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MDIM Journal of Management Review and Practice is published by Management Development Institute Murshidabad. The journal started publishing in 2023 in English Language. The journal aims to create and advance knowledge in the field of management sciences and its allied disciplines. High quality research papers, case studies, opinion pieces and book reviews are published in *MDIM Journal of Management Review and Practice*.

Through thought leadership, the journal fosters a knowledge ecosystem that enriches the existing body of knowledge.

MDIM Journal of Management Review and Practice is published twice a year, in March and September. The journal publishes research works that are thought provoking. The most recent developments in the following fields have been covered in recent years. Thought leaders, researchers, academicians as well as corporate professionals publish their scholarly work through this outlet.

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The main features (paper types) of the journal are as follows:

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- Review Articles
- Case Studies
- Book Reviews

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MDIM Journal of Management Review and Practice, a humble initiative of Management Development Institute Murshidabad, strives and fosters to propel research in the arena of business and management sciences by providing evidence-based research papers of highest quality for academicians, researchers, managers and policy makers. The journal endeavors to create influence on corporate and academia think tanks. It aspires to provide a platform for discussions and cross-pollinations of ideas across wide spectrum of scholarly perspectives to garner theoretical, empirical and comparative research on ongoing and probable problems in the business world.

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Addressing Professional Misconduct of the Indian Chartered Accountants

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Rajat Deb¹ 

Abstract

On February 8, 2024, the Supreme Court (SC) upheld Rule 9(3)(b) under the Chartered Accountants' (Procedure of Investigation of Professional and Other Misconduct and Conduct of Cases) Rules, 2007. This Rule empowers the Institute of Chartered Accountants of India (ICAI)'s Disciplinary Committee to re-investigate any professional misconduct complaint against any ICAI member (chartered accountant, in short, CA). The Rule indicates that the Board of Discipline can refer the complaint to the Disciplinary Committee despite the Director (Discipline) absolving the errant member of the alleged professional misconduct complaints. Affirming the Delhi High Court's ruling by dismissing the appellant CA's appeal, the SC upheld section 21A(4) of the Chartered Accountants (Amendment) Act, 2006, and observed that impugned Rule 9(3)(b) is not ultra vires of Section 21A(4). The SC further observed that the intent of the said Rule conforms to the very object and purpose of the *Chapter on "Misconduct"* under the Act of 2006. Against that backdrop, the present study motivates by revisiting the Rule's scope to assess whether it could minimize the CAs' professional misconduct.

Keywords

Chartered accountant, professional misconduct, Disciplinary Committee, Supreme Court

Introduction

The Institute of Chartered Accountants of India (ICAI), the Indian accountancy profession self-regulator, is committed to improving accounting and audit quality (AQ), but corporate India is not uncommonly exposed to accounting scams. The

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Chartered Accountants Act of 1949, as amended in 2022 to fortify the accountability of practicing chartered accountants (CAs) and CA firms, has yet to be notified. However, the ICAI data suggest 368 pending cases of professional misconduct in front of disciplinary bodies. Since its inception in 2007, the disciplinary mechanism has inquired into around 2,650 cases with *prima facie* evidence of violations of professional conduct reported against the erring CAs and CA firms. Data further revealed that in 2,284 cases, CAs were either found guilty or absolved post-hearing. Admittedly, 1,080 errant CAs were found guilty of professional misconduct during the last 17 years, indicating a culpability rate exceeding 40% (Kaushik, 2024). ICAI deals with disciplinary matters in three ways. The Director (Discipline) *prima facie* investigates the complaint and refers it to the second arm, the Board of Discipline. Compliant with the First Schedule of the CA Act of 1949, the Board investigates the allegations of breach of professional conduct of the errant CAs and CA firms and consequently concludes about professional misconduct. On the other hand, the Disciplinary Committee (DC) deals with violation cases falling under the second or both Schedules of the Act. The DC could impose a maximum penalty of a life term ban from practice and a ₹5 lakh penalty on erring CAs for their gross professional misconduct. The Board of Discipline monitors the professional conduct of ICAI members under Section 21A of the Act. Under Section 21A(1)(c) of the Act, the Director (Discipline) discharges the Board's secretarial functions. Section 21A(2) empowers the Board to comply with a summary procedure in addressing the referred complaints. The Board could impose any of the three punishments *vide* Section 21A(3) of the First Schedule against the errant members for their proven professional or other misconduct.

The Director (Discipline) is required to submit all information in their access and complaints to the Board, where they believe there is no *prima facie* case in the complaint, compliant with provisions of Section 21A(4). It further provides that if the Board agrees with the Director (Discipline)'s opinion, it may close the matter, and if it disagrees with the opinion, it may advise the Director (Discipline) to investigate the complaint further. Section 21B(1) to (4) contains a similar scheme to deal with complaints relating to misconduct as prescribed in the Second Schedule of the Act of 1949. Section 29A of the Act is titled "Power of Central Government to Make Rules." Section 29A(1) enables the central government "to make rules to carry out the provisions of this Act." Section 29A(2) sets out the heads for framing rules. Rule 9(3), which is part of Rules 2007, appears to have been made under Section 29A(2)(c). Notably, the power to make rules under Subsection (2) of Section 29A is "without prejudice to the generality of the foregoing power" provided for in Section 29A(1). Rule 9, entitled "Examination of Complaint," and Subclause (1) deal with the procedures for addressing the complaints. The Director (Discipline) followed the procedures stipulated in Subclause (2) after being *prima facie* convinced about the alleged misconduct of the CA. Subclauses (3) to (9) stipulate compliance with the procedures referred to in Subclause (2) of Rule 9. Subclause (3) provides that the Board could close the complaint *vide* Rule 9(3)(a) by affirming the opinion of the Director (Discipline). If the Board disagrees with the Director (Discipline)'s *prima facie* opinion, it could proceed with Chapter IV of the Rules, 2007, if the matter pertains to the

First Schedule, or it may advise the Director to investigate the matter further. Similarly, the Board could refer the matter to the DC for action under Chapter V if it pertains to the Second Schedule or advise the Director (Discipline) to conduct further investigation.

The Act of 1949 governs the Indian accountancy profession. The Chapter on “Misconduct” in the Act is crucial in maintaining the profession’s ethical standards, setting ethical guidelines, preventing actions that may compromise public interests, ensuring accountability among CAs, and preserving the profession’s reputation. The chapter’s scope encompasses upholding honesty and integrity and preventing professional misconduct by practicing CAs. It sets a framework for accountability, reinforces the credibility of the CAs, and is committed to maintaining the profession’s reputation. The Act includes a disciplinary mechanism to achieve these goals, ensuring a fair and transparent process for investigating and adjudicating alleged misconduct cases. The power exercised by the Council of the ICAI under Section 21 is quasi-judicial, and the Supreme Court (SC) (*Institute of Chartered Accountants of India v. L. K. Ratna*, 1986) considered the duties of the Council. Moreover, the SC ruled that the DC is a fact-finding body subordinate to the Council as a fact-finding authority (*Institute of Chartered Accountants of India v. Price Waterhouse*, 1997). Upholding Rule 9(3)(b) of the Rules, 2007, which is not in ultra vires Section 21A(4) of the Act, the SC (*Naresh Chandra Agrawal v. Institute of Chartered Accountants of India*, 2024) observed that the Director (Discipline), who functions as a secretary to the Board of Discipline compliant with Section 21A(2), will have more extraordinary powers than the Board itself. The Director’s “prima facie” opinion will become nothing but a final opinion if the Board cannot direct the Director (Discipline) to investigate the matter further. The Apex Court judgment will likely open a new vista for regulating erring CAs, and the accounting profession could achieve new heights. Eliminating accounting misconduct from corporate India is a herculean task. However, proactive steps initiated in the past few years by the National Financial Reporting Authority of India (NFRA), the regulator of the auditing profession, could bring significant improvements in the accounting and auditing profession. Apart from the steps initiated by the ICAI that were compliant with the disciplinary mechanism for accounting failures, NFRA initiates steps for audit failures, such as not complying with standards on auditing (SA). Against the backdrop of this SC judgment, the present study assesses the entire gamut of addressing accounting misconduct perpetrated by the CA and CA firms.

Theoretical Issues

Fraud, scams, corruption, and audit failure significantly impact accounting actors. Accounting literature indicates that the “Big Four” accountancy firms render services to manage corporate fraud risk and corruption (Slager, 2017). Accounting academics exclusively addressed the role of auditors in fraud and corruption prevention (Paterson et al., 2019), but debate remains. Theoretically, the auditor’s primary role is to ensure the “true and fairness” of the audited financial statement

(FS) and the auditee's going concern ability based on historical information (Humphrey et al., 2021). However, the auditing literature also documents controversy (D'Andreanmatteo et al., 2024). The auditor's role in fraud prevention is unlikely; we expect the audit expectations gap (AEG) or disconnect between "what the public believes auditors' responsibilities to be and what auditors believe their responsibilities are" (Hassink et al., 2009). The *AEG theory* suggests that users of the FSs expect auditors to provide assurances about material fraud, irregularities, and going concern propositions. However, auditors provide "reasonable assurance" regarding the FSs and whether they are free from material misstatements (MMs). As auditors presume themselves to be protective shields of auditees (Roussy, 2013), the general public and management are concerned about the definition of corruption and fraud. Although the accounting-based definitions of those terms are self-explanatory, they suffer from many inherent limitations (Paterson et al., 2019), which could trigger the present AEG (Humphrey et al., 2021). Moreover, the accounting literature reports apprehensions regarding meeting the accountancy profession's societal norms and objectives, as strict legal compliance with rule-based standards could impede those objectives (Everett et al., 2018).

There is growing interest in the auditing literature, which sheds light on different insights into the auditor's role in corruption and fraud prevention. First, the auditor no longer acts as a "watchdog" but instead acts as a trusted advisor and management team member (Dermarkar & Hazgui, 2022). However, this raises a severe concern about audit independence (AI) and AQ. Second, the audit practice is unstable and changes its meaning (Sikka et al., 1998). In recent times, auditors have assumed themselves as trusted management advisors but could somersault the earlier stand of "watchdog" for maintaining AI and improving AQ. Third, the nature of audits significantly changes over time (Brown, 2020). However, despite the remarkable change in ambiguous objectives, scope, and consequences (Bottausci & Robson, 2023), audit enjoys a constitutive power, which could change the shape of the accounting field and make those auditable (Power, 1997). Consequently, the audit objective focuses on fraud and corruption prevention rather than fraud detection (Reichborn-Kjennerud et al., 2019). Fourth, a reasonable AEG exists between the auditor and auditee regarding fraud prevention and detection (Porter, 1993). The AEG increases in fraud prevention and detection as nonaudit people expect fraud detection to be an audit objective, which sharply differs from the auditor's objective (Hassink et al., 2009). Finally, the audit profession, in two ways, responds to the AEG: first, in a defensive manner, that is, by better educating the public about their expectations on audit; and second, in a constructive manner, that is, through regulatory changes and conducting extensive audit works and expanding reporting and communication significantly (Deepal & Jayamaha, 2022).

Related theories also address the role of auditors in fraud and corruption prevention. The *policeman theory* posits that auditors are entrusted with the responsibility of detecting and preventing fraud. Auditee typically hires audit service at the least cost, and changes in audit fees lead to auditor turnover (DeFond, 1992). The literature reports that audit delays foment auditor resignations (Mande & Son, 2011) and higher audit fees likely signal to financiers about higher AQ of the FS

(Alrashidi et al., 2021). The *credibility theory* indicates that auditors significantly improve the credibility of the audited FS and firms' decisions. A stock market positive response indicates those developments, while a negative response indicates an auditor's resignation (Choi et al., 2019). The *theory of normal organizational wrongdoing* (Palmer & Maher, 2006) suggests that organizational corruption and misdeeds are common phenomena unlikely to be motivated from social contexts. The *economic theory* (Klein & Leffler, 1981) posits that auditors urge improvement in AQ due to the threat of reputation loss in accounting scams and audit failures. The *agency theory* posits that stringent internal and ownership monitoring could mitigate accounting fraud (Jensen & Meckling, 1976). Asymmetric information leads to acute conflict between managers and owners. However, it is manageable through robust corporate governance (CG) mechanisms. The research concludes that a robust CG mechanism will likely prevent corporate fraud (Deb, 2021). The *skeptical trait theory* is one way to understand and assess auditors' fraud planning judgments (Quadackers et al., 2014); however, little research exists.

Professional Misconduct and Audit Failures

An entity's stakeholders, including minority investors, expect the highest professional and ethical conduct from the practicing CAs appointed as statutory auditors. However, in many instances, the stakeholders are debased as the statutory auditors miserably fail to discharge their professional duties, leading to fraudulent financial reporting and, eventually, audit failures. Corporate India consistently witnesses those exposed scams and fiascos across industries. Theoretically, the audit serves a dual role, that is, deterrence (anti-fraud fabric) and detection. The fraud perpetrators assess the robustness of the audit in detecting the fraud, as an effective audit could detect the fraud. Admittedly, detecting and preventing fraud and errors is the secondary objective of the audit, as indicated in SA 240 (Revised). However, fraud detection becomes the auditor's primary role when FSs indicate materially misstated.

Critical analysis of multiple audit failures suggests that the errant auditors mostly failed to apply professional skepticism (PS), that is, a questioning mind and attitude, in critically judging the audit evidence before concluding. Although auditors significantly rely on analytical procedures (APs) in assessing risk and detailed substantive tests to detect fraud and misstatements, audit failures indicate a lack of appropriate applications of APs. It consequently catalyzes decorating AQ, that is, the auditors' probability of discovering and reporting any breach in the auditee's accounting system. Moreover, the poor AQ further leads to the expansion of the AEG. As the audit combines science (application of SA) and art (the auditors' ability to smell the red flag but not like a bloodhound), the audit profession's stakeholders expect the highest standard of PS from the auditors. Moreover, in detecting frauds and materially misstated FSs, the auditors will likely apply AP rigorously. Unfortunately, audit failures vividly indicate auditors' professional misconduct and lack of PS and AP in audit assignments.

The infamous instances of CAs' professional misconduct and resultant financial shenanigans and audit failures are not uncommon and new in corporate India. The exposure of the Satyam Computer scam in 2009, tuning to ₹8,373 crore, indicates the application of aggressive accounting techniques such as exaggerating revenues, understating liabilities, bogus and inflated profits, and overstating assets by its promoter, Mr. Ramalinga Raju, who was hand in glove with the key managerial personnel (KMP). Price Waterhouse (PwC) India, the Indian audit partner firm of PwC, a so-called "Big 4" audit firm, failed to detect and prevent the audit failure. The lengthy investigation indicates not only CG failures but also audit failures and errant auditors found guilty of professional misconduct. The exposure of scams did not rest in peace. Instead, they were perpetual. The IL&FS scandal's exposure in 2018 pointed out a significant audit failure of another "Big 4" audit firm, Deloitte, as it failed to detect and prevent the auditee's debt obligation defaults and liquidity crunch. The Serious Fraud Investigation Office (SFIO), an investigating wing, concluded that the auditors and credit rating agencies significantly contributed to the IL&FS failure.

The scams were unlikely confined to the nonfinancial sector; they stuck to the financial sector, as evidenced by the biggest-ever banking fraud exposed in 2018, perpetrated by Nirav Modi and his uncle Mehul Choksi in connivance with a few corrupt officials of the Punjab National Bank (PNB), Brady House branch of Mumbai, tuning to around ₹13,000 crores. Although *prima facie*, the investigation reports an ill nexus between the perpetrators and bank officials, it predominantly occurred due to the internal control system's collapse and the internal audit's failure, the third line of defense. However, the statutory auditor also failed to thoroughly understand the client's business models and related risks, which could have led to a debacle. Consequently, eight auditors face ICAI's disciplinary proceedings for their alleged professional misconduct. An audit failure by an affiliate of another "Big 4" audit firm, KPMG network affiliate BSR & Co., was exposed, indicating the alleged diversion of ₹3,535 crore from seven subsidiary companies of Coffee Day Enterprises to Mysore Amalgamated Coffee Estate (MACEL) in 2019. NFRA subsequently, in 2024, imposed a hefty penalty and debarment from practice on two errant statutory auditors for their professional misconduct.

The Indian financial system was again jolted by the shocking news of putting YES Bank, the fourth largest Indian private bank, under a moratorium on March 5, 2020, by the central government. Investigation revealed that the former CEO, Mr. Rana Kapoor, allegedly extended loans in *quid pro quo* nonarrangement to the companies confronting financial turmoil (Deb, 2021). The statutory auditors and AC failed to detect, which led to the fiasco. The bank's statutory auditor is BSR & Co. LLP Chartered Accountants, an affiliate of KPMG, one of the so-called "Big 4" audit firms, who are facing an investigation for their failure in detecting and preventing misdeeds. Moreover, the auditor's opinions on the status of the bank's going concern since 2017–2018 are also under the scanner.

In mid-June 2025, NFRA sought files since 2017 and served notices to the past and current auditors of IndusInd Bank Ltd. (IBL), a private bank, concerning alleged *derivatives irregularities*. The suspected accounting manipulation was allegedly perpetrated by senior bank officials, either by overstating the bank's

bottom line or suppressing losses, aligning with exchange rate movements. The statutory auditors' role is under scanner, and the probabilities of grave professional misconduct are unlikely to be refuted. The current auditor, MSKA & Associates, a member of the global advisory network BDO, and past auditors' roles are under NFRA's scanner for the exposed irregularities. The audit files could also include the Memorandum of Changes (MoCs), vital documents used to record and communicate material changes or misstatements found in FSs. NFRA will likely investigate whether auditors applied PS to the bank's other assets, predominantly used for internally hedging transactions concerning derivative price manipulations (Ghosh, 2025).

