplace stress that has not been successfully managed, built around three components: emotional exhaustion, cynicism (or depersonalization), and a shrinking sense of professional efficacy. None of that is a personality flaw. It is what happens, fairly predictably, when staffing is thin, shifts are unstable, the emotional demands of the job never let up, and there is nowhere to advance to.

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This paper sets out to do three things. It reviews the theoretical grounding for treating burnout as the mechanism behind much of this turnover, rather than treating the two as separate problems. It estimates, in practical terms, what unaddressed burnout actually costs an organization. And it works through a set of retention strategies, grouped into four categories, that target the structural causes of burnout rather than papering over its symptoms.

2. Review of Literature

The literature relevant to this topic comes from a few different directions at once: occupational psychology, human resource management, and a fair amount of applied, industry-specific workforce research that does not always cite the psychology literature but arrives at strikingly similar conclusions. What follows is not an exhaustive review, but it covers the strands that matter most for the argument this paper is making.

2.1 Foundational Burnout Theory

Maslach and Jackson's early work is still the starting point for most discussions of burnout, and for good reason. Their three-dimensional model of emotional exhaustion, depersonalization, and reduced personal accomplishment has held up remarkably well across four decades of research and across occupations that look nothing alike on the surface: nursing, teaching, social work, and, more recently, retail and gig work. The Maslach Burnout Inventory built from this model is still the most widely used instrument in the field. Later work by Maslach and Leiter pushed the idea further, arguing that burnout results from a mismatch between a person and six specific areas of work life: workload, control, reward, community, fairness, and values. That six-area framework turns out to map fairly cleanly onto the retention strategies discussed later in this paper, which is not entirely a coincidence.

2.2 The Job Demands-Resources Tradition

If Maslach's work explains what burnout looks like, the Job Demands-Resources model, developed by Demerouti, Bakker, Nachreiner, and Schaufeli, explains why it shows up more in some jobs than others.

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The model's core claim is fairly intuitive once stated: every job involves demands (the things that require sustained effort) and resources (the things that help meet those demands or offset their cost). Burnout is not simply a function of how demanding a job is; it emerges when demands consistently outpace the resources available to deal with them. Bakker and Demerouti's later review found this pattern holding up across a decade of studies, and it is the reason the JD-R model has become the default lens in more recent workforce research it points at things an employer can actually change (staffing levels, scheduling control, managerial support) rather than framing burnout as a fixed property of a given occupation.

2.3 Turnover and Withdrawal Literature

A separate but overlapping literature in human resource management has looked at voluntary turnover directly, largely independent of the burnout research described above. That work has repeatedly found job dissatisfaction and exhaustion to be strong predictors of turnover intention, which is in turn the single best predictor researchers have of whether someone actually leaves. Labor market data tells a similar story from a different angle: the Job Openings and Labor Turnover Survey has shown persistently elevated separation rates in leisure and hospitality and in healthcare support roles for years, through multiple economic cycles, which argues against explaining the pattern away as a temporary, pandemic-era anomaly.

2.4 Industry-Specific and Applied Research

Some of the more granular cost modeling in this area comes out of nursing workforce research, where the American Nurses Association and similar bodies have documented what is sometimes called a "vicious circle": understaffed units produce burned-out nurses, burned-out nurses leave, and their departure makes the remaining units even more understaffed. Research from the Society for Human Resource Management and from Gallup's ongoing engagement surveys has found much the same pattern outside of healthcare in retail, food service, and call centers, scheduling instability, weak managerial support, and limited room for advancement show up again and again as predictors of both burnout symptoms and actual departures. The consistency of that finding across such different work settings is, honestly, one of the more persuasive things about this literature: it suggests the mechanism is structural rather than tied to any one industry's quirks, which is the premise the rest of this paper builds on.

3. Understanding Burnout in High-Turnover Contexts

3.1 Defining the Construct

Burnout, in the Maslach sense, is not just being tired of work. It is a syndrome with three fairly distinct components. Emotional exhaustion is the depletion part the sense of having nothing left to give by the end of a shift, day after day. Depersonalization is the more cynical, detached response that follows: customers become interruptions, patients become tasks, coworkers become obstacles. Reduced personal accomplishment is the quieter of the three, a creeping sense that none of it is really adding up to anything. High-turnover industries have a knack for producing all three at once, mostly because the work is emotionally demanding to begin with and the institutional support meant to buffer that demand tends to be thin.