Disciplinary Mechanism and Judicial Intervention

The Act of 1949 and the Regulations framed thereunder constitute a holistic code guiding the handling of CAs' misconduct. The Council of ICAI frames the Regulations under the powers conferred under Section 30 of the Act. Section 9 empowers the Council to manage ICAI's affairs and discharge functions delegated to it in compliance with the Act of 1949. Section 15(2)(1) confers powers on the Council to take disciplinary actions against the CAs. Section 22 defines professional misconduct, and Section 21 deals with procedures for professional or other misconduct. Section 21 covers the required procedures while investigating all classes of misconduct, be it professional or otherwise. Section 21 of the Act incorporates different functionaries, viz., DC, the Council, and, in some instances, the High Court (HC). However, the Council acts as the governing body of ICAI. After acknowledging the alleged complaint of CA's misconduct and considering the prima facie observation of the Director (Discipline), if it finds substance, it refers the complaint to the DC. The DC becomes quasi-judicial, plays a subordinate role, and, after the inquiry, submits a report to the Council, the governing body. Notably, the DC, as a committee of ICAI, enjoys a specific function within the scope of the Act. The report contains a statement of the allegations, a defense of the CA, a record of the evidence, and conclusions drawn based on that material. Conclusion refers to DC's conclusion instead of findings, as DC has no locus under the Act to render findings. Sections 21(2) and (3) empower the Council to decide whether the CA is guilty of misconduct. Complaint to Section 21(2), the Council, based on DC's report, if it finds the CA is not guilty of misconduct, could record the finding and direct for dismissing the complaint. On the other hand, as per Section 21(3), if the Council finds the CA is guilty of misconduct, it records the findings of the DC and proceeds as stipulated in subsequent subsections. Again, under Regulation 12(11) (i), the Council is unlikely to record its opinion supported by reasons. The Council's recorded opinion could differ from a reasoned decision as understandable in administrative law. However, if the Council's opinion is challenged, it is bound to disclose the reasons supporting it to the Court for review.

Judicial intervention in the DC's findings against erring CAs indicates mixed outcomes. In one such case, the SC observed that the Council failed to provide independent findings, and independent reasons did not support its recommendations,

leading to quashing and canceling the imposed punishment (*D. K. Agrawal v. Council of Institute of Chartered Accountants of India*, 2021). Notably, the SC ruled that when the Council concludes a breach of professional misconduct by any errant member, the Council, under the Act, should refer the matter to the HC with a recommendation for the latter's adjudication. The HC can pass a final order dismissing the complaint or penalizing the errant CA. The aggrieved member can also appeal before the HC to assail the Council's order to impose a penalty. In the circumstances, the recommendation/order of the Council must contain reasons for the conclusion. The Delhi HC, while upholding the Council's power under the existing Act and Rules, observes that ICAI can take action against firms or individual CAs—if a CA cannot be held responsible, ICAI can proceed against the firm as a whole. The HC further observes the need to strengthen disciplinary mechanisms against CA firms and implement the Amendment Act of 2022 as soon as possible (*Harinderjit Singh v. Disciplinary Committee Bench-III, Institute of Chartered Accountants of India*, 2024). The ICAI before the Delhi HC relied on the SC judgment (*S. Sukumar v. Secretary, Institute of Chartered Accountants of India*, 2018), which held that the PwC group of firms had violated the provisions of the Act. However, earlier, the SC upheld the findings of the HC, which dismissed the DC's recommendation against a CA for his alleged professional misconduct and reprimanded him on the ground of lapses in the DC's findings (*Institute of Chartered Accountants of India v. M. S. Rathi*, 2017). The SC also held that the Council is competent to hold an inquiry only where the Council is satisfied prima facie that the facts alleged against the CA, if proved, would justify the exercise of disciplinary jurisdiction against him. The ratio of this judgment is that if the allegation leveled against the CA, if proven, would amount to misconduct on his part, then the Council undoubtedly has legal competence to initiate disciplinary action (*Institute of Chartered Accountants v. P. K. Mukherjee*, 1957). The same ratio was followed in subsequent judgments by different HCs (*C. Krishna Babu v. Institute of Chartered Accountants of India*, 2000).

Scrutiny of SC and different HC judgments indicates inconsistent definitions of professional negligence regarding auditors' liability (Ram Mohan & Raj, 2020). An auditor's professional negligence without mens rea (criminal intention or evil mind) would be gross negligence (*Institute of Chartered Accountants of India v. Mukesh Gang*, 2016), sharply contrasting the SC ruling about medical and legal professions (*Dr. Suresh Gupta v. NCT of Delhi*, 2004; *Jacob Mathew v. State of Punjab*, 2006; *T. A. Kathiru v. Jacob Mathai*, 2017). The terms "negligence" and "gross negligence" significantly differ in the medical and legal professions; however, for the audit profession, no such difference is indicated by the Apex Court. The SC ruled that the presence of moral turpitude (anything done opposed to justice, honesty, and good morals) and professional negligence was necessary to punish the errant professionals (*Jacob Mathew v. State of Punjab*, 2006; *Sushil Kumar Singhal v. Regional Manager, Punjab National Bank*, 2010; *T. A. Kathiru v. Jacob Mathai*, 2017). The Bombay HC stepped in to settle the conflict between the overlapping power of the capital market regulator, the Securities and Exchange Board of India (SEBI), and ICAI in debarment of an auditor from practice and affirmed the latter as the authority of issuance for such debarment (*Price Waterhouse v. SEBI*, 2010). The Calcutta HC ruled that there must be mens rea in

the auditor's modus operandi and inefficiency to hold him liable for gross negligence (*Institute of Chartered Accountants of India v. Somnath Basu*, 2006). Per contra, Madras HC observed that an auditor is grossly negligent if he admits to dependence on management, even without the presence of mens rea (*Registrar of Companies v. P. Arunajatai*, 1963; *Superintendent of Police v. R. Rajamany*, 1961). Following the Madras HC ruling, the Himachal Pradesh HC reduced the punishment for errant auditors found to be grossly negligent (*Punjab State Government v. K. N. Chandla*, 1972). Affirming the Bombay HC order, the SC stayed the National Company Law Tribunal (NCLT)'s order, debarring IL&FS auditors from practice for 5 years, as the auditor had already stepped down on the date of passing that impugned order (*Union of India v. Deloitte Haskins and Sells LLP*, 2023). However, the SC held that the subsequent resignation of an auditor does not lead to the quashing of proceedings under Section 140(5) of the Companies Act of 2013 and that Subsection (5) neither violates Articles 14 nor 19(1) of the Indian Constitution. Again, the Calcutta HC reprimanded an auditor who was held guilty of negligence due to a lack of turpitude (*S. Ganesan v. A. K. Joscelyne*, 1957). Interestingly, in another case, the same HC debarred an errant auditor from practice for 2 years (*Deputy Secretary, Government of India v. S. N. Das Gupta*, 1956).

The Impact

In May 2024, the ICAI indicated disciplinary actions initiated against different multinational accounting firms (MAFs) for violations of the code of conduct pursuant to the SC's ruling (*S. Sukumar v. Secretary, Institute of Chartered Accountants of India*, 2018) (Srivats, 2024a). The SC ruling paved the way for MAFs aligning with domestic accounting firms to be covered by the CA Act of 1949 and the Rules made thereunder. Consequently, ICAI passed orders against one of the "Big 4" accountancy firms, EY's three Indian affiliates, and imposed hefty penalties for professional misconduct. However, the Delhi HC subsequently passed an interim order to stay ICAI's impugned order (Srivats, 2024b). Again, the Delhi HC's ruling permits ICAI's DC to take action against an entire audit firm even when no individual can be held responsible for the allegations in a complaint, further fortifying the ICAI's commitment to adherence to high professional conduct (*Harinderjit Singh v. Disciplinary Committee Bench-III, Institute of Chartered Accountants of India*, 2024). Admittedly, PwC Indian affiliates of Satyam Computers claimed they could not detect any suspicious activities due to negligence and challenged ICAI's action against the entire firm. Amendments introduced in 2022 to the CA Act also brought audit firms along with errant auditors for professional misconduct under the discipline mechanism. However, the Ministry of Corporate Affairs (MCA) has yet to notify it. Noting that CAs are like "gatekeepers" of the Indian financial system, the Court underscored the need for a proper mechanism to prevent misconduct and preserve the profession's robustness and integrity. Furthermore, the Court directed the MCA to notify the amended Act expeditiously. The SC's landmark judgment of 2018 directed forming a three-member Committee of Experts to examine the possibility of building a statutory

framework for enforcing Sections 25 and 29 of the 1949 Act and the statutory Code of Conduct for the CAs. It envisages revisiting the scope of the appropriateness of the disciplinary framework and regulating the MAFs at par with the Indian Chartered Accountancy Firms regarding breach of professional conduct under the said Act (*S. Sukumar v. Secretary, Institute of Chartered Accountants of India*, 2018).

A review of the catena of judgments of the SC and HCs concludes the word “misconduct” indicates a transgression of some established and definite rule of action; it could be a moral turpitude. It must be improper or wrong, unlawful, willful, forbidden, or transgression. Again, auditors are expected not to be involved in any conflict of interest, as strictly debarred and reiterated by the SC (*Board of Control for Cricket in India v. Cricket Association of Bihar*, 2015). Most of the judgments indicate that statutory auditors’ mere breach of contracts without ill motives is unlikely to be referred to as mens rea. Again, mere allegations without any financial loss caused by the alleged negligence of the accused are legally unsustainable (*Hari Sao v. State of Bihar*, 1969; *Mohd. Ibrahim v. State of Bihar*, 2009). Admittedly, the onus lies on the defendant-litigant that he discharged his duty with a complaint with the law, honesty, and utmost integrity (*N. V. Subbarao v. State*, 2013; *Vinayak Narayan Deosthali v. Central Bureau of Investigation*, 2015). The SC rulings opened a debate on the mass resignations of statutory auditors and corporates exposed to accounting scams, such as the Yes Bank and IL&FS, which held the auditors responsible without proving their mens rea. Moral turpitude also has its uses in societal parlance, indicating any conduct that is inherently base, vile, depraved, or connected to depravity (*Neera Yadav v. Central Bureau of Investigation*, 2017). DC and judiciary require a careful analysis of the allegations labeled against the errant auditors before initiating disciplinary proceedings for professional misconduct leading to accounting shenanigans.

The socio-economic consequences of fraud are enormous and adversely affect stakeholders (Hulme *et al.*, 2021). With multiple accounting and audit failures, the global financial crisis of 2008 raised a severe concern about auditors’ modus operandi of audit in general and firm-specific key audit matters (KAMs) and critical audit matters (CAMs) specifically (Dunne *et al.*, 2023). Research documents the importance of reporting KAMs in audit reports, for example, lean interest to invest by experienced investors (Christensen *et al.*, 2014), coupled with abysmal confidence in books of accounts (Kachelmeier *et al.*, 2020). On the other hand, analysts could assess a firm’s critical financials if an audit report discloses CAMs and stakeholders dedicate more time to auditors’ risk disclosures (Sirois *et al.*, 2018). Audit literature documents different factors leading to auditor litigations, such as reporting of fraudulent revenues, fictitious transactions, and restated core accounting items (Palmrose *et al.*, 2004). Although the auditor’s opinion on going concern is a shield in the absence of mens rea (Kaplan & Williams, 2013), “corporate recidivism” is more culpable of having a significant negative impact on society, the firm’s goodwill, and the image of accounting professionals (Wang *et al.*, 2023). Nevertheless, errant auditors are unlikely to take any lessons from history, as evidenced by the Indian corporate scams, such as IL&FS and Yes Bank vis-à-vis the Satyam debacle. Moreover, research paints a conflicting conclusion

(Lennox & Li, 2020) against the popular myth of auditors' responsibility for accounting failures (Saad & Lesage, 2009). However, despite the exposure of corporate financial gimmicks and fraud, auditors often fail to detect those (Nallareddy & Ogneva, 2017). Admittedly, auditors' ethical lapses adversely impact the detection of FS frauds and MMs (Arirail & Crumbley, 2019).

Role of NFRA

The collapse of Enron in the USA brings a global consensus regarding fundamental reform in the accounting and auditing profession to regulate self-regulating organizations (SROs) such as the ICAI (Sridharan, 2020). The NFRA came into existence vide Section 132(1) of the Companies Act of 2013, under the recommendation of the report of the Standing Committee on Finance. However, the government established it on October 1, 2018, after the SC's judicial intervention. It monitors enforcing the SA, ensuring high AQ, greater AI, functions of audit firms, and enhancing stakeholders' confidence in FS and disclosure. It has wide-ranging powers, including investigating CAs and their firms, listed and large unlisted companies, and any entity involving a substantial amount of public interest as notified by the central government. Admittedly, the need for establishing an NFRA to monitor the audit profession continues despite the presence of the accountancy profession regulator, ICAI. In 2016, the Companies Law Committee recommended the Companies Act of 2013 for the constitution of NFRA despite ICAI's objection. Considering many infamous audit failures and learning lessons from global experience, the Committee noted that auditors perform a crucial role and that an independent regulator must monitor the audit profession. Consequently, the insertion of restrictions on auditors rendering nonaudit services (NASSs) in the Companies Act of 2013 is an appropriate step toward improving AQ and AI. Audit literature affirms the increasing acceptance of independent audit regulators for fortifying investors' confidence, improving corporate reporting practices and disclosure, transparency, and accountability to the auditing profession (Simnett & Smith, 2005). However, auditors and auditees are subject to investigation by multiple regulators (Juric et al., 2018), including in India. The ICAI's objections are unlikely tenable, as it has dual roles: regulating CAs, imposing disciplinary actions for professional negligence, and promoting the accountancy profession at a competing level at par with other professions. ICAI's continued opposition to forming the NFRA has deferred critical reform in the audit profession (Deb, 2024a). However, comprehensively addressing teething problems, NFRA is discharging its critical role as the regulator of the audit profession.

The critical role of NFRA against the backdrops of the debacles perpetrated by the IL&FS, Jaiprakash Associates, Yes Bank, and PNB is significant. In recent years, NFRA has played a vibrant role in improving AQ and maintaining the integrity of the audit profession by initiating punitive actions such as imposing penalties and debarring errant auditors from practice. On October 10, 2024, it imposed a ₹2 crore fine on an audit firm and ₹10 lakhs and ₹5 lakhs each on two errant auditors for professional misconduct, along with a ban of 10 years and 5

years, respectively, for accepting internal or statutory audit assignments. The Committee of Experts, constituted as per the ruling of the SC, recommends the vested power of NFRA for imposing civil liability and pecuniary penalties on the Indian audit firms that work in partnership/networking with the MAFs for any audit failure if they adopt faulty audit methodologies. However, ICAI argues that its Disciplinary Directorate is empowered to investigate the CAs guilty of professional misconduct under Clause (7) of Part I of the Second Schedule read with Sections 21 and 22 of the Act of 1949 (Deb, 2024a). US evidence indicates that punitive actions against errant auditors for professional misconduct are imposed (Westermann et al., 2019), and auditors have preferred those actions (Ege et al., 2020). NFRA is empowered to take punitive actions for professional misconduct, but ICAI's objections about the former's scope and modus operandi create severe repercussions among the auditors. The literature concedes the immense benefits of regulating statutory auditors, which significantly increases public interest in corporate reporting practices (Baker et al., 2014). In the past few years, Indian auditors have stepped down from audit assignments that are unlikely to be related to NFRA's punitive actions against errant auditors (Upadhyay & Sultana, 2018). Moreover, the SC's ruling upholding Section 140(5) of the Companies Act of 2013 paved the way for the continuation of proceedings against the errant auditors even after their resignations, likely to improve the AQ and AI substantially (Deb, 2024b).

The Way Forward

The present study attempts to assess the changing scenario of Indian accounting professionals after upholding Rule 9(3)(b) under the Chartered Accountants' (Procedure of Investigation of Professional and Other Misconduct and Conduct of Cases) Rules, 2007, which allows the Board of Discipline to refer a complaint for misconduct to the DC despite the Director (Discipline)'s opinion that the person/firm accused of misconduct is not guilty and to advise the Director to investigate further. This study is likely the pioneer after the SC judgment.³ It assesses its impact on the accountancy profession, specifically the auditing profession, particularly how auditors could exert more significant efforts in fraud prevention and shun perpetrating professional misconduct. It critically discusses different judicial pronouncements about professional misconduct and the role of NFRA in punishing errant auditors. It carefully reviewed the literature and controversies between ICAI and NFRA regarding regulating the auditing profession. Albeit since its inception, NFRA has attempted to regulate the auditing profession and impose punitive steps for professional misconduct, the role of DC of the Council of ICAI is unlikely to be dispensed with, as affirmed by the SC. Critical fraud analysis sometimes suggests that different regulators, such as the RBI and SEBI, have imposed severe punishments on errant auditors. However, they have qualified audit reports and complaints with the SA 260 "Communication with those charged with Governance," on a real-time basis, they have rightly communicated to the management, indicating material weaknesses in the internal control system

identified during the audit. Consequently, the auditors become scapegoats and pay a considerable price for reputation loss and hefty fines, with a ban on the practice.

The study contributes literature related to the underlying theoretical framework. It would contribute to the *AEG theory* as the SC judgment³ upholding the complaint to the DC would likely minimize MMs and auditors' professional misconduct. The auditors could apply enhanced PS in discharging the statutory audit function, which could substantially improve AQ and AI. It would align with the *policeman theory* as the auditors, after the said judgment, would be proactively motivated to achieve the secondary audit objective, that is, their responsibility for identifying and reporting fraud and error [SA 240 (Revised)]. The auditors are likely to exert their best effort to improve AQ, which could substantially increase stakeholders' credibility in the audited FS, affirming the credibility theory. The Apex Court judgment could caution auditors about maintaining the highest degree of professional integrity, which is likely to minimize audit failures and instances of professional misconduct. The improved AQ could affirm the *economic theory*. Theoretically, auditors are the gatekeepers of the stakeholders, preventing accounting shenanigans and fraud. However, practically, it is difficult for statutory auditors to detect fraud perpetrated by management since the primary objective of the audit is to express an opinion as to the truthfulness and fairness of FS (SA 200). Nevertheless, reasonable assurance of the truth and fairness of the FS instills public confidence in the audited FS. Admittedly, detecting and preventing fraud and error is the secondary audit objective (SA 200). Infamous corporate debacles raised severe questions about the statutory audit function, particularly postjudicial interventions. Audit failures lead to a few corporate fiascos, for example, Satyam, IL&FS, PNB, and Café Coffee Day. The research concludes that audit failures could be due to the statutory auditor's professional negligence or faulty applied audit techniques.

Critics argue that liticaphobia likely compelled the auditors' mass resignations in the past few years, which was probably refuted by SC (*Union of India v. Deloitte Haskins and Sells LLP*, 2023) upholding Section 140(5) of the Companies Act of 2013. Similarly, the Apex Court ruling suggests that the auditors (CAs) could not absolve themselves from their professional duties if they smelled a red flag in the auditee's FS but failed to prevent it due to professional negligence. The auditors are likely to face disciplinary proceedings as DC could impose penalties, as affirmed by the SC ruling (*Naresh Chandra Agrawal v. Institute of Chartered Accountants of India*, 2024). However, the tug-of-war between the NFRA and ICAI will likely intensify further regarding the former's issuing of a Consultation Paper on revising the Auditing Standard (SA 600, Using the Work of Another Auditor). NFRA argues that many audit firms and auditors fail to understand their legal responsibilities and erroneously apply SA 600 due to auditors' gross negligence and lack of due diligence, leading to adverse impacts on public interests (Srivats, 2024c).

Professional misconduct, the central theme of the present qualitative study, is linked with the definition of AQ proposed by DeAngelo (1981), that is, the probability of an auditor discovering and reporting any breach in the auditee's

accounting system. Experience indicates that investigating many infamous scams and accounting gimmicks perpetrated due to auditors' lack of applying PS eventually leads to audit failures. However, NFRA's moot objective in past years indicates its commitment to improving the AQ. The draft Revised SA 600 is a bold step in that direction, which puts the onus on the principal/lead auditor in group audits to audit consolidated FSs. However, ICAI's apprehension about AI of small audit firms needs adequate addressing. Ideally, the principal and component auditor should be jointly responsible for improving AQ and preventing audit failures. The latter should be responsible for nonreporting KAMs or CAMs, while the former should not force the latter to report those. The final version is likely to incorporate the provision for improving the AQ. Setting aside the controversy related to the Standards on Quality Management (SQM) issued by ICAI, the SRO of the Indian accountancy profession, which are not treated as SA by NFRA; ICAI, NFRA, and MCA should treat them as measures to improve the AQ. SQM 1 will cover a CA firm's responsibilities to design, implement, and operate a system of quality management for audits or reviews of FSs, and SQM 2 will address the appointment and eligibility of the engagement quality reviewer and review process. Those would likely significantly improve the AQ, AI, and accountancy professions in general and, more specifically, the audit profession.

The SC ruling could open a new vista of research in the Indian accounting profession, particularly audit research. The CAs could not further plead that the Director (Discipline) absolved themselves from the alleged professional misconduct, and the DC could not initiate an investigation. CAs (auditors) are unlikely to defend by justifying that they were not in unholy nexus with the perpetrator management in exposed accounting gimmicks and audit failures. Instead, they should prove they applied utmost professional conduct in discharging statutory audit functions. The SC ruling could motivate the CAs to revisit their *modus operandi* and apply appropriate audit techniques during the audit to avoid audit failure in general and prevent themselves from punitive action. The verdict could substantially increase stakeholders' confidence and trust in audited FS, specifically the gullible retail investors such as the investors of Satyam Computers, IL&FS, Yes Bank, PNB, IBL, and others. The study further sheds light on how the SC affirms the quasi-judicial role of the Council of ICAI in regulating the Indian accountancy profession. Apart from the statutory auditors, the internal auditors, the pivotal pillar of the internal control system, could take a lesson from the ruling in revisiting their audit plans and strategies to prevent fraud and errors. They could chalk audit plans with a zero-tolerance policy against fraud and errors. Like their external counterparts, as they could also be held responsible for professional misconduct, they are likely to exert the highest professional commitment. The ruling could lead to building a robust CG system for corporate India in the near future. Apart from auditors, other stakeholders could use the current study report to assess the auditors' statutory role in improving AQ and curbing fraud and accounting shenanigans.

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References

- Alrashidi, R., Baboukardos, D., & Arun, T. (2021). Audit fees, non-audit fees and access to finance: Evidence from India. *Journal of International Accounting, Auditing and Taxation*, 43, 100397.
- Arirail, D., & Crumbley, L. (2019). PwC and the colonial bank fraud: A perfect storm. *Journal of Forensic and Investigative Accounting*, 11(3), 440–458.
- Baker, C. R., Bédard, J., & Pradt Hauret, C. (2014). The regulation of statutory auditing: An institutional theory approach. *Managerial Auditing Journal*, 29(5), 371–394.
- Board of Control for Cricket in India v. Cricket Association of Bihar*, (2015) 3 SCC 251.
- Bottausci, C., & Robson, K. (2023). “He Hears”: An essay celebrating the 25 year anniversary of the Audit Society. *Critical Perspectives on Accounting*, 97, 102581.
- Brown, R. G. (2020). Changing audit objectives and techniques. In *The evolution of audit thought and practice* (pp. 1–8). Routledge.
- C. Krishna Babu v. Institute of Chartered Accountants of India*, MANU/AP/0327/2000.
- Choi, W., Mande, V., & Son, M. (2019). How do investors react to auditor resignations? *International Journal of Accounting and Finance*, 9(2–4), 205–227.
- Christensen, B., Glover, S., & Wolfe, C. (2014). Do critical audit matter paragraphs in the audit report change nonprofessional investors’ decision to invest? *Auditing: A Journal of Practice & Theory*, 33(4), 71–93.
- D’Andreamatteo, A., Grossi, G., Mattei, G., & Sargiacomo, M. (2024). The intersection between ‘The Audit Society’ and public sector corruption and fraud: A literature review and future research agenda. *Qualitative Research in Accounting & Management*, 21(1), 29–40.
- D. K. Agrawal v. Council of Institute of Chartered Accountants of India*, MANU/SC/0837/2021
- DeAngelo, L. (1981). Auditor independence, low-balling and disclosure regulation. *Journal of Accounting and Economics*, 3(2), 113–127.
- Deb, R. (2021). Yes Bank fiasco: A corporate governance failure. *Decision*, 48(2), 181–190.
- Deb, R. (2024a). Limning auditing Indian auditors. *Jindal Journal of Business Research*, 13(2), 198–212.
- Deb, R. (2024b). Fraud prevention and auditors’ resignation—Indian evidence. *Metamorphosis: A Journal of Management Research*, 24(1), 21–30.
- Deepal, A. G., & Jayamaha, A. (2022). Audit expectation gap: A comprehensive literature review. *Asian Journal of Accounting Research*, 7(3), 308–319.
- DeFond, M. L. (1992). The association between changes in client firm agency costs and auditor switching. *Auditing: A Journal of Practice and Theory*, 11(1), 16–31.
- Deputy Secretary, Government of India v. S. N. Das Gupta*, AIR 1956 Cal 414.
- Dermarckar, S., & Hazgui, M. (2022). How auditors legitimize commercialism: A micro-discursive analysis. *Critical Perspectives on Accounting*, 83, Article 102228.
- Dr. Suresh Gupta v. NCT of Delhi*, (2004) 6 SCC 422.

- Dunne, N. J., Brennan, N. M., & Kirwan, C. E. (2023). How the big four maintain and defend logic equilibrium at concurrent performances. *Critical Perspective on Accounting*, 94, 102479.
- Ege, M., Knechel, W. R., Lamoreaux, P. T., & Maksymov, E. (2020). A multi-method analysis of the PCAOB's relationship with the audit profession. *Accounting, Organizations and Society*, 84(C), 101–131.
- Everett, J., Friesen, C., Neu, D., & Rahaman, A. S. (2018). We have never been secular: Religious identities, duties, and ethics in audit practice. *Journal of Business Ethics*, 153(4), 1121–1142.
- Ghosh, S. (2025, June 16). NFRA slaps notices on IndusInd auditors. *The Economic Times*.
- Hari Sao v. State of Bihar*, (1969) 3 SCC 107.
- Harinderjit Singh v. Disciplinary Committee Bench-III, The Institute of Chartered Accountants of India*, MANU/DE/4378/2024.
- Hassink, H. F., Bollen, L. H., Meuwissen, R. H., & de Vries, M. J. (2009). Corporate fraud and the audit expectations gap: A study among business managers. *Journal of International Accounting, Auditing and Taxation*, 18(2), 85–100.
- Hulme, S., Disley, E., & Blondes, E. L. (2021). *Mapping the risk of serious and organised crime infiltrating legitimate businesses: Final report*. European Union.
- Humphrey, C., Sonnerfeldt, A., Komori, N., & Curtis, E. (2021). Audit and the pursuit of dynamic repair. *European Accounting Review*, 30(3), 445–471.
- Institute of Chartered Accountants of India v. L. K. Ratna*, (1986) 4 SCC 537.
- Institute of Chartered Accountants of India v. M. S. Rathi*, (2017) 8 SCC 539.
- Institute of Chartered Accountants of India v. Mukesh Gang*, MANU/AP/0809/2016.
- Institute of Chartered Accountants of India v. Price Waterhouse*, (1997) 6 SCC 312.
- Institute of Chartered Accountants of India v. Somnath Basu*, MANU/WB/0675/2006.
- Institute of Chartered Accounts v. P. K. Mukheerjea* MANU/SC/0007/1957.
- Jacob Mathew v. State of Punjab*, (2006) 5 SCC1.
- Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency cost, and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Juric, D., O'Connell, B., Rankin, M., & Birt, J. (2018). Determinants of the severity of legal and employment consequences for CPAs named in SEC accounting and auditing enforcement releases. *Journal of Business Ethics*, 147(3), 545–563.
- Kachelmeier, S., Rimkus, D., Schmidt, J., & Valentine, K. (2020). The forewarning effect of critical audit matter disclosures involving measurement uncertainty. *Contemporary Accounting Research*, 37(4), 2186–2212.
- Kaplan, S., & Williams, D. (2013). Do going concern audit reports protect auditors from litigation? A simultaneous equations approach. *The Accounting Review*, 88(1), 199–232.
- Kaushik, M. (2024, October 11). Over 40% of ICAI probes reveal CA misconduct. *The Financial Express*.
- Klein, B., & Leffler, K. B. (1981). The role of market forces in assuring contractual performance. *Journal of Political Economy*, 89(4), 615–641.
- Lennox, C., & Li, B. (2020). When are audit firms sued for financial reporting failures and what are the lawsuit outcomes? *Contemporary Accounting Research*, 37(3), 1370–1399.
- Mande, V., & Son, M. (2011). Do audit delays affect client retention? *Managerial Auditing Journal*, 26(1), 32–50.
- Mohd. Ibrahim v. State of Bihar*, (2009) 8 SCC 751.
- Nallareddy, S., & Ogneva, M. (2017). Predicting restatements in macroeconomic indicators using accounting information. *The Accounting Review*, 92(2), 151–182.

- Naresh Chandra Agrawal v. Institute of Chartered Accountants of India*, 2024 LiveLaw (SC) 101.
- Neera Yadav v. Central Bureau of Investigation*, (2017) 8 SCC 75.
- N. V. Subbarao v. State*, (2013) 2 SCC 162.
- Palmer, D., & Maher, M. (2006). Developing the process model of collective corruption. *Journal of Management Inquiry*, 15(4), 363–370.
- Palmrose, Z., Richardson, V. J., & Scholz, S. (2004). Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics*, 37(1), 59–89.
- Paterson, A. S., Changwony, F., & Miller, P. B. (2019). Accounting control, governance and anti-corruption initiatives in public sector organisations. *The British Accounting Review*, 51(5), Article 100844.
- Porter, B. (1993). An empirical study of the audit expectation-performance gap. *Accounting and Business Research*, 24(93), 49–68.
- Power, M. (1997). *The audit society: Rituals of verification*. Oxford University Press.
- Price Waterhouse v. SEBI*, MANU/MH/1027/2010.
- Punjab State Government v. K. N. Chandla*, MANU/HP/0095/1972.
- Quadackers, L. M., Groot, T., & Wright, A. (2014). Auditor's professional skepticism: Neutrality versus presumptive doubt. *Contemporary Accounting Research*, 31(3), 639–657.
- Ram Mohan, M. P., & Raj, V. (2020, September). *Auditors' negligence and professional misconduct in India: A struggle for a consistent legal standard* [IIMA Working Paper No. 2020-09-01]. IIMA.
- Registrar of Companies v. P. Arunajatai*, AIR1963 Mad99.
- Reichborn-Kjennerud, K., Gonzalez-Díaz, B., Bracci, E., Carrington, T., Hathaway, J., Jeppesen, K., & Steccolini, I. (2019). SAIs work against corruption in Scandinavian, South European and African countries: An institutional analysis. *The British Accounting Review*, 51(5), 100842.
- Roussy, M. (2013). Internal auditors' roles: From watchdogs to helpers and protectors of the top manager. *Critical Perspectives on Accounting*, 24(7–8), 550–571.
- S. Ganesan v. A. K. Joscelyne*, AIR 1957 Cal 33.
- S. Sukumar v. The Secretary, Institute of Chartered Accounts of India*, (2018) 14 SCC 360.
- Saad, E. B., & Lesage, C. (2009). *Why are auditors over-blamed in accounting frauds?* [Working paper]. HEC Paris.
- Sikka, P., Puxty, A., Willmott, H., & Cooper, C. (1998). The impossibility of eliminating the expectations gap: Some theory and evidence. *Critical Perspectives on Accounting*, 9(3), 299–330.
- Simnett, R., & Smith, A. (2005). Public oversight: An international approach to auditing. In T. Campbell & K. Houghton (Eds), *Ethics and auditing* (pp. 45–62). ANUE Press.
- Sirois, L., Bédard, J., & Bera, P. (2018). The informational value of key audit matters in the auditor's report: Evidence from an eye-tracking study. *Accounting Horizons*, 32(2), 141–162.
- Slager, R. (2017). The discursive construction of corruption risk. *Journal of Management Inquiry*, 26(4), 366–382.
- Sridharan, R. (2020, December 24). *The role of the National Financial Regulating Authority in independent audit regulation*. The 35th Regional Conference of the Western India Regional Council of the Institute of Chartered Accountants of India.
- Srivats, K. R. (2024a May 4). ICAI's actions on multinational accounting firms follow SC diktats. *The Business Line*.
- Srivats, K. R. (2024b July 8). ICAI is free to proceed against entire firm for misconduct, Delhi High Court rules. *The Business Line*.

- Srivats, K. R. (2024c September 18). NFRA issues consultation paper on revamp of key auditing standard. *The Business Line*.
- Superintendent of Police v. R. Rajamany*, (1961) SCC OnLine Mad 86.
- Sushil Kumar Singhal v. Regional Manager, Punjab National Bank*, (2010) 8 SCC 573.
- T. A. Kathiru v. Jacob Mathai*, (2017) 5 SCC 755.
- Union of India v. Deloitte Haskins and Sells LLP*, MANU/SC/0518/2023.
- Upadhyay, J. P., & Sultana, N. (2018, June 5). 32 auditors of listed firms have resigned in the last 5 months. *The Mint*.
- Vinayak Narayan Deosthali v. Central Bureau of Investigation*, (2015) 2 SCC 553.
- Wang, Y., Ashton, J. K., & Jaafar, A. (2023). Financial statement fraud, recidivism and punishment. *Emerging Markets Review*, 56, 101033.
- Westermann, K. D., Cohen, J., & Trompeter, G. (2019). PCAOB inspections: Public accounting firms on “trial”. *Contemporary Accounting Research*, 36(2), 694–731.

The FinTech Prescription: Redefining Financial Operations in the Healthcare Sector

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Abstract

The technology and discoveries have transformed every business, including healthcare, and brought about a rapid transformation in the world. Healthcare organizations are setting new standards for sustainable practices to increase their financial performance without depleting social and natural capital. Financial technology (FinTech) promotes new and improved digital service models to the healthcare industry. FinTech companies are using blockchain, AI, and machine learning to plug gaps in the current healthcare system. As a result, the research study examines how FinTech is used in the healthcare sector and how it affects both digitalization and service quality improvement. The article presents facts in a descriptive manner, compiled from recent research and literature. The findings of the study provide a thorough review of the developments made possible by the merger of digital financial services, FinTech, health care technology and services, including digital health. The study concludes that combining FinTech and digital health can improve the standard of care for low- and moderate-income Indians while lowering service costs and increasing accessibility.

Keywords

Financial technology, digitalization, healthcare, accessibility, artificial intelligence

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Introduction

The COVID-19 pandemic significantly accelerated the adoption of digital financial and healthcare services, acting as a catalyst rather than the core focus of technological transformation. According to Fortune, nearly 46% of consumers exclusively use digital channels for their financial needs, and 24% of the respondents report familiarity with blockchain technology (Baker, 2022).

At the individual level, financial technology (FinTech) for health strategy aims to increase people's alternatives for how they access and pay for health care, especially in times of high out-of-pocket costs, while ensuring their financial security against catastrophic care events. In order to increase the efficacy, efficiency, and transparency of financing for and providing care, FinTech for Wellness offers digital financial enterprise solutions that may be used by healthcare systems and national insurance schemes (Asian Development Bank, 2022). The use of digital technologies in the healthcare industry has revolutionized how people access treatment and the type of care they get. Clinicians and patients alike frequently use digital health tools, such as remote monitoring, health-tracking gadgets, and smart health applications, to check their health. With the introduction of COVID-19, telemedicine advancements have accelerated, giving consumers access to qualified healthcare advice from the comfort of their own homes.

The financial services and healthcare sectors are very comparable. Both have historically significant traditional institutions; the majority of the oldest banks, insurance firms, and healthcare organizations date back more than a century. The goal of any government to provide health care to all is possible by implementing FinTech in the systems. The 2030 agenda of the Sustainable Development Goals is such that all people and communities have access to the various health care services without experiencing any financial hardship.

FinTech relieves administrative burden, allowing healthcare providers to focus on patient care rather than paperwork. This culminates in better results for the patients, with healthcare becoming more individual-oriented. Conclusively, FinTech creates innovation and collaboration between diverse sectors, which eventually leads to the development of novel health structures that are flexible and scalable. For instance, collaboration in FinTech and digital health technologies, such as AI-based diagnostics and health-tracking applications, will provide personalized engagement in healthcare services. It improves quality and enables patients to be more proactive in managing their health for better long-term health outcomes.

The role of FinTech has become increasingly pronounced in recent years, with global developments since 2020 reinforcing its critical place in modern financial systems, especially in healthcare.

Literature Review

Al-Anezi (2024) explored the integration of FinTech and electronic health to examine the opportunities, challenges, and implications that emerge from their

interconnection in Saudi Arabia. The study identified various benefits, including improved efficiency in administrative processes, enhanced access to healthcare services, increased financial inclusion, better decision-making, an improved patient experience, and the promotion of innovation and sustainability. Various barriers such as regulatory challenges, concerns over data privacy and security, interoperability issues, the digital divide, resistance to change, and cost-related implications were also put across.

Odeyemi (2024) evaluated the role of FinTech and focused on the growth of FinTech and its adoption in the Healthcare industry. The study was done in the US Healthcare system and studied the challenges faced by the organization. It also put forward that FinTech in healthcare offers new opportunities for users, particularly in areas such as healthcare payments. The study suggested that by focusing on patient-centric solutions, fostering cross-sector collaboration can be achieved without the risk of financial collaboration.

The intersection of FinTech and healthcare has attracted considerable attention in recent years due to the potential for innovations to improve access to financial services, patient care, and efficiency across healthcare. Khan et al. (2023) investigated the role of digital payment systems in healthcare, focusing on the use of mobile payment platforms and digital wallets to streamline transactions in hospitals and clinics. The study found that these technologies reduce administrative costs, increase transaction speed, and ultimately improve patient satisfaction by reducing payment wait times and insurance claims.