3.2 The Job Demands-Resources (JD-R) Model

The JD-R model is useful here because it explains the clustering. Every job has demands: physical effort, emotional labor, the general grind of the schedule. Every job also has resources: the things that make those demands manageable, whether that is adequate staffing, some control over one's own schedule, or a manager who actually has your back.

Burnout shows up when demands chronically exceed resources, and in retail, hospitality, and frontline healthcare that gap tends to be built into the job rather than incidental to it. Volume is unpredictable, shifts are physically taxing, conflict with customers or patients is routine and on the resource side, staffing buffers are thin, schedules are set with little input from the people working them, and pay often does not track the effort involved. It is this gap, more than anything particular to the individual employee, that predicts burnout and, eventually, an exit.

3.3 Industry-Specific Drivers

The underlying mechanism is the same everywhere, but it shows up differently depending on the sector:

- **Healthcare and long-term care:** chronic understaffing, mandatory overtime, near-constant exposure to suffering and death, and an administrative workload that keeps growing on top of actual clinical duties.
- **Hospitality and food service:** schedules that change at the last minute, tip-dependent pay that often falls below a living wage, physically punishing shifts, and regular exposure to rude or hostile customers.
- **Retail:** "just-in-time" scheduling that makes it hard to plan a life around the job, sharp seasonal spikes in workload, and part-time roles that rarely come with meaningful benefits.
- **Call centers and customer service:** constant emotional labor, rigid metrics like average handle time, and very little say over how the work actually gets done.

4.The Organizational Costs of Burnout-Driven Turnover

There is a straightforward financial case for treating burnout as a retention problem rather than a wellness afterthought, and it is worth spelling out. Replacing a frontline or hourly employee is not cheap once everything is counted: job postings, manager hours spent screening and interviewing, onboarding and training, and the productivity dip while a new hire climbs the learning curve. Workforce research generally puts the fully loaded cost of replacing a frontline worker somewhere around 20 to 30 percent of annual salary. For skilled roles, the number climbs fast replacing a registered nurse, once recruitment, orientation, and lost productivity are all factored in, can run past 100 percent of that nurse's annual salary. The costs that do not show up on a spreadsheet as neatly are, if anything, more corrosive.

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Absenteeism rises. So does presenteeism people showing up but not really being there. Safety incidents increase in physically demanding roles. Service quality slips, whether that means a longer wait at a restaurant table or a missed detail on a hospital floor. And burnout has a way of spreading: a disengaged team tends to pull others toward the door with it, which is part of why turnover in these sectors often arrives in waves rather than a steady trickle. Table 1 lays out the main categories.

Table 1. Primary cost categories associated with burnout-driven turnover.

Cost Category	Description
Direct replacement costs	Recruitment, interviewing, onboarding, and training for each departing employee
Productivity ramp-up loss	Reduced output while new hires reach full competency
Overtime and coverage costs	Premium pay and mandatory overtime to cover unfilled shifts
Quality and safety costs:	Errors, incidents, and service failures linked to fatigue and disengagement
Contagion and morale costs	Accelerated exits among remaining staff exposed to chronic understaffing

5. Retention Strategies: An Evidence-Based Framework

It is worth saying up front that interventions treating burnout as a purely individual problem resilience workshops, meditation apps, the occasional pizza party tend to show weak and inconsistent effects on turnover when they are not paired with actual changes to how the job is structured. The strategies below are grouped into four categories that go after the demands-resources gap directly, rather than trying to help employees cope with it.

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5.1 Workload and Scheduling Redesign

- **Predictive scheduling:** giving employees their schedules one to two weeks out, with real compensation for last-minute changes, addresses the income and life instability that drives so much of the turnover in retail and hospitality.
- **Adequate staffing ratios:** setting minimum staffing floors, particularly in healthcare, keeps the overtime and coverage burden from snowballing onto whoever is still on the schedule.
- **Cross-training and flexible coverage pools:** a bench of cross-trained or float staff means fewer people getting called in on their day off when someone calls out.
- **Protected rest and shift-length limits:** capping consecutive shifts and requiring rest between them cuts down on the acute fatigue most closely tied to both errors and people quitting.