Research done by Bhatt et al. (2022) stated that digitalization had changed and evolved the way of every industry. It identified the main areas and current dynamics of FinTech, digitalization, and financial services and suggests future research directions. A bibliometric analysis was done to understand the role of FinTech and digitalization in separate industries. By paying attention to the healthcare industry, the research analyzed the growing importance of the same.

Access Health International & MetLife Foundation (2021) focused on the importance of FinTech towards the development of the healthcare sector. The study stated that FinTech for health provides new opportunities to the users with regard to health care payments, banking, insurance and most importantly the access to health care services to all people. The study suggested that high-quality healthcare can be provided without running the danger of financial ruin by putting patients at the center of all solutions, collaborating across sectors, and offering integrated services.

Research done by Meiling et al. (2021) focused on improving the sustainability of healthcare through the use of FinTech. The study examined the relation between financial and Technological development with the usage of FinTech. The study found that the implementation of FinTech is having an effect on the performance of the organization as well as its development.

Research done by Das and Mohan (2020) stressed out that FinTech plays an important role in the healthcare sector. The changes in the needs of the nation's health have heightened the need for improving the scenario of healthcare.

The study done by Gustke et al. (2000) evaluated the satisfaction of the patients with telemedicine in clinical consultations. For the purpose of the study, data were collected from 495 patients who had taken the real-time consultations. Satisfaction of the patients was analyzed in relation to patient age, gender, race, income, education, and insurance. The findings of the study revealed that some of the patients were dissatisfied with the telemedicine facility, and some were satisfied. The reason for dissatisfaction was the physical examination of the patient, and the factors which affected the satisfaction were waiting sector time, scheduling appointment, accessibility, availability and affordability.

Research article done by Sajjad and Waqar (2020) evaluated the relevance of telemedicine. The study focused its attention on telemedicine, especially during the outbreak period of COVID-19. The study stressed the importance of Telehealth and its benefits. The study concluded that telemedicine acted as a boon during the outbreak period, where it served as a platform to assess the needs of the people in society.

Sinha et al. (2019) analyzed the satisfaction of the patients with telemedicine for fracture care. The study was carried out in Pennsylvania. Two groups of patients from semi-urban and rural areas were evaluated for the purpose of the study. The study found that travel time, travel cost, video consultations and waiting time were strongly affecting the satisfaction of the patients.

Breidbach et al. (2020) examined the use of disruptive technologies by new market entrants to transform financial service systems into digital ones. The study found that these innovations compete with established financial institutions for market share.

Research Gap

Health care has been greatly impacted by FinTech, yet there is still room for more study in several areas. Apart from expanding financial access, there is currently little empirical proof that using FinTech translates into better health outcomes for patients. Particularly in low-income areas, further research is required to determine the long-term viability and scalability of such solutions. The adoption of FinTech is seriously hindered by social and cultural factors such as a lack of digital literacy and “trust” in the technology, and these factors are not being properly observed. Further research is also needed to determine whether FinTech actually reduces inequities in health care access for the poor. Research is urgently needed into the untapped potential of FinTech to reduce disparities in access, affordability, and quality of care. Ultimately, beyond bridging these gaps, it remains unclear how FinTech’s broader impact on healthcare will be realized.

Objectives

1. To explore the role of FinTech in healthcare.
2. To examine the advantages of FinTech in digitalization.
3. To examine the role of FinTech in socioeconomic well-being.

Methodology

Research Design

Using a descriptive research design, the study examines the role of FinTech in the healthcare industry and aims to comprehend its effects on digitalization, service quality enhancement, and socioeconomic well-being. A review of the literature, case studies, industry reports, and expert interviews is one of the techniques used to acquire data. The goal of the study is to offer a precise framework for examining the influence of FinTech on the digitization of healthcare, enhancement of service quality, and socioeconomic welfare.

Data Collection Method

The integration of FinTech in healthcare is analyzed by using secondary data sources such as industry records and databases, assessing the body of current research, and evaluating case studies. The data was collected from the reports of firms like Statista, Research and Markets, and different journals related to finance, technology, and healthcare. The Pulse of FinTech report, which tracks investments, trends, and developments in the FinTech sector globally, published by KPMG International (2016), was also considered, and Global FinTech Innovation Lab reports provided insights into emerging FinTech trends and the competitive landscape, published by Accenture, were also taken into consideration. In order to comprehend the difficulties and possibilities involved in incorporating FinTech into healthcare systems, the study included the data related to interviews with specialists in FinTech, healthcare, and digital health and their opinions about the same were analyzed through the available reports.

Scope of the Study

The research analyzes information from the past twenty years, especially paying attention to the period following 2015 when the adoption of FinTech started to speed up around the world. The time period covers new advancements until 2024, showcasing the most up-to-date trends and innovations in the industry. The research is centered on the healthcare industry, which encompasses hospitals, clinics, insurance firms, and healthcare startups. It also examines how government and non-governmental organizations contribute to the advancement of FinTech solutions in the healthcare sector.

The research delves into FinTech technologies like blockchain, AI, machine learning, digital wallets, and telemedicine platforms. The examination involves their utilization in healthcare funding, patient care, and the provision of services. Additionally, the study adds to the body of research that offers a comprehensive examination of the relationship between FinTech and healthcare, elucidating how new technologies are applied to enhance the administration and provision of healthcare services while expediting financial transactions in healthcare startups, insurance companies, clinics, and hospitals. The study looked at both public and

private initiatives that have advanced the adoption of FinTech in the healthcare industry. It offered insightful perspectives that closed a gap in the current body of scholarly work. Since it covered developments up to 2024, the study provided a modern viewpoint on the ongoing development of healthcare services, enhancing and elucidating the conversation on FinTech's contribution to healthcare innovation

Limitations of the Study

1. The study primarily relies on secondary data, which may limit the depth of analysis in certain areas. The availability and quality of secondary data may also vary across regions and sources.
2. The findings from specific case studies may not be generalizable to all healthcare systems, especially in regions with different socioeconomic and regulatory contexts.
3. The fast pace of technological advancements in both FinTech and healthcare means that some findings may become outdated as new innovations emerge.

FinTech in Healthcare

First, the objective of exploring the role of FinTech in healthcare is met by the revelation that FinTech applications, such as digital wallets, healthcare lending, and crowdfunding platforms, are fundamentally transforming the way healthcare services are accessed and financed. These technologies have made healthcare more accessible, particularly for low- and middle-income populations, thereby bridging gaps that traditional financial systems have struggled to address. It shows that by bypassing conventional financial institutions and providing innovative financial products, FinTech is empowering individuals with better financial tools to manage their healthcare needs, thereby improving their overall quality of life. These findings collectively underscore the profound influence of FinTech in reshaping healthcare, highlighting its potential to drive more equitable, efficient, and accessible healthcare systems, and setting the stage for future research to further explore these dynamics in various global contexts.

1. FinTech is being investigated as a substitute for extending financial access to fulfil the healthcare needs of individuals living in the low-middle-income class group.
2. To save money for medical procedures, FinTech designed a digital wallet account.
3. Offer prompt payment for personalized services.
4. Provides improved access to healthcare.
5. Helps in closing the gaps in the healthcare system.

This discussion directly connects to the second objective, which is to examine the advantages of digitalization within the healthcare sector. The discussion reveals

that FinTech's digital solutions not only reduce costs and increase efficiency but also enhance the quality of care by enabling timely, remote, and personalized healthcare services.

Advantages of FinTech in Digitalization

The integration of FinTech into the healthcare sector has brought about significant advantages, transforming how healthcare services are delivered and accessed. One of the foremost benefits is the enhancement of healthcare accessibility, particularly for low- and middle-income groups who often struggle with high out-of-pocket expenses. FinTech solutions, such as healthcare lending and digital wallets, provide patients with innovative financial options, enabling them to access necessary treatments without the immediate burden of costs. These financial tools are crucial in reducing economic disparities in healthcare access, ensuring that even those in underserved areas can receive timely and adequate medical care.

Another critical advantage is the efficiency and speed at which healthcare services can be provided. With the rise of medical and remote monitoring, made possible through FinTech, patients can get medical advice and recommendations at their homes. This not only reduces travel times and costs but also reduces pressure on healthcare facilities, allowing for more efficient patient flow. Lowering the costs associated with traditional travel makes health care more affordable and efficient.

The stress on the healthcare system is also alleviated through the use of FinTech, as it allows for better resource allocation and management. By digitizing and automating many processes, FinTech helps in reducing administrative burdens, allowing healthcare professionals to focus more on patient care rather than on paperwork. This leads to improved patient outcomes, as the healthcare system becomes more patient-centered and responsive to individual needs.

FinTech in Socioeconomic Well-being

FinTech is quickly emerging as a key factor in improving socioeconomic well-being, particularly for low-income and marginalized groups. Its popularity is mostly due to its capacity to facilitate lending and borrowing agreements without going through conventional financial institutions like commercial banks. FinTech makes it easier and faster for people and small enterprises to obtain credit through peer-to-peer (P2P) lending platforms, frequently at a lower cost than traditional loans (Zhang et al., 2020). By providing cutting-edge services and products related to finance, FinTech is revolutionizing the way that people with low and moderate incomes may obtain healthcare services. Saving for medical expenses and obtaining funds to buy treatments or medications are made possible by mobile-based HSAs and microloans, which are frequently managed through smartphone applications (Klapper et al., 2019). By eschewing conventional bank accounts, these platforms enable underbanked and unbanked individuals to access

financial services. Additionally, FinTech's payment solutions have improved the process for paying for medical services. Both the transaction cost and the treatment delay have been reduced (Gomber et al., 2017).

One of the main reasons FinTech is taking the lead in socioeconomic well-being is that it does not depend on conventional financial institutions like commercial banks to formally build borrowing-lending arrangements. Peer-to-peer lending and FinTech have sped up the process of borrowing money. By facilitating and streamlining the payment process for healthcare services for patients, as well as by offering low-interest loans and mobile-based health savings accounts, FinTech solutions have made healthcare services more accessible to populations in low- and middle-income segments of society. Crowdfunding, which makes use of digital and social networks to raise money and donations, is another well-known example of a FinTech platform that enhances healthcare financing.

Findings

The findings of the study put forward that FinTech encourages innovation and collaboration across various sectors, driving the development of new healthcare models that are more adaptable and scalable. For instance, the synergy between FinTech and digital health tools such as AI-powered diagnostics and health-tracking apps enables the creation of more personalized healthcare experiences. These innovations not only enhance the quality of care but also empower patients to take a more active role in managing their health, leading to better long-term health outcomes.

In summary, the advantages of FinTech in healthcare are profound, offering enhanced accessibility, efficiency, security, and innovation. By addressing both financial and operational challenges, FinTech is poised to play a crucial role in transforming healthcare systems globally, making them more equitable and effective for all.

Theoretical Implications of the Study

The study's conclusions make a substantial contribution to the expanding corpus of research on the relationship between healthcare and FinTech. This study contributes to the theoretical knowledge of how digital financial innovations might change the way healthcare is operated, giving academics a fresh perspective on how technology affects the provision of healthcare services. This article presents a framework that connects FinTech with healthcare sustainability and accessibility by merging ideas of digital transformation, socio-economic development, and healthcare management.

Additionally, the present work lays the groundwork for further investigations into the complementary benefits of FinTech and digital health. It unveils how crucial interdisciplinary methods are for tackling healthcare issues, especially regarding low- and middle-class communities.

Practical Implications of the Study

The research article emphasizes the potential of FinTech solutions in the healthcare industry, emphasizing how they may enhance patient access, lower operating costs, and improve service delivery. It recommends that legislators create laws to encourage the use of FinTech, especially in underprivileged areas. The report also recommends encouraging digital literacy and offering accessible technology as ways to close the digital divide. By tackling issues like financing medical procedures and ensuring access to high-quality treatment, FinTech companies may leverage the insights to develop and grow their services in the expanding healthcare sector.

Conclusion

Further research on FinTech adoption in the health sector may be directed at assessing the long-term effects of such technologies on the improvement in patient outcomes and health care expenditure. The comparison between different health systems, specifically between developed and developing nations, can help in the wider generalizability of FinTech solutions globally. Additionally, it is very important to consider the ethical and regulatory implications of advanced technologies like AI and decentralized finance on the healthcare sector to ensure a culture of safety and efficiency in their integration. The standpoints of patients and providers could be important to know, possibly allowing better customization of FinTech applications to serve them more appropriately and improve the rates of their adoption. It also performed economic analyses on the cost-effectiveness of FinTech solutions, which are really important for stakeholders to make their investment and policy choices accordingly.

The integration of digitization and AI within the realm of FinTech holds immense potential to foster healthcare equity and improve the overall well-being of individuals on a global scale. By leveraging AI-powered tools, we can address several key challenges that have historically hindered equitable healthcare access. AI-driven predictive analytics can analyze vast datasets to identify underserved populations and predict healthcare trends, enabling targeted interventions and resource allocation. Furthermore, AI-powered chatbots and virtual assistants can enhance patient engagement, providing personalized healthcare information and assistance in real-time, which is particularly beneficial for individuals with limited access to medical facilities.

However, despite these promising advancements, challenges persist. Ensuring the privacy and security of sensitive health data remains a priority, necessitating robust data encryption and compliance with stringent regulatory frameworks. Moreover, there is a digital divide that must be addressed, as not all individuals have equal access to the internet and technology. Bridging this gap requires concerted efforts from governments, organizations, and tech companies to promote digital literacy and provide access to affordable technologies.

In conclusion, the synergy between AI and FinTech has the potential to revolutionize healthcare by promoting equity and well-being worldwide. Through AI tools, we can identify, analyze, and address healthcare disparities, ultimately leading to more targeted and effective interventions. However, to realize this vision, collaboration is essential to overcome challenges such as data privacy concerns and digital inequality. By navigating these hurdles collectively, we can harness the power of AI in FinTech to create a more equitable and healthier global society.

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References

- Access Health International & MetLife Foundation. (2021). *Breaking the health-poverty trap: How fintech can improve access to healthcare in Asia*. Retrieved, August 24, 2025, from <https://accessh.org/fintech-for-health-whitepaper-breaking-the-health-poverty-trap/>
- Al-Anezi, F. (2024). Interlinking FinTech and eHealth: A qualitative study. *Frontiers in Public Health*, 12, 1–8. <https://doi.org/10.3389/fpubh.2024.1398136>
- Asian Development Bank. (2022). *Leveraging fintech to expand digital health in Indonesia, the Philippines, and Singapore: Lessons for Asia and the Pacific* (June). Retrieved, August 24, 2025, from <https://www.adb.org/sites/default/files/publication/800276/fintech-digital-health-indonesia-philippines-singapore.pdf>
- Baker, A. (2022). How financial technology can help the healthcare industry. *FinTech Weekly*. Retrieved, August 24, 2025, from <https://www.fintechweekly.com/magazine/articles/how-financial-technology-can-help-the-healthcare-industry>
- Bhatt, A., Joshipura, M., & Joshipura, N. (2022). Decoding the trinity of fintech, digitalization and financial services: An integrated bibliometric analysis and thematic literature review approach. *Cogent Economics & Finance*, 10(1), 2114160. <https://doi.org/10.1080/23322039.2022.2114160>
- Breidbach, C. F., Keating, B. W., & Lim, C. (2020). Fintech: Research directions to explore the digital transformation of financial service systems. *Journal of Service Theory and Practice*, 30(1), 79–102. <https://doi.org/10.1108/JSTP-08-2018-0185>
- Das, A. S., & Mohan, S. (2024). *Fintech innovations in medicine: Transforming healthcare through financial technology*. [White paper]. https://www.researchgate.net/publication/381887171_Fintech_Innovations_In_Medicine_Transforming_Healthcare_Through_Financial_Technology
- Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital finance and fintech: Current research and future research directions. *Journal of Business Economics*, 87(5), 537–580. <https://doi.org/10.1007/s11573-017-0852-x>

- Gustke, S. S., Balch, D. C., West, V. L., & Rogers, L. O. (2000). Patient satisfaction with telemedicine. *Telemedicine Journal*, 6(1), 5–13. <https://doi.org/10.1089/107830200311806>
- Klapper, L., Singer, D., & Ansar, S. (2019). *FinTech, inclusive growth and job creation*. World Bank. Retrieved, August 24, 2025, from <https://documents1.worldbank.org/curated/en/370741556352994735/Fintech-Inclusive-Growth-and-Job-Creation.pdf>
- KPMG International. (2016). *Fintech in India: A global growth story* (June). Retrieved, August 24, 2025, from <https://assets.kpmg/content/dam/kpmg/pdf/2016/06/FinTech-new.pdf>
- Meiling, L., Yahya, F., Waqas, M., Shaohua, Z., Ali, S. A., & Hania, A. (2021). Boosting sustainability in healthcare sector through fintech: Analyzing the moderating role of financial and ICT development. *Inquiry*, 58. <https://doi.org/10.1177/00469580211028174>
- Odeyemi, O. (2024). Integrating accounting fintech innovations in the U.S. healthcare sector: Opportunities, challenges, and impacts on financial management and patient care. *World Journal of Advanced Research and Reviews*, 22(1), 1221–1233. <https://doi.org/10.30574/wjarr.2024.22.1.1211>
- Sajjad, B. T., & Waqar, M. N. (2020). Telehealth: A boon in the time of COVID-19 outbreak. *Journal of Evolution of Medical and Dental Sciences*, 9(29), 2081–2084. <https://doi.org/10.14260/jemds/2020/454>
- Sinha, N., Cornell, M., Wheatley, B., Munley, N., & Seeley, M. (2019). Looking through a different lens: Patient satisfaction with telemedicine in delivering pediatric fracture care. *JAAOS: Global Research & Reviews*, 3(9), e100. <https://doi.org/10.5435/jaas-global-d-19-00100>
- Zhang, B., Chen, L., Shen, Y., & Liu, T. (2020). Peer-to-peer lending and fintech: Connecting financial inclusion with financial stability. *China Economic Review*, 61, 101327. <https://doi.org/10.1016/j.chieco.2020.101327>

The Role of Marketing Strategies and Trust in Shaping Consumer Behavior and Public Health Outcomes in the Street Food Sector: A PLS-SEM Approach

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Abstract

Urban food environments in developing economies present unique challenges for public health, particularly in the domain of informal street food consumption. This study investigates how integrated marketing strategies—comprising vendor training, digital marketing, hygiene certifications, and education campaigns—influence consumer trust and behavior regarding food safety. Utilizing Partial Least Squares Structural Equation Modeling (PLS-SEM) on data collected from street food consumers in Kolkata, India, the study demonstrates that marketing interventions significantly enhance trust in both certifications and vendor practices, which in turn positively predict safe behavioral intentions. The structural model reveals strong path coefficients and substantial effect sizes, indicating a robust link between marketing strategy, trust formation, and public health outcomes. The findings underscore the need for multi-level health communication strategies that incorporate both institutional and interpersonal trust mechanisms. Practical implications for policymakers and municipal authorities are discussed, with recommendations for integrating vendor training and public awareness into urban food safety frameworks. This research contributes to theory by contextualizing trust as a dual mediator and offers actionable insights for sustainable health promotion in complex urban food systems.

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Keywords

Urban food systems, food safety behavior, trust in food certifications, marketing strategy, health communication, street food safety, consumer behavior, public health intervention

Introduction

The global proliferation of street food vending is a reflection of its socioeconomic and cultural significance, particularly in developing urban centers such as Kolkata. Street food offers an accessible, affordable, and culturally rich source of nutrition to large segments of the population (FAO, 2016). Despite these benefits, the street food sector operates largely within informal regulatory frameworks, where concerns over hygiene, food safety, and consumer protection are pressing public health issues (WHO, 2020). In India, the coexistence of high demand for street food and the risk of foodborne illnesses represents a persistent challenge, requiring innovative and integrated strategies that extend beyond traditional regulatory interventions.

One key area has been the role of strategic marketing and communication initiatives in influencing consumer perceptions and behaviors related to food safety. These strategies include hygiene certification schemes, digital and educational campaigns, and vendor training programs—all aimed at increasing awareness, improving vendor compliance, and reinforcing trust among consumers. Marketing interventions, when designed with public health objectives, can significantly influence behavioral intentions and attitudes toward street food consumption (Choudhury et al., 2011; Sparks et al., 2014). In particular, digital marketing tools, which leverage mobile technology and social media platforms, have demonstrated efficacy in shaping urban consumer behavior in India's rapidly digitizing landscape (Kapoor & Dwivedi, 2020).

Hygiene certification programs and food safety labels have also been extensively studied for their ability to signal food safety compliance to consumers. Drawing from the cue utilization theory (Olson & Jacoby, 1972), consumers tend to rely on extrinsic cues like hygiene seals and endorsements in making food choices, particularly in high-uncertainty contexts such as street food markets. Certifications offered by local municipalities or third-party food safety organizations can reduce information asymmetry, thereby enhancing consumer confidence in the food's safety (Ali & Nath, 2013). In the Indian context, initiatives like the Food Safety and Standards Authority of India (FSSAI)'s "Clean Street Food Hub" program reflect efforts to institutionalize such certification schemes (FSSAI, 2021). However, the efficacy of these programs is not uniform and is often mediated by the degree of public trust in the certifying authorities (Yeung & Morris, 2001).

This leads to a crucial mediating construct in this research—trust. Trust plays a dual role: on one hand, it reflects institutional trust in food safety regulators and marketing programs, and on the other, it represents interpersonal trust in individual vendors. The literature identifies trust as a foundational element in risk management and behavior change, particularly in public health domains (Chen, 2013;

Frewer et al., 1996). Without trust in the regulatory institutions or in the vendors themselves, consumers are unlikely to respond to marketing efforts aimed at promoting safe food practices. In low- and middle-income countries, where regulatory enforcement is often weak, interpersonal trust developed through repeated vendor–consumer interactions can substitute for formal assurances (Kumar & Kapoor, 2017).

Furthermore, trust serves as a psychological safety net, reducing the perceived risk associated with consuming street food (Lobb et al., 2007). Research shows that trust is positively correlated with favorable attitudes and behavioral intentions in food choices (Han & Hyun, 2017). In the context of hygiene certification, for instance, consumer perceptions of credibility and transparency in the certification process influence the extent to which they internalize and act upon the safety message (Wang et al., 2019). Therefore, any study of marketing efficacy in the informal food sector must account for the pivotal role of trust in mediating behavior.

Consumer behavior itself is central to public health outcomes in the street food economy. The Theory of Planned Behavior (TPB) (Ajzen, 1991) provides a robust theoretical foundation for predicting food safety behaviors. According to TPB, behavioral intention—defined by attitudes, subjective norms, and perceived behavioral control—directly influences actual behavior. In this context, attitudes toward hygiene, peer norms surrounding safe food choices, and an individual's confidence in avoiding unsafe vendors are all modifiable constructs (Grunert, 2005). Marketing and educational interventions can influence these TPB dimensions by increasing knowledge, reshaping attitudes, and enhancing perceived control over food choices.

Studies such as Liu et al. (2014) and Soon et al. (2012) have demonstrated that awareness and knowledge of food safety are strong predictors of safe food consumption practices. However, gaps remain in empirical understanding of how integrated marketing strategies and trust dynamics jointly influence these behaviors. Most existing studies have either focused on vendor compliance or consumer awareness in isolation. There is a paucity of research that adopts a systems perspective, analyzing how various factors interact to shape health-related consumer behavior within complex urban ecosystems.

Finally, public health outcomes are contingent upon sustained improvements in consumer and vendor behaviors. Foodborne illness in urban India continues to pose a substantial health burden, affecting vulnerable populations including children, the elderly, and the immunocompromised (Barro et al., 2006; WHO, 2020). Behavior changes at the consumer level—facilitated through trust-building and strategic marketing—can contribute to broader community health benefits by reducing exposure to unsafe food sources.

In response to these gaps, the present study proposes a structural model based on partial least squares structural equation modeling (PLS-SEM) to empirically test the relationships among marketing interventions, trust (both institutional and interpersonal), consumer behavior, and public health outcomes. By situating this study within the context of Kolkata's diverse street food landscape, the research aims to provide both theoretical advancement and practical guidance for policymakers, health practitioners, and food safety regulators.

Literature Review

Street food vending constitutes a vital component of the informal urban economy in many upper-middle income countries, offering affordable meals to low- and middle-income populations. Yet, it poses significant public health risks due to inconsistent safety standards and limited regulatory oversight (FAO, 2016; WHO, 2020). As such, understanding how institutional interventions—particularly marketing strategies—interact with consumer trust and behavior is essential for developing effective, scalable policy frameworks. While several studies have investigated hygiene practices and consumer awareness (Barro et al., 2006; Choudhury et al., 2011), relatively few adopt an integrative perspective linking these factors with behavioral theory and structural modeling approaches.

Marketing Interventions and Consumer Perception

The literature increasingly acknowledges the utility of strategic marketing—including digital campaigns, hygiene certifications, and vendor training—as a vehicle for enhancing food safety awareness. Hygiene certification schemes, in particular, function as quality assurance signals that mitigate consumers' information asymmetries about food safety (Ali & Nath, 2013; Wang et al., 2019). In India, programs under the aegis of the Food Safety and Standards Authority of India (FSSAI), such as the “Clean Street Food Hub”, aim to institutionalize hygiene awareness through branding and vendor incentives (FSSAI, 2021). However, the impact of these initiatives remains inconsistent, often limited by enforcement challenges and low consumer trust in certification bodies (Kumar & Kapoor, 2017).

Digital marketing, particularly via social media and mobile applications, is emerging as a low-cost method for delivering food safety information. Kapoor and Dwivedi (2020) argue that the digital medium can empower consumers by providing real-time, localized safety information. Yet, adoption among street vendors is uneven, constrained by digital literacy and infrastructural limitations. Furthermore, while digital platforms can increase message reach, their impact on behavioral change is rarely evaluated longitudinally, leaving questions about sustained effectiveness.

Trust as a Mediating Construct

Trust—both in institutions (e.g., government, certifiers) and vendors (e.g., known sellers)—has been identified as a critical variable influencing risk perception and behavioral intent (Frewer et al., 1996; Lobb et al., 2007). Yeung and Morris (2001) argue that without trust, even well-designed interventions may fail to shift consumer behavior. However, the trust construct is often treated superficially in the food safety literature, with limited distinction between interpersonal and institutional dimensions.

Recent empirical work has attempted to disentangle these levels. Han and Hyun (2017) show that trust in foodservice providers is positively correlated with repeat purchase intentions, while Chen (2013) emphasizes that institutional transparency and responsiveness are key to building public confidence. Nonetheless, much of the existing research is situated in high-income countries with mature regulatory environments. Studies in developing contexts, where trust in formal institutions is often low and reliance on interpersonal networks is high, remain sparse and insufficiently theorized (Kumar & Kapoor, 2017).

This omission is problematic, particularly in environments like Kolkata, where street food consumers frequently rely on familiar vendors or community endorsements to assess hygiene (Banik et al., 2021). These trust-based heuristics can either complement or undermine institutional certification programs. Yet few studies systematically examine how these dual dimensions of trust interact or how they may mediate the relationship between institutional marketing strategies and consumer behavior. Street food vending represents a vital, yet underregulated, component of the urban informal economy in many developing countries, serving as both a livelihood source and a primary meal option for low- and middle-income populations. However, its growth has outpaced regulatory oversight, giving rise to public health concerns that are increasingly addressed through institutional marketing interventions, consumer education, and trust-building mechanisms (Majumder et al., 2025).

Consumer Behavior and the Theory of Planned Behavior

Consumer behavior in food safety contexts is frequently modeled using the TPB, which posits that behavior is shaped by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). Grunert (2005) and Sparks et al. (2014) have applied TPB constructs to food consumption settings, arguing that information-based interventions can positively influence attitudes and norms, particularly when reinforced by trusted sources. However, in informal food economies, consumers often face constrained choice environments where perceived behavioral control is low due to financial or logistical barriers.

Moreover, knowledge of food safety does not always translate to behavior. Liu et al. (2014) and Soon et al. (2012) observe that while food safety awareness has increased, behavioral shifts remain limited, particularly among price-sensitive consumers. This attitude–behavior gap calls into question the assumption that awareness alone is sufficient to drive change. It also highlights the importance of contextual variables, such as trust and perceived accessibility, that moderate TPB pathways.

Crucially, enhancing public education on this emerging concern is essential, given its potential threats to environmental integrity and public health (Majumder & Mukherjee, 2023). Most existing work adopts a piecemeal approach, examining variables in isolation rather than as components of an interactive system. This fragmentation limits the explanatory power of existing models and impedes the development of holistic strategies for food safety governance.

Gaps and Research Imperatives

The critical gap in the literature lies in the absence of integrated, empirical models that assess the causal pathways linking institutional marketing, trust (institutional and interpersonal), consumer behavior, and public health outcomes. While tools such as PLS-SEM have been employed in other public health contexts (Hair et al., 2021), their application to informal food systems remains limited.

Furthermore, there is a notable geographic gap, with most empirical studies focused on Western or East Asian markets. The unique sociocultural and infra-structural conditions of Indian urban food systems, including heterogeneity in vendor training, enforcement capacity, and consumer demographics, warrant localized investigation. The present study addresses this gap by using PLS-SEM to model these constructs within Kolkata's street food ecosystem, contributing to both theoretical refinement and policy relevance.

Research Methodology

Research Design

This study adopts a quantitative, cross-sectional research design to investigate the relationships between strategic marketing interventions, trust dimensions, consumer behavior, and public health outcomes within Kolkata's street food ecosystem. The cross-sectional approach allows for the simultaneous examination of multiple constructs at a specific point in time, suitable for exploring behavioral patterns, and latent perceptions within urban populations (Creswell & Creswell, 2018). Quantitative methods were deemed appropriate due to the hypothesis-driven nature of the research and the need for empirical validation of a structural model using latent constructs.

Instrument Design and Measurement Model

The research instrument was developed based on established scales adapted to the context of street food safety and consumer behavior. A structured questionnaire comprising multiple-item constructs was used, measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The instrument was pre-tested for face validity through expert reviews and pilot-tested on a sample of 30 participants to ensure clarity and reliability.

The measurement model included the following constructs:

- **Digital Marketing:** Measured through items adapted from Kapoor and Dwivedi (2020), assessing perceived exposure to and influence of digital hygiene campaigns.
- **Hygiene Certification:** Measured using scales reflecting consumer recognition and perceived credibility of formal certifications (Ali & Nath, 2013).
- **Vendor Training:** Assessed based on consumer perceptions of vendors' hygiene knowledge and visible hygiene practices.

- Trust in Vendor Practices and Trust in Certification: Operationalized as distinct constructs following Yeung and Morris (2001), with modifications to reflect street food contexts.
- Behavior—Safe Choices and Behavior—Purchase Intention: Derived from the TPB (Ajzen, 1991), measuring consumers' intention and frequency of choosing hygienic street food options.
- Public Health Outcomes: Measured as perceived benefits of safe food consumption and reduced foodborne illness, based on constructs used by Grunert (2005) and Soon et al. (2012).

The questionnaire was subjected to content validity evaluation and confirmed via confirmatory factor analysis (CFA) in SmartPLS 4.0 to assess the reliability and validity of the measurement items.

Sample and Data Collection

The study targeted street food consumers and vendors within Kolkata, India, where the street food culture is diverse and widely patronized. A purposive sampling technique was employed to capture respondents who had recent experience with street food consumption or vending. The inclusion criteria included adults (18 years and above) residing in Kolkata and having purchased or sold street food in the past three months.

Data were collected through self-administered questionnaires and structured interviews at major street food hubs across Kolkata, including Gariahat, Esplanade, College Street, and New Market. The final sample comprised 232 valid responses, which exceeds the minimum recommended sample size for SEM using PLS (Hair et al., 2021). Ethical considerations, including informed consent and respondent confidentiality, were strictly maintained.

Data Analysis and Results

The data were analyzed using SmartPLS 4.0, a variance-based SEM tool that supports exploratory and predictive modeling. SmartPLS is suitable for complex models with latent constructs and does not assume multivariate normality, making it appropriate for social science research involving non-probability samples (Sarstedt et al., 2017).

Measurement Model Assessment

The measurement model was assessed for reliability and validity through the following procedures:

- Internal Consistency Reliability: Evaluated using Cronbach's alpha (α) and composite reliability (CR), with thresholds of 0.70 and above indicating acceptable reliability (Hair et al., 2021).

- Convergent Validity: Assessed via average variance extracted (AVE), with values above 0.50 indicating that constructs explain more than half of the variance of their indicators.
- Indicator Reliability: Outer loadings of ≥ 0.70 were considered acceptable, while items loading between 0.40 and 0.70 were retained selectively based on their contribution to construct reliability.
- Discriminant Validity: Evaluated using the Fornell–Larcker criterion and heterotrait–monotrait ratio (HTMT). Constructs were considered distinct if the square root of AVE exceeded inter-construct correlations and HTMT values remained below 0.85 (Henseler et al., 2015).

The results confirmed that all constructs met the reliability and validity criteria, indicating a robust measurement model.

Structural Model Assessment

The structural model was evaluated using bootstrapping with 5,000 resamples to test the significance of path coefficients. The following criteria were used:

- Path Coefficients (β): Estimated for each hypothesized relationship, with t -values and p values determining statistical significance ($p < .05$).
- Coefficient of Determination (R^2): Used to assess the model's explanatory power for endogenous constructs, with values of 0.25 (weak), 0.50 (moderate), and 0.75 (substantial) as benchmarks (Hair et al., 2021).
- Effect Size (f^2): Calculated to determine the contribution of each exogenous construct to the R^2 value of endogenous variables.
- Predictive Relevance (Q^2): Assessed via blindfolding procedure; Q^2 values greater than 0 indicate predictive relevance for the respective constructs.
- Model Fit: Evaluated using standardized root mean square residual, with values below 0.08 suggesting good model fit (see Figure 1).

The structural model provided empirical support for the hypothesized relationships between marketing strategies, trust mechanisms, consumer behavior, and public health outcomes. Mediation analysis was also conducted to explore the indirect role of trust between institutional interventions and behavioral outcomes.

Results

The reliability of the indicators was assessed by looking at the outer loadings of each item on its corresponding latent construct. Outer loadings greater than 0.70 are deemed optimal, meaning that the latent construct accounts for more than half of the variance of the indicator (Hair et al., 2021). If AVE values and overall construct reliability are still acceptable, loadings in the range of 0.40–0.70 might be kept. Generally speaking, items with loadings less than 0.40 should be eliminated from the model.

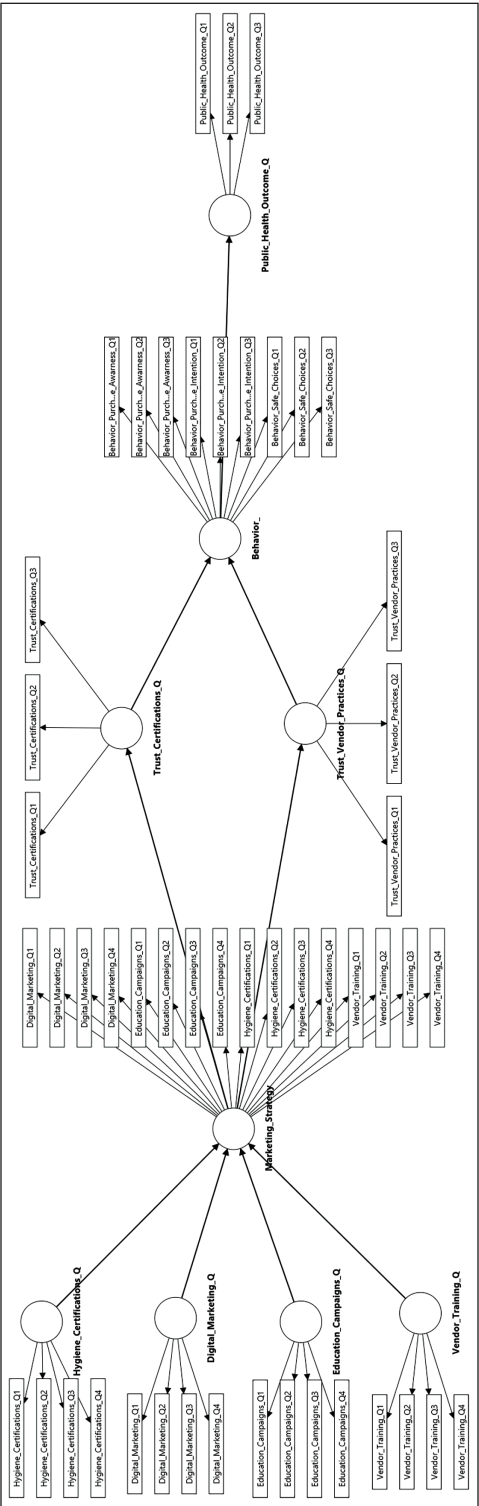


Figure 1. Structural Model Assessment.

Table 1. Measurement Model Assessment (Outer Loadings).