5.2 Compensation and Benefits Redesign

- **Wage benchmarking above the local competitive floor:** frontline labor markets are extremely price-sensitive, so even a modest wage bump relative to the competition down the street can noticeably reduce early-tenure attrition, which is usually the steepest part of the turnover curve.
- **Access to earned wage or on-demand pay:** letting employees draw on wages they have already earned, before the standard pay date, eases the financial strain that correlates strongly with people quitting hourly jobs.
- **Benefits for part-time and variable-hour staff:** extending even limited health coverage, paid sick leave, or retirement contributions to part-timers who make up a large share of retail and hospitality staffing signals something a flat raise alone does not.
- **Retention and referral incentives:** milestone bonuses at, say, 90 days, six months, and a year directly target the early-attrition curve that is so common in these roles.

5.3 Managerial Practice and Culture

Manager quality shows up again and again as one of the strongest predictors of retention in exit interview data, frequently outweighing pay. The old line that people quit managers, not jobs, oversimplifies things a little, but not by much. A few interventions in this category tend to matter most:

- **Manager training in supportive supervision:** teaching frontline supervisors to notice early signs of exhaustion or cynicism, and to spread workload more fairly, can interrupt the burnout trajectory before it ends in a resignation letter.

- **Realistic span of control:** keeping the number of direct reports per manager reasonable preserves enough individual attention to catch disengagement while it is still fixable.
- **Psychological safety and voice mechanisms:** giving frontline staff a real channel to flag staffing or workload problems, without fear of getting written up for it, is associated with higher engagement and less of the cynicism that defines the depersonalization side of burnout.
- **Recognition tied to genuine achievement:** recognition that is specific and tied to something real helps counter the reduced sense of accomplishment at the core of burnout; generic or occasional praise does not move the needle much.

5.4 Career Development and Advancement Pathways

- **Internal mobility programs:** a clear, visible path from an entry-level role to a supervisory one gives people a reason to push through the hardest early months.
- **Skills-based advancement:** tying raises to demonstrated skill rather than tenure alone rewards engaged employees more directly and pushes back against the sense of stagnation so common in these jobs.
- **Stay interviews:** asking current employees, proactively, what would make them leave surfaces fixable problems earlier than an exit interview ever can by definition, the exit interview happens after the decision is already made.

6. Toward an Integrated Retention Framework

None of these four categories does much on its own. A wage increase without any staffing relief just pays people more to stay exhausted. Scheduling reform without buy-in from managers tends to get quietly ignored at the store or unit level.

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The organizations that see real, lasting improvement in retention generally sequence these changes rather than launching all of them at once: stabilize staffing and scheduling first, since that addresses the most acute exhaustion; bring compensation up to a competitive benchmark next; and only then invest in manager training and advancement pathways, which target the cynicism and reduced-accomplishment side of burnout that pay and staffing changes do not reach on their own.

Measurement matters at every stage of that sequence. Organizations that keep an eye on leading indicators overtime hours per employee, how often schedules change after being posted, departures within the first 90 days are in a much better position to step in before burnout turns into a resignation, rather than finding out about the problem months later from a lagging turnover report.

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7. Conclusion

The turnover problem in industries like healthcare, hospitality, retail, and call centers is, at its root, a burnout problem: a structural mismatch between what the job demands and what the organization provides to meet those demands. Framed that way, the fix is less mysterious than it might seem. Retention improves where organizations close that gap directly predictable scheduling, adequate staffing, pay that reflects the effort involved, managers who are trained and supported themselves, and a visible path upward. Organizations that keep treating high turnover as an unavoidable feature of the industry, rather than as a symptom with identifiable and addressable causes, will keep paying the costs laid out in this paper, year after year. The ones willing to invest in structural change, rather than wellness programming as a substitute for it, are the ones with a real shot at turning high-turnover roles into ones people actually stay in.

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AUTHENTICITY OR GREENWASHING:
Evaluating the Strategic Efficiency and Consumer Perception of Corporate Social Responsibility Programs