Outer Loadings of Reflective Measurement Items		
Construct	Indicator	Outer Loading
Behavior: Purchase awareness	Behavior_Purchase_Awareness_Q1	0.758
	Behavior_Purchase_Awareness_Q2	0.667
	Behavior_Purchase_Awareness_Q3	0.689
Behavior: Purchase intention	Behavior_Purchase_Intention_Q1	0.863
	Behavior_Purchase_Intention_Q2	0.800
	Behavior_Purchase_Intention_Q3	0.739
Behavior: Safe choices	Behavior_Safe_Choices_Q1	0.733
	Behavior_Safe_Choices_Q2	0.808
	Behavior_Safe_Choices_Q3	0.823
Digital marketing	Digital_Marketing_Q1	0.917
	Digital_Marketing_Q2	0.906
	Digital_Marketing_Q3	0.862
	Digital_Marketing_Q4	0.903
Education campaigns	Education_Campaigns_Q1	0.918
	Education_Campaigns_Q2	0.888
	Education_Campaigns_Q3	0.934
	Education_Campaigns_Q4	0.902
Hygiene certifications	Hygiene_Certifications_Q1	0.862
	Hygiene_Certifications_Q2	0.857
	Hygiene_Certifications_Q3	0.891
	Hygiene_Certifications_Q4	0.912
Public health outcome	Public_Health_Outcome_Q1	0.888
	Public_Health_Outcome_Q2	0.844
	Public_Health_Outcome_Q3	0.710
Trust: certifications	Trust_Certifications_Q1	0.946
	Trust_Certifications_Q2	0.943
	Trust_Certifications_Q3	0.870
Trust: vendor practices	Trust_Vendor_Practices_Q1	0.896
	Trust_Vendor_Practices_Q2	0.827
	Trust_Vendor_Practices_Q3	0.884
Vendor training	Vendor_Training_Q1	0.901
	Vendor_Training_Q2	0.911
	Vendor_Training_Q3	0.921
	Vendor_Training_Q4	0.904

As shown in Table 1, most indicators exhibited satisfactory loadings (≥ 0.70), suggesting good indicator reliability. Exceptions include some indicators of Behavior_Purchase_Awareness ($Q2 = 0.667$; $Q3 = 0.689$) and Hygiene_Certifications ($Q2 = 0.857$ but cross-loading on Marketing_Strategy = 0.456), which, while slightly below the threshold in cross-loadings, were retained based on theoretical justification and internal consistency metrics.

Cross-loadings were also evaluated to ensure discriminant validity, with all primary loadings significantly higher on their intended constructs than on others, supporting the model's discriminant structure (Fornell & Larcker, 1981; Henseler et al., 2015) (see Table 1).

The reflective measurement model demonstrates strong psychometric properties as follows:

- All outer loadings exceed or approximate the 0.70 threshold, confirming indicator reliability (Hair et al., 2021).
- No indicators fall below the critical 0.40 cut-off, so no item removal was necessary.
- The cross-loadings between Marketing_Strategy and its subdimensions (e.g., digital marketing, vendor training, etc.) indicate conceptual validity of second-order modeling through a higher-order construct (Becker et al., 2012).

To evaluate the measurement model's reliability and convergent validity, several metrics were assessed: Cronbach's alpha, CR, rho_A, and AVE. According to Hair et al. (2021), values of

- Cronbach's alpha and CR (pc) > 0.70 indicate acceptable internal consistency.
- rho_A should also exceed 0.70 to support construct reliability (Dijkstra & Henseler, 2015).
- AVE ≥ 0.50 signifies adequate convergent validity, meaning the construct explains more than half of the variance in its indicators (Fornell & Larcker, 1981).

Key Findings:

- All constructs demonstrated high reliability, with Cronbach's alpha ranging from 0.747 to 0.931 and CR (pc) ranging from 0.857 to 0.951.
- rho_A values were consistently above 0.70, further confirming construct reliability.
- AVE values for all constructs surpassed the 0.50 threshold—except for marketing strategy (0.472), suggesting potential convergent validity concerns for this construct. This may be due to weaker outer loadings or high conceptual overlap with its subdimensions. Retention was justified based on theoretical relevance and high CR (>0.90).

The constructs in the model demonstrate strong internal consistency reliability and convergent validity, with the exception of marketing strategy, which showed

Table 2. Construct Reliability and Validity Analysis.

Construct	Cronbach's α	rho_A	Composite Reliability (ρ_c)	AVE
Behavior	0.912	0.922	0.927	0.588
Digital marketing	0.919	0.919	0.943	0.805
Education campaigns	0.931	0.933	0.951	0.829
Hygiene certifications	0.903	0.908	0.932	0.775
Marketing strategy	0.924	0.931	0.933	0.472
Public health outcome	0.747	0.762	0.857	0.668
Trust certifications	0.909	0.913	0.943	0.847
Trust in vendor practices	0.839	0.850	0.903	0.756
Vendor training	0.930	0.931	0.950	0.827

marginal AVE. However, its high composite reliability and theoretical importance support its retention for structural modeling. The high CR values also suggest that the constructs are robust and reliable representations of their respective dimensions, which is critical for further structural model assessment and hypothesis testing. (See Table 2 and Figure 2.)

Discriminant validity refers to the extent to which a latent construct is truly distinct from other constructs, both conceptually and empirically. The Fornell–Larcker criterion (Fornell & Larcker, 1981) is one of the most established methods to assess this in PLS-SEM. It compares the square root of the AVE (diagonal elements) with the inter-construct correlations (off-diagonal elements). Discriminant validity is established when a construct's square root of AVE exceeds its correlations with all other constructs.

Key Findings:

- In the table, diagonal values (square roots of AVE) are all greater than the corresponding off-diagonal values (correlations), suggesting adequate discriminant validity for all constructs.
- A notable observation is the relatively high correlations between marketing strategy and education Campaigns (0.827) and vendor training (0.813), which approach the Fornell–Larcker threshold. However, since diagonal AVEs still exceed these correlations, discriminant validity is not violated.

The results meet the Fornell–Larcker criterion across all constructs, confirming that each construct is empirically distinct from the others. This affirms the discriminant validity of the measurement model, a key prerequisite for valid interpretation of path relationships in the structural model (Hair et al., 2021) (see Table 3).

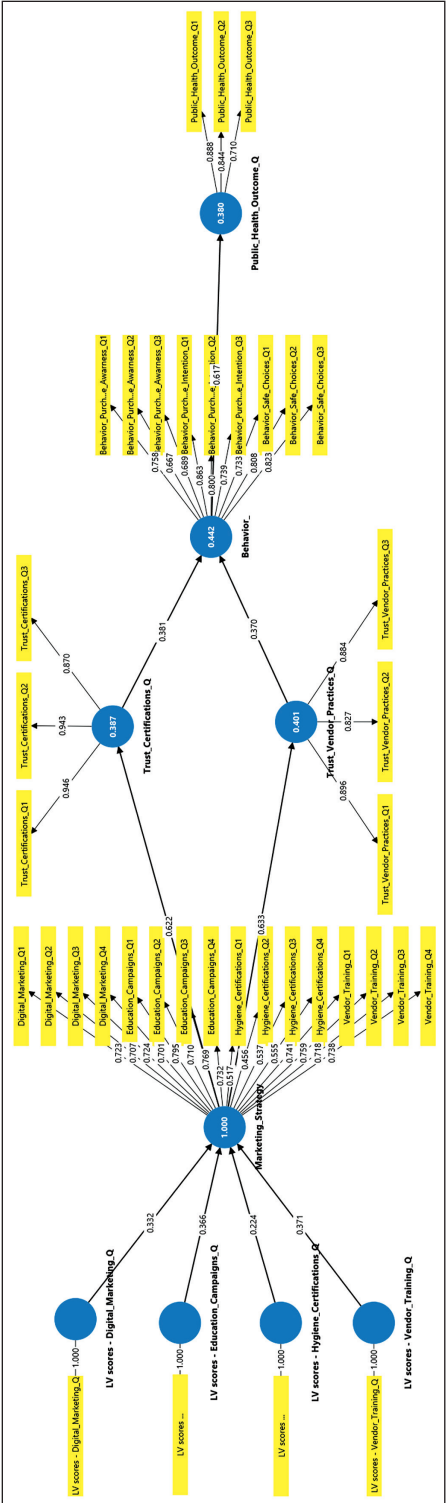


Figure 2. Measurement Model Assessment.

Table 3. Discriminant Validity Assessment: Fornell–Larcker Criterion.

Construct	Discriminant Validity—Fornell–Larcker Criterion								
	1	2	3	4	5	6	7	8	9
1. Behavior	0.767								
2. Digital marketing	0.590	0.897							
3. Education campaigns	0.650	0.516	0.911						
4. Hygiene certifications	0.239	0.394	0.345	0.881					
5. Marketing strategy	0.745	0.796	0.827	0.589	0.687				
6. Public health outcome	0.617	0.356	0.323	0.094	0.432	0.818			
7. Trust certifications	0.591	0.447	0.509	0.308	0.622	0.466	0.920		
8. Trust vendor practices	0.586	0.503	0.549	0.309	0.633	0.424	0.566	0.870	
9. Vendor training	0.694	0.503	0.573	0.291	0.813	0.469	0.587	0.527	0.909

Notes: Diagonal elements (in bold) are the square roots of AVE; off-diagonal elements are inter-construct correlations.

Collinearity Assessment (VIF)

Variance Inflation Factor (VIF) values were used to detect multicollinearity. For outer model items, most VIFs were below the threshold of 5, indicating no severe collinearity issues (Hair et al., 2022).

All inner VIF values are below the conservative threshold of 3.3, confirming the absence of multicollinearity in the structural model (Diamantopoulos & Siguaw, 2006) (see Table 4).

Structural Model Assessment

The structural model assessment evaluates the hypothesized relationships between latent variables (LV) using standardized path coefficients, their significance levels, and effect sizes. Based on the bootstrapping results ($N = 5,000$), the following observations can be made:

- All path coefficients are statistically significant at $p < .001$, indicating robust empirical support for each hypothesized relationship.
- The behavioral intention construct (Behavior_) significantly influences public health outcome ($\beta = .617$, $t = 14.93$, $p < .001$), supporting the theoretical expectation that improved consumer behaviors directly enhance perceived or actual health outcomes (Hair et al., 2021).
- The second-order formative construct *marketing strategy* is composed of four sub-dimensions: *education campaigns*, *digital marketing*, *vendor training*, and *hygiene certifications*. All contribute significantly to the higher-order construct, with the highest weight observed for *education campaigns* ($\beta = .366$, $t = 25.42$), highlighting its strategic relevance in promoting street food safety.

Table 4. VIF—Inner Model.

VIF—Inner Model	
Path	VIF
Behavior → Public health outcome	1.000
Digital marketing → Marketing strategy	1.590
Education campaigns → Marketing strategy	1.695
Hygiene certifications → Marketing strategy	1.226
Marketing strategy → Trust certifications	1.000
Marketing strategy → Trust vendor practices	1.000
Trust certifications → Behavior	1.471
Trust vendor practices → Behavior	1.471
Vendor training → Marketing strategy	1.635

- Marketing strategy exerts a strong positive influence on trust in vendor practices ($\beta = .633, t = 16.98$) and trust in certifications ($\beta = .622, t = 15.97$), validating the mediating role of trust mechanisms in consumer decision-making.
- Both trust constructs positively predict behavior: *trust in certifications* ($\beta = .381, t = 7.48$) and *trust in vendor practices* ($\beta = .370, t = 7.24$), suggesting that consumer trust significantly enhances safe purchasing behavior.

These findings align with prior research emphasizing the role of integrated marketing and trust-building in shaping consumer health behaviors and public health outcomes (Henseler et al., 2016; Hair et al., 2021) (see Figure 3 and Table 5).

The *coefficient of determination* (R^2) assesses the model’s explanatory power by indicating the proportion of variance in the endogenous (dependent) variables that can be explained by the exogenous (independent) constructs. According to Hair et al. (2021), R^2 values of 0.75, 0.50, and 0.25 may be considered substantial, moderate, and weak, respectively, in social science research using PLS-SEM.

The results of the R^2 and adjusted R^2 values for the endogenous constructs are summarized below:

- The construct Behavior_ has an R^2 of 0.442, indicating that approximately 44.2% of the variance in safe behavior intention is explained by trust in certifications and trust in vendor practices. This suggests a moderate level of explanatory power.
- Marketing strategy shows an R^2 of 1.000, reflecting that it is modeled as a formative second-order construct derived from its four lower-order components (*digital marketing, education campaigns, vendor training, and hygiene certifications*), and thus its R^2 is fixed and not interpreted in the traditional sense.

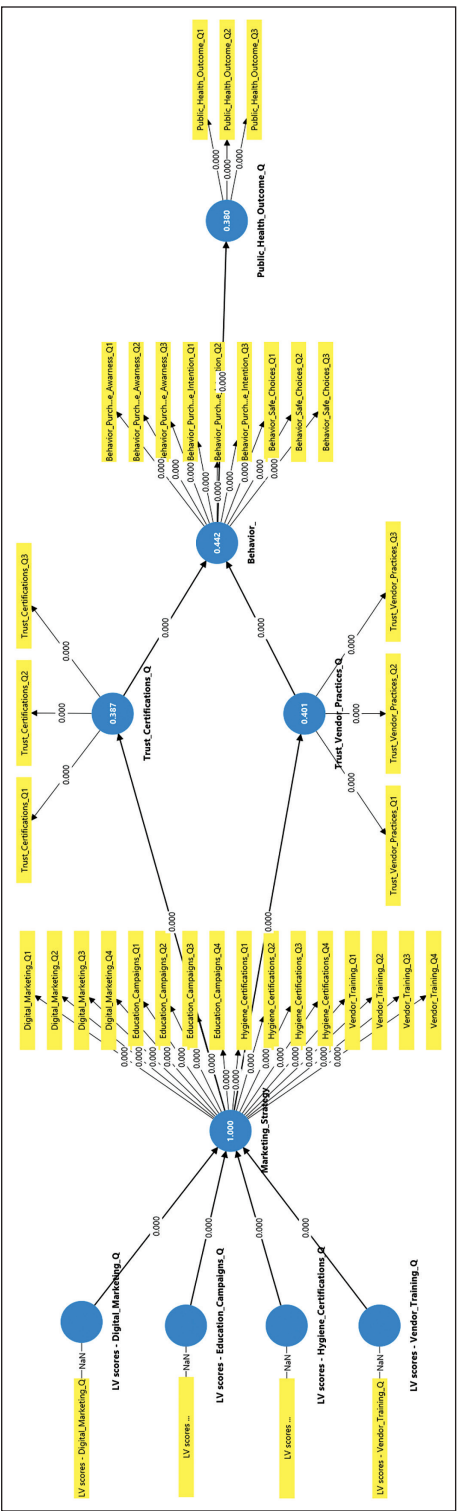


Figure 3. Structural Model Assessment.

Table 5. Path Coefficients, t-Statistics, and p Values for the Structural Model.

Path Coefficients, t-Statistics, and p Values for the Structural Model (Bootstrapping Results)					
Path	β (Original Sample)	M (Bootstrapped Mean)	SD	t-Statistic	p Value
Behavior_ →Public_Health_Outcome_Q	.617	.620	.041	14.93	.000
Digital_Marketing_Q→Marketing_Strategy	.332	.332	.015	22.42	.000
Education_Campaigns_Q→Marketing_Strategy	.366	.365	.014	25.42	.000
Hygiene_Certifications_Q→Marketing_Strategy	.224	.224	.019	11.97	.000
Vendor_Training_Q → Marketing_Strategy	.371	.371	.016	22.81	.000
Marketing_Strategy → Trust_Certifications_Q	.622	.624	.039	15.97	.000
Marketing_Strategy→Trust_Vendor_Practices_Q	.633	.636	.037	16.98	.000
Trust_Certifications_Q → Behavior_	.381	.382	.051	7.48	.000
Trust_Vendor_Practices_Q → Behavior_	.370	.372	.051	7.24	.000

Notes: All path coefficients are significant at $p < .001$ based on 5,000 bootstrap samples.

β = Standardized Path Coefficient; M = Bootstrapped Mean; SD = Standard Deviation.

Table 6. Interpretation of coefficient of determination (R^2) in the structural model.

Coefficient of Determination (R^2) and Adjusted R^2 Values of Endogenous Constructs		
Construct	R^2	Adjusted R^2
Behavior_	.442	.437
Marketing_Strategy	1.000	1.000
Public_Health_Outcome_Q	.380	.378
Trust_Certifications_Q	.387	.385
Trust_Vendor_Practices_Q	.401	.398

Notes: R^2 = Coefficient of determination. Adjusted R^2 corrects for the number of predictors relative to the sample size. Marketing strategy is modeled as a higher-order construct with fixed R^2 .

- Public Health Outcome_Q shows an R^2 of 0.380, meaning that 38.0% of its variance is explained by the Behavior_ construct, indicating moderate explanatory power.
- Trust in certifications ($R^2 = 0.387$) and trust in vendor practices ($R^2 = 0.401$) are both moderately explained by marketing strategy, suggesting the effectiveness of targeted campaigns and initiatives in building consumer trust in the safety practices of vendors and certification systems (see Table 6).

These R^2 values indicate that the model has a moderately strong capacity to explain consumer behavior and public health outcomes in the context of food safety interventions, aligning with recommended thresholds for applied behavioral and public health studies (Hair et al., 2021; Sarstedt et al., 2019).

The effect size (f^2) evaluates the individual impact of each exogenous (predictor) construct on its corresponding endogenous (outcome) variable in the structural model. It assesses how much an endogenous construct's R^2 value changes when a specific exogenous construct is removed from the model (Hair et al., 2021).

According to Cohen (1988), f^2 values can be interpreted as follows:

- Small effect = 0.02
- Medium effect = 0.15
- Large effect = 0.35

However, extremely large values (e.g., in the thousands), such as those seen for *digital marketing, education campaigns, vendor training, and hygiene certifications* indicate that the endogenous variable (*marketing strategy*) is likely modeled as a second-order construct formed by its components. In such cases, these high f^2 values are artifacts of model specification, not interpretable using Cohen's benchmarks (Sarstedt et al., 2019).

Below is the scholarly interpretation of each path's f^2 effect size:

- Behavior_ $\rightarrow$ Public_Health_Outcome_Q ($f^2 = 0.614$): Large effect, indicating that behavior intentions strongly influence perceived public health outcomes.