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Abstract

Corporate social responsibility (CSR) has moved well beyond its roots as a largely philanthropic gesture and is now treated as a core part of how companies manage reputation, engage stakeholders, control risk and build value over the long run. Alongside this shift, the rapid growth of sustainability messaging has raised concern about greenwashing, symbolic CSR and the widening gap between what companies claim and what they actually deliver. This paper looks at how effective CSR programs really are, drawing on the connected ideas of organizational purpose, authenticity, transparency and consumer perception. The approach taken is a structured review of the literature, bringing together peer-reviewed research on CSR authenticity, consumer scepticism, greenwashing and negative stakeholder reactions, together with international guidance on social responsibility. Across this literature, a fairly consistent pattern shows up: CSR tends to generate favourable consumer reactions when initiatives line up with how an organization actually behaves, speak to real stakeholder needs, hold steady over time and rest on evidence that can be checked. Exaggerated claims, cherry-picked disclosure and a mismatch between communication and performance, by contrast, tend to erode trust and credibility. Recent reviews also make clear that scepticism is not a simple rejection of CSR but a broad, multidimensional phenomenon. Building on these findings, the paper proposes an authenticity-based framework that links CSR inputs, organizational alignment, evidence and communication quality to consumer perceptions and strategic outcomes. The recommendations that follow emphasize measurable commitments, transparent reporting, independent assurance, stakeholder participation, balanced disclosure of both progress and limitations, and embedding CSR into core business decisions rather than treating it as a separate activity. The paper concludes that strategic efficacy is better judged by how closely a company's words, actions and verifiable evidence align than by how much CSR communication it puts out.

Keywords

Corporate social responsibility; CSR authenticity; greenwashing; consumer perception; consumer scepticism; sustainability communication; corporate reputation; stakeholder engagement; strategic CSR.

1. Introduction

Corporate social responsibility, broadly speaking, covers the responsibilities organizations take on for the social, environmental and economic consequences of what they do. ISO 26000 offers guidance for organizations on the principles and practices of social responsibility, on engaging stakeholders and on communicating commitments and performance, and it makes clear that responsibility goes beyond simply following the law. The standard remains current following its 2025 review.

CSR has become more strategically important as consumers, employees, investors, regulators and local communities look more closely at corporate conduct and sustainability claims. Yet this growth in CSR communication brings a credibility problem along with it. When a company's messaging paints a rosier sustainability picture than its actual performance supports, stakeholders can read that gap as greenwashing or as CSR that exists mainly for show. A 2025 systematic review of how greenwashing is measured at the firm level found that researchers frequently operationalize greenwashing in terms of selective disclosure and a decoupling between what companies communicate and what they actually do.

Consumer perception matters a great deal here because CSR claims can shape brand credibility, trust, purchase-related judgments and willingness to engage with a company. A review of CSR-related scepticism, drawing on 89 studies published over more than two decades, treats scepticism as a complex outcome with multiple causes and multiple downstream effects. Experimental work points in a similar direction, showing that consumers rely on cues of consistency, distinctiveness and consensus when deciding whether a CSR statement reflects genuine intent or is mostly symbolic.

Newer evidence strengthens the argument for focusing on authenticity rather than on the sheer volume of CSR communication. A 2026 experimental study found that even fairly small gaps between environmental promises and actual activities can lower perceived corporate reputation and credibility, with the damage growing as the gap widens. That same study ties these effects back to perceived authenticity, perceived motives and scepticism. The core managerial question, then, is not simply whether an organization runs CSR programs, but whether those programs are strategically coherent, genuinely implemented and communicated in a way that can be trusted.

2. Objectives of the Study

1. To look at the strategic role CSR programs play in creating value for organizations and their stakeholders.
2. To identify the main factors that shape how consumers judge the authenticity of CSR efforts.
3. To examine how greenwashing, selective disclosure and gaps between communication and performance feed consumer scepticism.

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4. To pull together evidence on how authentic CSR relates to trust, reputation and consumer responses.
5. To develop practical recommendations for designing, measuring and communicating CSR programs more credibly.

3. Materials and Methods

This study takes a qualitative, structured approach to reviewing the literature. The evidence base draws on peer-reviewed academic work covering CSR authenticity, CSR-related consumer scepticism, greenwashing, sustainability communication and negative stakeholder responses. ISO 26000 is also included as an international point of reference for the scope and principles of social responsibility.

The literature was worked through thematically rather than analysed statistically. Six analytical categories guided the review: (1) CSR strategic efficacy, (2) perceived authenticity, (3) consumer scepticism, (4) greenwashing and communication-performance gaps, (5) reputation and trust outcomes, and (6) governance and measurement mechanisms. Particular attention went to recent systematic reviews, since these consolidate findings drawn from larger bodies of research. This review does not attempt to estimate a single causal effect size for CSR; instead, it draws out recurring relationships and the conditions under which they seem to hold.