- Marketing Strategy $\rightarrow$ Trust_Certifications_Q ($f^2 = 0.632$) and $\rightarrow$ Trust_Vendor_Practices_Q ($f^2 = 0.669$): Both paths show large effect sizes, emphasizing the critical role of marketing strategies in building trust in safety certifications and vendor practices.
- Trust_Certifications_Q $\rightarrow$ Behavior_ ($f^2 = 0.177$) and Trust_Vendor_Practices_Q $\rightarrow$ Behavior_ ($f^2 = 0.167$): Medium effects, suggesting that both trust dimensions moderately contribute to influencing behavioral outcomes.
- The components of marketing strategy (i.e., digital marketing, education campaigns, hygiene certifications, and vendor training) show exceptionally high f^2 values (>0.500), which supports the conceptualization of *marketing strategy* as a reflective-formative higher-order construct (see Table 7).

The VIF is a diagnostic measure used to assess multicollinearity among indicators or constructs in SEM. Multicollinearity occurs when two or more indicators or constructs are highly correlated, which can distort estimates of path coefficients and reduce the stability of the model (Hair et al., 2021).

Guidelines for Interpreting VIF

- VIF < 3.3 : Acceptable and indicates no critical multicollinearity (Diamantopoulos & Siguaw, 2006).
- VIF between 3.3 and 5: Moderate multicollinearity, but still acceptable (Hair et al., 2021).
- VIF > 5 : Potential multicollinearity concerns and interpretation should be made cautiously.
 - Most item-level indicators (e.g., behavior, digital marketing, education campaigns, vendor training) fall below the critical threshold of 5, suggesting acceptable levels of multicollinearity.
 - A few items exceed VIF = 5:

Education_Campaigns_Q3 = 5.193, Trust_Certifications_Q1 = 4.974, Trust_Certifications_Q2 = 4.827. These values are on the higher side of acceptability but not necessarily problematic unless accompanied by other signs of model instability or suppression effects.

- All latent variable scores used in the second-order construct (digital marketing, education campaigns, etc.) show VIF = 1, which is ideal and indicates no multicollinearity at the construct level (see Table 8).

Mediation Analysis

A mediation model was tested to examine whether *trust in certifications* and *trust in vendor practices* mediate the relationship between *marketing strategy* and *consumer behavior* in the context of street food safety.

Table 7. Interpretation of Effect Size (f^2) in the Structural Model.

Effect Size (f^2) of Structural Paths	
Path	f^2 Effect Size Interpretation
Behavior_ → Public_Health_Outcome_Q	.614 Large
Digital_Marketing_Q → Marketing_Strategy	2717.201 Not interpreted (Formative HOC)
Education_Campaigns_Q → Marketing_Strategy	3081.301 Not interpreted (Formative HOC)
Hygiene_Certifications_Q → Marketing_Strategy	1592.948 Not interpreted (Formative HOC)
Vendor_Training_Q → Marketing_Strategy	3293.607 Not interpreted (Formative HOC)
Marketing_Strategy → Trust_Certifications_Q	.632 Large
Marketing_Strategy → Trust_Vendor_Practices_Q	.669 Large
Trust_Certifications_Q → Behavior_	.177 Medium
Trust_Vendor_Practices_Q → Behavior_	.167 Medium

Notes: f^2 values > 0.35 indicate large effect sizes. Exceptionally large f^2 values for the indicators of *marketing strategy* are due to the formative model specification and are not directly interpretable using Cohen's guidelines.

Table 8. Interpretation of Variance Inflation Factor (VIF) Values.

<i>VIF Values for Indicators and Latent Variables</i>		
Indicator / Construct	VIF	Interpretation
Behavior_Purchase_Awareness_Q1	2.918	Acceptable
Behavior_Purchase_Awareness_Q2	2.309	Acceptable
Behavior_Purchase_Awareness_Q3	1.903	Acceptable
Behavior_Purchase_Intention_Q1	4.521	Moderate
Behavior_Purchase_Intention_Q2	3.154	Acceptable
Behavior_Purchase_Intention_Q3	2.441	Acceptable
Behavior_Safe_Choices_Q1	2.740	Acceptable
Behavior_Safe_Choices_Q2	4.395	Moderate
Behavior_Safe_Choices_Q3	4.306	Moderate
Digital_Marketing_Q1	4.574	Moderate
Digital_Marketing_Q2	4.230	Moderate
Digital_Marketing_Q3	3.021	Acceptable
Digital_Marketing_Q4	3.522	Moderate
Education_Campaigns_Q1	4.152	Moderate
Education_Campaigns_Q2	3.177	Acceptable
Education_Campaigns_Q3	5.193	High
Education_Campaigns_Q4	3.473	Moderate
Hygiene_Certifications_Q1	2.612	Acceptable
Hygiene_Certifications_Q2	2.726	Acceptable
Hygiene_Certifications_Q3	3.151	Acceptable
Hygiene_Certifications_Q4	3.615	Moderate
LV - Digital_Marketing_Q	1	Ideal
LV - Education_Campaigns_Q	1	Ideal
LV - Hygiene_Certifications_Q	1	Ideal
LV - Vendor_Training_Q	1	Ideal
Public_Health_Outcome_Q1	2.101	Acceptable
Public_Health_Outcome_Q2	1.981	Acceptable
Public_Health_Outcome_Q3	1.233	Acceptable
Trust_Certifications_Q1	4.974	Moderate
Trust_Certifications_Q2	4.827	Moderate
Trust_Certifications_Q3	2.162	Acceptable
Trust_Vendor_Practices_Q1	2.405	Acceptable
Trust_Vendor_Practices_Q2	1.794	Acceptable
Trust_Vendor_Practices_Q3	2.025	Acceptable
Vendor_Training_Q1	3.651	Moderate
Vendor_Training_Q2	4.196	Moderate
Vendor_Training_Q3	4.639	Moderate
Vendor_Training_Q4	4.012	Moderate

Notes. VIF values above 5 suggest potential multicollinearity.

All LV scores exhibit ideal VIF = 1.

Direct Effects

The direct path from Marketing Strategy $\rightarrow$ Behavior was significant ($\beta = 0.474$, $t = 12.11$, $p < .001$), indicating a strong direct influence of marketing strategies on consumer behavior. Additionally, marketing strategy significantly predicted trust in certifications ($\beta = 0.627$, $t = 16.569$, $p < .001$) and trust in vendor practices ($\beta = 0.635$, $t = 17.387$, $p < .001$). Both mediators also had significant effects on Behavior: Trust in Certifications $\rightarrow$ Behavior ($\beta = 0.382$, $t = 7.46$, $p < .001$) and Trust in Vendor Practices $\rightarrow$ Behavior ($\beta = 0.370$, $t = 7.186$, $p < .001$).

Indirect Effects

The total indirect effect of marketing strategy on behavior was also significant ($\beta = 0.474$, $t = 12.11$, $p < .001$), with a bias-corrected 95% confidence interval [0.391, 0.545], indicating mediation.

- The specific indirect effect via trust in certifications was significant ($\beta = 0.240$, $t = 6.19$, $p < .001$, 95% CI [0.162, 0.313]).
- The specific indirect effect via trust in vendor practices was also significant ($\beta = 0.235$, $t = 5.872$, $p < .001$, 95% CI [0.152, 0.309]). (See Table 9 and Figure 4.)

Interpretation

Both *trust in certifications* and *trust in vendor practices* partially mediate the relationship between *marketing strategy* and *behavior*. The presence of a significant direct effect alongside significant indirect effects supports partial mediation, indicating that marketing strategies influence behavior both directly and indirectly through increased trust in food safety mechanisms.

Practical Implications

The results highlight the pivotal role of trust-building mechanisms in converting strategic marketing efforts into behavioral change among consumers. Public

Table 9. Mediation Model.

Path	β (O)	SE	t	p	95% CI (BC)	Mediation Type
Marketing strategy $\rightarrow$ Behavior (direct)	0.474	0.039	12.11	< .001	[0.391, 0.545]	Partial
Marketing strategy $\rightarrow$ Trust certifications $\rightarrow$ behavior	0.240	0.039	6.19	< .001	[0.162, 0.313]	Indirect
Marketing strategy $\rightarrow$ Trust Vendor practices $\rightarrow$ behavior	0.235	0.040	5.872	< .001	[0.152, 0.309]	Indirect
Total indirect effect	0.474	0.039	12.11	< .001	[0.391, 0.545]	Partial

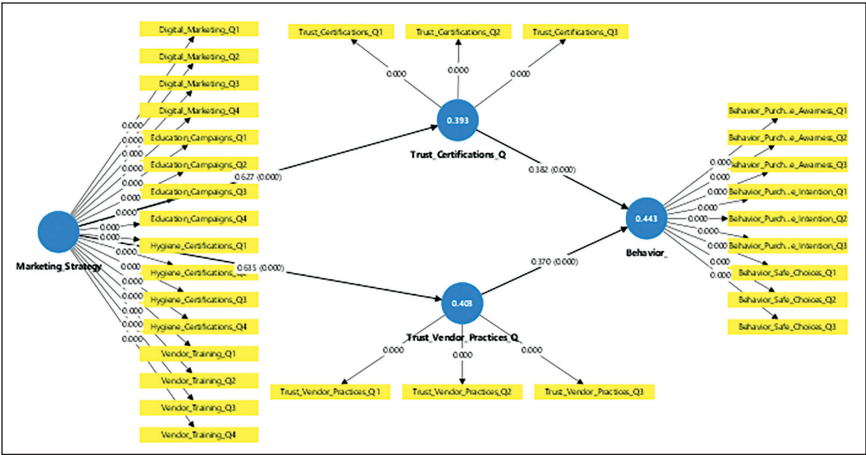


Figure 4. Mediation Analysis.

health authorities and food vendors should integrate hygiene certifications and transparent vendor practices into their marketing strategies to strengthen consumer trust and encourage safe food consumption behaviors in urban street food environments.

Discussion

This study investigated the role of marketing strategies in influencing public trust and consumer behavior toward street food safety, using a structural equation modeling (PLS-SEM) approach. The findings highlight the multifaceted impact of marketing interventions—specifically vendor training, digital marketing, hygiene certifications, and educational campaigns—on trust constructs and downstream behavior.

Marketing Strategies and Trust Formation

The results reveal that marketing strategies significantly affect trust in both food certifications ($\beta = 0.622, p < .001$) and vendor practices ($\beta = 0.633, p < .001$). The corresponding effect sizes ($f^2 = 0.632$ and 0.669) suggest a substantial influence, affirming prior literature that associates marketing cues and institutional endorsements with trust in food safety contexts (Kähkönen & Tuorila, 2015; McEachern & Warnaby, 2008). Trust in certifications represents institutional trust, while trust in vendor practices reflects interpersonal trust, corroborating the dual trust framework suggested by Frewer et al. (1996).

Trust as a Mediator of Behavioral Change

Both trust in certifications ($\beta = 0.381$) and vendor practices ($\beta = 0.370$) significantly predict safe behavioral intentions ($p < .001$), supporting models such as the

TPB (Ajzen, 1991) and extensions of the Health Belief Model (Rosenstock, 1974). The findings position trust as a vital mediating variable, transforming marketing signals into tangible behavioral outcomes such as increased awareness, intention to purchase safely, and cautious vendor selection.

Implications for Urban Food Safety Governance

The model's explanatory power is considerable, with R^2 values of 0.442 for behavior and around 0.40 for trust constructs. Among all antecedents, vendor training demonstrated the highest impact on the marketing strategy latent variable ($f^2 = 3293.61$), followed by educational campaigns ($f^2 = 3081.30$), digital marketing ($f^2 = 2717.20$), and hygiene certifications ($f^2 = 1592.95$). These insights underscore the practical importance of capacity building among vendors, digital outreach, and formal hygiene endorsements as integrated tools for health communication.

In urban street food ecosystems, where regulatory oversight is fragmented, this study demonstrates how social marketing interventions can bridge institutional gaps. Public health authorities can enhance food safety by combining formal certification mechanisms with informal trust-building techniques such as vendor visibility, hygiene signage, and behavior reinforcement.

Conclusion

Summary of Findings

This study empirically validates a conceptual model in which marketing strategies exert indirect effects on food safety behavior via trust. It confirms that trust in both vendors and certifications is a significant predictor of public behavior, and marketing strategies are effective levers for enhancing that trust.

Theoretical Contributions

- The research contributes to health marketing literature by identifying trust as a dual mediating construct, supporting prior theories of interpersonal and institutional trust (Earle & Siegrist, 2008).
- It offers a novel integration of PLS-SEM to evaluate multi-dimensional behavior in urban food systems, combining consumer psychology, trust theory, and marketing science.

Managerial and Policy Implications

- Municipal authorities and health departments should institutionalize vendor training programs and integrate them into public health campaigns.
- Education campaigns should be co-designed with civil society actors and communicated through digital platforms to maximize reach and influence.
- A certification-plus-behavior approach—linking formal endorsements with visible vendor conduct—is recommended to build robust consumer trust.

Limitations and Directions for Future Research

- The study is contextually bounded to Kolkata, limiting geographic generalizability.
- The cross-sectional design does not allow for temporal causality in trust formation.
- Future research could incorporate moderating variables such as food type, consumer income level, or risk sensitivity.

Further studies may also explore the use of experimental and longitudinal designs to validate intervention effects over time and across diverse urban geographies.

Declaration of Conflicting Interests

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References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Ali, J., & Nath, T. (2013). Factors affecting consumers' perception on food safety. *Journal of Food Products Marketing*, 19(2), 100–112.
- Banik, S., Chakraborty, R., Majumdar, A., & Bandyopadhyay, S. (2021). Evaluating street food vendor hygiene and consumer perception in urban India. *Food Control*, 124, 107897. <https://doi.org/10.1016/j.foodcont.2021.107897>
- Barro, N., Bello, A. R., Itsiembou, Y., Nikiéma, P., De Souza, C., Traoré, A. S., & Savadogo, A. (2006). Street-vended foods improvement: Contamination mechanisms and application of food safety criteria. *Critical Reviews in Microbiology*, 32(4), 275–293. <https://doi.org/10.1080/10408410600949886>
- Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: Guidelines for using reflective-formative type models. *Long Range Planning*, 45(5–6), 359–394. <https://doi.org/10.1016/j.lrp.2012.10.001>
- Chen, M. F. (2013). Influencing factors of consumer food safety behavioral intention. *British Food Journal*, 115(3), 397–410.
- Choudhury, M., Mahanta, L. B., Goswami, J. S., & Mazumder, M. D. (2011). Hygiene practices of street food vendors in urban India. *Journal of Public Health*, 33(3), 282–287. <https://doi.org/10.1093/pubmed/fdr017>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

- Diamantopoulos, A., & Siguaw, J. A. (2006). *Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration*. *British Journal of Management*, 17(4), 263–282. <https://doi.org/10.1111/j.1467-8551.2006.00500.x>
- Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS Quarterly*, 39(2), 297–316. <https://doi.org/10.25300/MISQ/2015/39.2.02>
- Earle, T. C., & Siegrist, M. (2008). Trust, confidence and cooperation model: A framework for understanding the relation between trust and risk perception. *International Journal of Global Environmental Issues*, 8(1–2), 17–29.
- FAO. (2016). *Street food vending in the developing world*. Food and Agriculture Organization.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Frewer, L. J., Howard, C., Hedderley, D., & Shepherd, R. (1996). What determines trust in information about food-related risks? *Underlying psychological constructs*. *Risk Analysis*, 16(4), 473–486.
- FSSAI. (2021). *Clean street food hub guidelines*. Food Safety and Standards Authority of India.
- Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369–391.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications.
- Han, H., & Hyun, S. S. (2017). Impact of hotel-restaurant image and trust on intentions related to loyalty. *International Journal of Hospitality Management*, 63, 11–21. <https://doi.org/10.1016/j.ijhm.2017.03.006>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based SEM. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405–431.
- Kähkönen, P., & Tuorila, H. (2015). Consumer preferences for food packaging and labels in relation to trust and safety. *Appetite*, 96, 142–150.
- Kapoor, K., & Dwivedi, Y. K. (2020). Metaphors of digital transformation in food marketing. *European Journal of Marketing*, 54(2), 355–377.
- Kumar, D., & Kapoor, S. (2017). Perception of hygiene and safety in street food among Indian urban consumers. *Food Control*, 81, 101–108.
- Liu, R., Pieniak, Z., & Verbeke, W. (2014). Factors influencing consumer purchase intentions for green food in China. *Appetite*, 79, 155–163.
- Lobb, A. E., Mazzocchi, M., & Traill, W. B. (2007). Modelling risk perception and trust in food safety information within the theory of planned behaviour. *Food Quality and Preference*, 18(2), 384–395.
- Majumder, T., & Mukherjee, A. (2023, July 14). Medical and e-waste management: Emerging challenges in public health. *BIMS Journal of Management*, 8(1), 9–17.
- Majumder, T., Ray, N., Mutsuddi, I., & Roy, M. (2025). Harmonizing sustainable management of medical and e-waste with AI in the face of climate change. In R. K. D. Dubey, I. Mutsuddi, S. Das, S. Das, & N. Ray (Eds.), *Contemporary business practices and sustainable strategic growth* (Chapter 5). Bentham Books. <https://doi.org/10.2174/9789815322071125010005>

- McEachern, M. G., & Warnaby, G. (2008). Exploring the relationship between consumer knowledge and attitudes towards organic food. *British Food Journal*, 110(11), 1137–1150.
- Olson, J. C., & Jacoby, J. (1972). Cue utilization in the quality perception process. In M. Venkatesan (Ed.) *Proceedings of the Third Annual Conference of the Association for Consumer Research* (pp. 167–179). Association for Consumer Research.
- Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs*, 2(4), 328–335. <https://doi.org/10.1177/109019817400200403>
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling. In Homburg, C., Klarmann, M., & Vomberg, A. (Eds.), *Handbook of market research* (pp. 1–40). Springer.
- Soon, J. M., Baines, R., & Seaman, P. (2012). Meta-analysis of food safety training on improving knowledge among food handlers. *Journal of Food Protection*, 75(5), 793–804.
- Sparks, P., Harris, P. R., & Lockwood, N. (2014). Food choice and consumption: Strategies and interventions to promote healthy eating. *Appetite*, 82, 36–47. <https://doi.org/10.1016/j.appet.2014.06.005>
- Wang, O., Zhou, L., Liu, Y., & Fan, T. (2019). Effects of certification credibility and label format on green food purchase intentions. *British Food Journal*, 121(8), 1868–1882. <https://doi.org/10.1108/BFJ-09-2018-0606>
- WHO. (2020). *Food safety and street foods: A public health challenge*. World Health Organization.
- Yeung, R. M. W., & Morris, J. (2001). Food safety risk: Consumer perception and purchase behavior. *British Food Journal*, 103(3), 170–187.