The resulting conceptual framework treats consumer perception as a process: CSR initiatives and organizational behaviour generate observable cues; consumers interpret those cues for consistency, motive and credibility; and the resulting sense of authenticity or scepticism then shapes outcomes such as trust, reputation and behavioural intentions. This view fits with attribution-based research on how consumers work out whether a given CSR effort is substantive or merely symbolic.

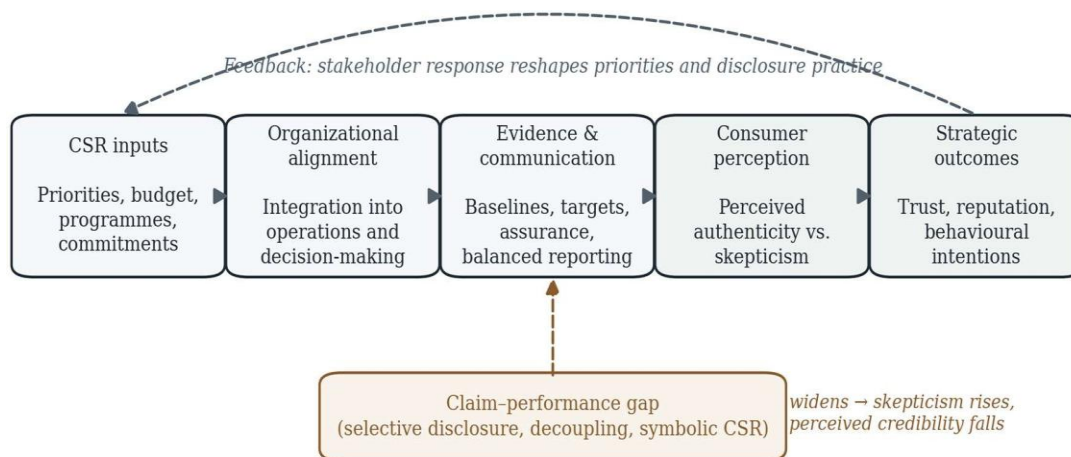


Figure 1. Authenticity-based framework linking CSR inputs, organizational alignment, evidence and communication to consumer perception and strategic outcomes.

4. Results

4.1 Strategic efficacy of CSR

The literature reviewed here suggests CSR works best strategically when it is built into how an organization makes decisions, rather than treated as a standalone promotional effort. ISO 26000 stresses that socially responsible behaviour should run throughout an organization and that stakeholders should be engaged directly. In other words, the strategic value of CSR rests as much on internal processes, policies and relationships as it does on externally visible campaigns.

CSR efficacy is therefore a multidimensional matter. Relevant outcomes span stakeholder trust, organizational reputation, consumer response, employee-related outcomes, reduced risk and a contribution to sustainable development. Nothing in the evidence supports treating CSR as automatically beneficial; outcomes shift depending on how stakeholders interpret the initiative, how credible it is, and how well it fits with the organization's actual conduct.

4.2 Consumer perception and authenticity

Perceived authenticity, from the consumer's side, is the central link between CSR activity and how consumers respond. Experimental work grounded in attribution theory finds that consumers weigh CSR information against cues such as consistency over time, distinctiveness and how comparable organizations behave, and these cues shape whether consumers read corporate motives as genuine or symbolic. Research on CSR content shared through social networking sites points to a similar conclusion: consumers can question authenticity even when CSR messaging is highly visible. A 2022 experiment with 480 Korean undergraduate students looked at perceived CSR authenticity and intentions to participate, and it showed that how CSR attributes are interpreted matters more than simply whether CSR content gets communicated at all.

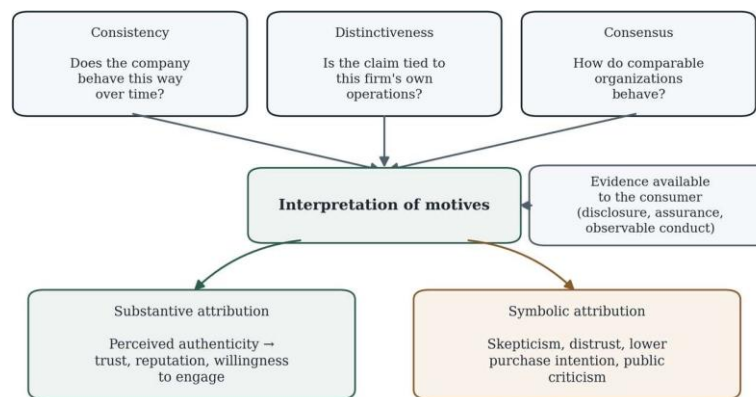


Figure 3. Attribution cues and how consumers form substantive or symbolic judgements about CSR claims.

4.3 Greenwashing and consumer skepticism

Greenwashing can be thought of as a communication-performance problem: sustainability claims create an impression that the organization's actual performance does not adequately back up. A 2025 systematic review of 111 studies found that selective disclosure and decoupling are among the most common ways researchers operationalize greenwashing empirically. That points to a key measurement issue: communication needs to be checked against evidence of actual performance rather than judged on its own terms.

The 2023 review of CSR-related consumer scepticism, which synthesized 89 studies, concluded that scepticism has a wide range of causes and consequences. The overall picture from this literature is that consumers do not simply accept or reject CSR claims outright; they weigh credibility using the information available, the motives they perceive and the surrounding context.

More recent experimental evidence reinforces how much alignment matters. A study published in 2026 found that even minor gaps between environmental promises and actual activities can hurt perceived corporate reputation and credibility, and that this effect gets stronger as the gap widens. Perceived authenticity and perceived motivation emerged as the mechanisms through which such gaps shape stakeholder judgments.

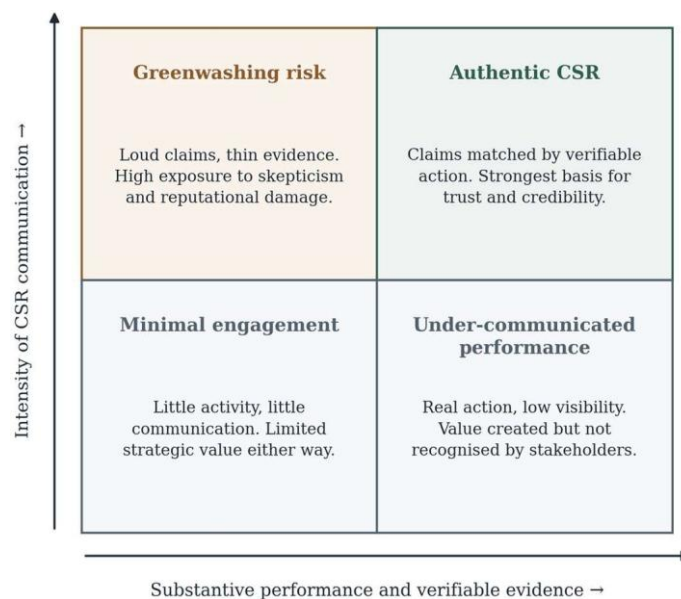


Figure 2. Four CSR positions defined by substantive performance and the intensity of CSR communication.

4.4 Negative responses to CSR

A 2026 systematic review pulling together 76 studies and more than 43,000 participants identified scepticism, distrust, negative perceptions and lower purchase intentions among the documented negative reactions to CSR. The review also noted that most of the evidence base focuses on consumers, while employees, job seekers and communities remain comparatively understudied. This suggests CSR evaluation should not stop at favourable consumer metrics; organizations also need to keep an eye on adverse reactions and stakeholder concerns.

4.5 Consolidated findings

Dimension	What the evidence shows	Strategic implication
Authenticity	Consistency and substantive action make CSR claims more believable.	Build CSR into everyday practice and keep it going over time.
Transparency	Cherry-picked disclosure feeds perceptions of greenwashing.	Report both wins and shortcomings, including unfavourable information.
Alignment	Gaps between what is claimed and what is delivered erode credibility.	Check claims against measurable operational results.
Consumer scepticism	Scepticism responds to motives, context and the information available.	Communicate in a way that is evidence-based, specific and restrained.
Stakeholder outcomes	CSR can trigger both positive and negative reactions.	Track trust, criticism and unintended responses, not just engagement numbers.

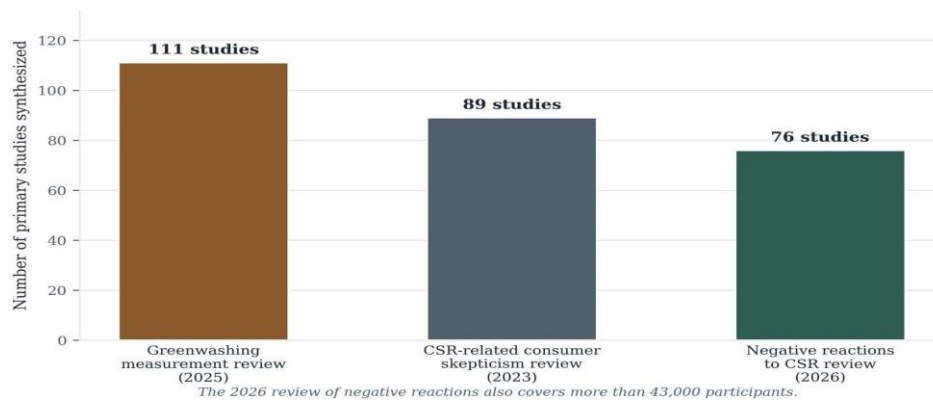


Figure 4. Number of primary studies synthesized by the systematic reviews drawn on in this paper.

5. Discussion

These findings point toward an authenticity-centered view of CSR strategy. How strategically effective a CSR program is cannot simply be read off its budget, the number of campaigns it runs, its social-media engagement or how often sustainability claims get made. Those figures describe activity or communication, not whether CSR is producing credible value for stakeholders while staying consistent with how the organization actually behaves.

Attribution theory helps explain why the same CSR initiative can land very differently with different consumers. An initiative is more likely to be seen as substantive when it holds steady over time, connects clearly to the company's operations and is backed by evidence that can be observed. It is more likely to be read as symbolic when the communication around it is unusually prominent but the operational evidence behind it is thin or inconsistent. That does not mean every high-profile CSR campaign amounts to greenwashing; rather, credibility depends on how claims, context and evidence line up together.

The literature also suggests that transparency is about more than how much a company discloses. Genuinely transparent CSR communication lets stakeholders understand objectives, baselines, methods, progress, limitations and problems that remain unresolved. Communication of that kind reduces ambiguity and gives stakeholders a real basis for checking whether claims match performance.

There is also a measurement challenge emerging from this research agenda. Greenwashing research has produced many indicators, but the 2025 systematic review found that a good number of these measures are still indirect or hypothetical. That means organizations and researchers need to distinguish carefully between a lack of evidence, weak performance and deliberate deception — three quite different situations that should not be treated as the same thing.

6. Recommendations

Align CSR with core strategy: Choose CSR priorities that connect materially to the organization's operations, value chain, stakeholder impacts and long-term goals.

Define measurable commitments: Set baselines, targets, timelines and indicators before communicating any outcomes.

Close the claim-performance gap: Verify internally that sustainability claims match operational evidence before anything goes public.

Use balanced communication: Report achievements alongside limitations, missed targets, uncertainties and corrective steps.

Strengthen independent assurance: Where it matters, bring in credible third-party assurance or verification for environmental and social performance data.

Engage stakeholders early: Involve consumers, employees, communities and relevant experts in setting priorities and assessing outcomes.

Monitor scepticism: Track consumer complaints, critical feedback, trust measures and shifts in perceived authenticity alongside the usual marketing metrics.

Avoid symbolic overreach: Do not let a small initiative stand in as evidence of broad organizational sustainability performance.

Build longitudinal evidence: Evaluate CSR across multiple reporting periods so stakeholders can see consistency and improvement rather than one-off campaigns.

7. Conclusion

CSR can serve as a genuine strategic capability when social and environmental responsibility is built into how an organization operates, backed by measurable performance and communicated with real transparency. The literature reviewed here indicates that authenticity is the critical link between CSR activity and how consumers perceive a company. Consumers increasingly judge organizations not just on what they say but on whether that matches observable actions and credible evidence.

Greenwashing poses a distinct credibility risk because gaps between communication and performance can breed scepticism and weaken perceived reputation and authenticity. The evidence also shows that negative reactions to CSR go beyond accusations of greenwashing stakeholders may also question motives, relevance, effectiveness or fairness. Responsible CSR management therefore calls for ongoing attention to both positive and negative stakeholder responses.

The main implication is that organizations should approach CSR as an evidence-based management responsibility rather than mainly a communications exercise. Strategic efficacy is better judged through alignment, measurable outcomes, stakeholder relevance, transparency and performance sustained over time. Future empirical research should test these relationships across different industries, cultures and stakeholder groups, and should refine methods for telling actual greenwashing apart from incomplete disclosure, weak performance and legitimate shifts in corporate strategy.

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