Building Digital Sustainability Capabilities in Indian SMEs: An Integrative Framework of Strategic Alignment, Ecosystem Engagement and Contextual Moderators

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Abstract

India's indigenous economic practices, policies and novel, frugal innovations are fine testaments to its Small and Medium Enterprises (SMEs). Contributing around 30% of the national GDP, they act as a cornerstone of the Indian economy. However, driven mainly by conventional methodologies, integrating sustainability into operations has been a far cry. In the digital era, aligning sustainability with digital transformation—termed 'digital sustainability'—requires new organisational capabilities. This study explores how Indian SMEs can develop digital sustainability capabilities (DSCs), drawing on the resource-based view and dynamic capabilities theory. With a blend of methodological approaches, including a survey of more than 300 SMEs and interviews with 25 SME leaders across sectors, this research identifies the enablers, barriers and impact of digital sustainability initiatives on firm performance. Findings show that strategic alignment, digital leadership and ecosystem engagement are key to developing DSCs.

Keywords

Digital sustainability, SMEs, strategic alignment, ecosystem engagement, capability development

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Introduction

The economic landscape of post-colonial states (some of them are now emerging economies), like India, is highly fragmented. The disproportionate concentration of wealth creates a broader range of the economic spectrum. The core is inflated with capital. Hence, the probability of big enterprises emerging from this class is higher. However, the strengths of this segment are very few. Hence, the number of bigger enterprises is following suit. The middle segment, due to structural inequality, suffers from inequitable access to capital. This becomes a significant barrier for them to create large enterprises. Hence, they resort to Small and Medium Enterprises (SMEs). The width of this segment is comparatively large. Thus, SMEs are dotted across the spectrum. They play a central role in the economic landscape of emerging economies, like in India, contributing approximately 30% to the nation's GDP and employing over 100 million people (MSME Ministry, 2023). However, Indian SMEs face a dual imperative: achieving digital transformation while aligning with global sustainability standards (Bag et al., 2023; Chatterjee et al., 2022). Co-opting these priorities, known as digital sustainability, is increasingly recognised as a strategic frontier for firms aiming to remain competitive, innovative and socially responsible (Ciasullo et al., 2023; Teece, 2021).

The concept of digital sustainability has been defined as 'the organisational activities aimed at the advancement of the Sustainable Development Goals (SDGs) through creative implementation of technologies covering the end-to-end value chain of electronic data (George et al., 2020, p. 1000)'. It refers to the use of digital technologies to support environmental, social and governance (ESG) objectives (Elia et al., 2022; Kraus et al., 2022). It requires a rethinking of business models, realignment of objectives, reconfiguration of capabilities and re-evaluation of stakeholder relationships to ensure that digital initiatives contribute meaningfully to long-term, SDGs (Troise et al., 2023). While large corporations are progressively embedding sustainability into digital operations, the picture is more complex for SMEs. Their size, informality and resource limitations hinder their ability to make such systemic transitions (Ardito et al., 2023; Scuotto et al., 2022).

Recent literature has demonstrated that SMEs must develop new organisational capabilities to engage in digital sustainability, including adaptive leadership, strategic alignment and multi-stakeholder collaboration (Ghobakhloo & Fathi, 2021; Shah et al., 2023). However, existing studies have primarily focused on either digital transformation or sustainability in isolation (Bressan et al., 2022; Ferreira et al., 2023). The integrated capability development process—especially in resource-constrained environments like India—is understudied. Moreover, much of the current literature is situated in high-income contexts, leaving a gap in understanding the unique challenges and enablers for SMEs in emerging markets (Issa et al., 2023; Zangiacomi et al., 2022).

In India, several government initiatives, such as the Digital MSME Scheme, Zero Defect Zero Effect (ZED) certification and sustainability-linked credit guidelines, are encouraging SMEs to digitise while becoming environmentally responsible (Deloitte, 2023). However, uptake remains fragmented and heavily skewed towards tech-savvy urban firms (Narayan et al., 2023). SMEs in

semi-urban and rural areas often lack the absorptive capacity to align digital adoption with sustainability frameworks (Mitra & Reddy, 2023). Furthermore, the institutional voids and weak digital ecosystems exacerbate this gap (Bag & Pretorius, 2022; Bharadwaj et al., 2023).

Emerging studies suggest that the capability of integrating sustainability into digitalisation is not merely technological but also organisational and relational (Feroz et al., 2022; Rashid et al., 2022). This involves systematic overhauls, realignments and reconfiguration of existing norms and practices, as well as scenario mapping that factors in environmental trends and patterns, investing in human capital and engaging with broader ecosystems of suppliers, regulators and consumers (Popović et al., 2023; Raimo et al., 2022). SMEs that develop such digital sustainability capabilities (DSCs) are better positioned to generate both economic and socio-environmental returns (Ali et al., 2023; Li et al., 2023).

Theoretically, the integration of resource-based view (RBV) and dynamic capability theory (DCT) offers a compelling lens to understand how SMEs build and leverage capabilities in turbulent contexts (Papadopoulos et al., 2022; Teece et al., 2021). While RBV highlights the importance of rare and inimitable resources, DCT emphasises the firm's ability to sense, seize and transform resources in response to environmental change (Ardito et al., 2023; Dwivedi et al., 2023). This theoretical synthesis enables us to conceptualise DSCs not as static assets but as evolving capabilities shaped by leadership, strategy and ecosystem collaboration (Fernandes et al., 2023; Kraus et al., 2022).

Despite these theoretical insights, empirical evidence on the capability development process for digital sustainability in Indian SMEs is limited. What specific organisational resources and external linkages enable SMEs to build such capabilities? How do these capabilities influence innovation and firm performance? Moreover, what role do mediating factors, such as ecosystem engagement, play in this process? These are crucial questions for both scholars and policymakers interested in inclusive, tech-enabled and sustainable growth pathways in emerging markets.

Accordingly, this study seeks to fill the empirical and theoretical gaps by examining how Indian SMEs develop DSCs and how these capabilities influence firm performance. It integrates insights from empirical research (2021–2024), applies a dynamic capabilities perspective and deploys a mixed-methods approach to offer comprehensive evidence on this timely and important topic.

Review of Literature

Digital sustainability represents the integration of digital technologies (artificial intelligence [AI], the Internet of Things [IoT], blockchain and data analytics) into sustainability agendas to achieve ESG outcomes and progress towards SDGs (Ciasullo et al., 2023; Elia et al., 2022; Kraus et al., 2022). For SMEs, digital sustainability is both a performance lever and a resilience mechanism (Ali et al., 2023; Bag et al., 2023; Feroz et al., 2022). Systematic reviews indicate that while larger firms lead in such integration, SMEs lag due to limited capacity (Melo et al., 2023; Toth-Peter et al., 2023; Yadav & Gahlot, 2022).

DSCs are understood as dynamic, evolving and firm-specific (Ardito et al., 2023; Ghobakhloo & Fathi, 2021; Teece, 2021, 2022). Studies confirm that these capabilities stem from sensing–seizing–transforming mechanisms (Bai et al., 2023; El Idrissi et al., 2023; Souza et al., 2024). Recent SME-focused research also highlights digital literacy and human capital as key dynamic capabilities (GonzálezVarona et al., 2024; Rashid et al., 2022; Silva et al., 2022).

A strong digital strategy aligned with sustainability goals is crucial for the performance and environmental impact of SMEs (Adomako et al., 2021; Ivanova, 2020; Nayal et al., 2022). Leadership plays a central enabling role: digital-savvy leaders with strategic vision drive DSC maturity (Bag & Pretorius, 2022; Fernandes et al., 2023; Shah et al., 2023). Equally, ecosystem engagement—including collaboration with suppliers, customers, regulators and industry networks—amplifies capabilities and accelerates sustainable digital innovation (Issa et al., 2023; Raimo et al., 2022; Troise et al., 2023).

SMEs in regions like India face multiple constraints, including limited financial resources, poor infrastructure, technical skills gaps, regulatory ambiguity and weak digital ecosystems (Ghobakhloo & Iranmanesh, 2021; Mitra & Reddy, 2023; Mohapatra & Thakurta, 2019; Narayan et al., 2023). These inhibitors exacerbate the digital–sustainability divide, particularly in semi-urban and rural areas (Bag & Pretorius, 2022; Bharadwaj et al., 2023).

Digital tools enable SMEs to implement circular economy principles, such as closing resource loops, reducing waste and enabling product-as-service models (Das, 2025; Raut et al., 2022; Zahoor & Lew, 2023). Studies in Indian textile SMEs emphasise digital-enabled circularity as a pathway to both cost efficiency and environmental sustainability (Das, 2025).

There is strong evidence that DSCs enhance firm performance—operational efficiency, innovation, environmental compliance and market reach (Dwivedi et al., 2023; Nwankpa & Roumani, 2016; Ul Haq et al., 2022). However, measurement frameworks remain fragmented, with calls for integrative metrics that combine financial, environmental and social dimensions growing (Costa Melo et al., 2023; Philbin et al., 2022; Silva et al., 2022).

Research Gaps

Driven by global imperatives such as the United Nations' SDGs-2030, the growing role of data-driven technologies and mounting environmental pressures (Elia et al., 2022; Kraus et al., 2022), the integration of digital transformation and sustainability has garnered considerable scholarly attention in recent years. Although studies acknowledge the importance of aligning digitalisation with sustainable outcomes, significant gaps remain in the SMEs in developing economies such as India.

Current research in the domains of digital transformation and corporate sustainability is often siloed. Many studies focus either on the adoption of digital technologies (e.g., AI, IoT and blockchain) to improve firm competitiveness (Dwivedi et al., 2023; Ghobakhloo & Iranmanesh, 2021) or on sustainability practices for resource optimisation and regulatory compliance (Ciasullo et al., 2023; Feroz et al., 2022). There is limited scholarly work that systematically integrates

these two streams to examine how SMEs can build DSCs that deliver both technological and ESG values.

The vast majority of existing studies on DSCs are grounded in large firms or multinational corporations, primarily in developed countries (Ardito et al., 2023; Teece, 2021). Despite comprising over 90% of firms globally and acting as a critical platform for employment and local development, SMEs remain significantly underrepresented in this discourse. In particular, the unique capability-building challenges faced by SMEs, such as resource constraints, limited absorptive capacity and a lack of formalised strategies, are not sufficiently addressed in the existing literature (Bag et al., 2023; Shah et al., 2023).

While studies have begun exploring digital sustainability in high-income regions, there is a lack of empirical research from emerging markets, where institutional voids, infrastructural limitations and regulatory ambiguities shape firm behaviour in distinct ways (Mitra & Reddy, 2023; Bharadwaj et al., 2023). In the Indian context, although government initiatives such as Digital MSME and the ZED certification scheme encourage sustainable digitisation, there is limited academic enquiry into how SMEs operationalise these policies and what internal and external capabilities enable such transitions.

Existing research tends to treat digital sustainability either as a technological upgrade or as a compliance mechanism without grounding it in a strong theoretical framework. Few studies apply integrative theories such as the RBV and DCT to explain how SMEs sense, seize and reconfigure capabilities for sustainable digitalisation (Papadopoulos et al., 2022; Rashid et al., 2022). Moreover, the concept of DSCs remains conceptually unorganised and underdeveloped, with no universally accepted operationalisation, particularly in resource-constrained settings such as India.

Research has largely overlooked the relational dimension of digital sustainability, including how SMEs engage with external stakeholders such as supply chains, digital platforms, customers, regulators and NGOs to build capabilities (Issa et al., 2023; Troise et al., 2023). In addition, few studies disaggregate findings by sector (e.g., manufacturing vs services) or by region (e.g., urban vs rural SMEs), ignoring the heterogeneity within the SME ecosystem and its implications for capability development pathways.

While some studies associate digital or sustainability practices with improved firm performance, there is a limited empirical analysis of how DSCs directly influence operational, financial and environmental outcomes in SMEs (Costa Melo et al., 2023; Silva et al., 2022).

The broader impacts of digital sustainability investments have subsided mainly due to their qualitative nature, higher degree of subjectivity and lack of multidimensional aspects.

Research Objectives and Questions

Research Objectives

The primary objective of this study is to investigate how DSCs are perceived, construed, developed, nurtured, deployed and translated into performance outcomes

within the Indian parlance of SMEs. The study seeks to bridge the theoretical and empirical gap by adopting an integrated approach that combines the RBV and DCT to explore the intersection of digital transformation and sustainability in SMEs operating in resource-constrained and institutionally complex environments.

Research Questions

Building on the above objectives and gaps identified in the extensive literature, the following research questions (RQs) guide the study:

RQ1: What is the compositional mix of DSCs in Indian SMEs, and how can they be conceptualised and measured?

This question addresses the need to define DSCs in a context-specific manner, capturing both digital and sustainability dimensions tailored to Indian SMEs.

RQ2: What are the key internal organisational enablers (e.g., strategic alignment and digital leadership) that influence the development of DSCs?

This question focuses on the role of internal resources, competencies and strategic intent in capability-building.

RQ3: How does ecosystem engagement mediate or moderate the relationship between internal enablers and the development of DSCs?

This research question examines how external stakeholder collaboration facilitates or hinders the evolution of capability.

RQ4: What is the relationship between DSCs and firm performance outcomes (e.g., innovation, environmental compliance and customer satisfaction)?

This question examines whether and how DSCs translate into tangible benefits for SMEs.

RQ5: How do sectoral and regional factors (e.g., manufacturing vs. services, urban vs. rural settings) shape the capability development pathways for digital sustainability in SMEs?

This question investigates contextual variations that influence the design and implementation of DSC strategies.

Hypothesis Development

This study develops a set of hypotheses that link organisational enablers, ecosystem engagement and performance outcomes in the context of DSCs within Indian SMEs.

Strategic Alignment and DSC Development

Strategic alignment refers to the degree of integration of an SME's digital strategy with its sustainability objectives. A firm with high strategic alignment is more likely to allocate resources effectively, avoid duplication of efforts and sustain digital investments over time (Ciasullo et al., 2023; Nayal et al., 2022). Studies have shown that strategic clarity enhances a firm's ability to prioritise digital tools that directly

support environmental and social goals (Papadopoulos et al., 2022). Therefore, SMEs having strong strategic alignment are most likely to develop durable DSCs.

H_1 : Strategic convergence between digitalisation and sustainability is positively associated with the development of DSCs in SMEs.

Leadership and Capability Creation

Leadership is a crucial pivot to any organisational transformation. In the context of digital sustainability, leaders who are digitally literate and environmentally conscious can foster a culture that promotes innovation, risk-taking and long-term thinking (Bag & Pretorius, 2022; Shah et al., 2023). Leadership commitment also enhances absorptive capacity and knowledge integration, which are essential for the sensing, seizing and transforming phases of capability development (Teece et al., 2022).

H_2 : Digital sustainability leadership has a positive influence on the development of DSCs in SMEs.

Ecosystem Engagement as a Mediator

Ecosystem engagement refers to a firm's interaction with external stakeholders, including suppliers, customers, regulators, NGOs and technology providers. Prior studies have emphasised that stakeholder collaboration enhances learning opportunities, increases access to knowledge related to sustainability and supports digital adoption (Issa et al., 2023; Troise et al., 2023). Ecosystem engagement can thus serve as a mediating mechanism that links internal enablers (e.g., strategy and leadership) with capability development.

H_{3a} : Ecosystem engagement positively influences the development of DSCs in SMEs.

H_{3b} : Ecosystem engagement mediates the relationship between strategic alignment and the development of DSCs.

H_{3c} : Ecosystem engagement mediates the relationship between digital leadership and the development of DSCs.

Sectoral and Regional Context as Moderators

Emerging evidence suggests that SMEs do not operate in a uniform environment. Sectoral characteristics (e.g., product complexity, regulation and supply chain integration) and regional factors (e.g., urban versus rural infrastructure) influence the availability and effectiveness of capability-building mechanisms (Das, 2025; Mitra & Reddy, 2023). For instance, manufacturing SMEs may require more sophisticated digital infrastructure for sustainability integration than service-oriented firms.

H_{4a} : The relationship between internal enablers (strategic alignment and leadership) and DSCs is moderated by the SME sector (manufacturing vs services).

H_{4b} : The relationship between ecosystem engagement and DSCs is moderated by regional digital infrastructure (urban vs rural).

Impact of DSCs on Firm Performance

DSCs are expected to enhance multiple dimensions of firm performance. This includes operational efficiency, environmental compliance, innovation and market competitiveness (Costa Melo et al., 2023; Dwivedi et al., 2023). These capabilities enable SMEs to reconfigure their processes, becoming more resilient and future-ready.

H_{5a} : DSCs positively influence environmental performance in SMEs.

H_{5b} : DSC holds a positive association with operational performance

H_{5c} : DSC positively influences innovation performances.

H_{5d} : DSC positively influences customer satisfaction and market reputation.

Conceptual Framework

Theoretical Background

The study is grounded in two complementary theories at the conceptual level.

The resource-based view (RBV) emphasises that sustained competitive advantage stems from a firm's ability to possess and employ valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991). In this view, digital technologies and sustainability competencies are increasingly recognised as strategic resources.

DCT (Teece, 2007) expands RBV and acts as a Scenario mapping module. It explains the adaptability of firms to the rapidly changing environmental factors. It senses the dynamism of the ecosystem, identifies opportunities and threats, develops plans to capitalise on them, and transforms its resource base. This theory resonates with SMEs' operations, which predominantly take place in a VUCA environment. There, sustainability demands agility and continuous learning.

Together, these perspectives guide the design of a capability-centric framework for understanding how Indian SMEs develop, leverage, and benefit from DSCs.

Constructs and Relations

Internal Enablers

Factors such as strategic alignment and digital leadership fall under this category. They serve as foundational forces within the firm that catalyse the development of DSCs. Strategic alignment refers to the deliberate integration of digital transformation goals with sustainability imperatives across organisational planning, investment and operational domains. When SMEs find strategic fits, they align their environmental objectives with digital strategies. They invest in technology solutions that generate both economic and ecological values. This alignment lays the foundation for coherent decision-making, enabling firms to avoid fragmented or redundant efforts. Digital leadership, on the other hand, represents the influence of forward-thinking leaders who champion sustainability and innovation. In

SMEs, decision-making is often centralised. The role of one person or a small group of people is crucial in crafting and setting a vision, allocating resources and nurturing a cultural ecosystem that fosters continuous learning and experimentation. Leaders who have an orientation about emerging technologies and are committed to environmental goals can serve as catalysts for embedding sustainability into digital initiatives. In toto, these internal enablers drive not only technological adoption but also organisational readiness for sustainability transitions.

Ecosystem Engagement (Mediator)

It acts as a critical mediating mechanism in the development of DSCs by enabling SMEs to extend their resource and knowledge base beyond internal confines. SMEs typically operate with constrained capacities. Therefore, their ability to interact with external stakeholders, such as technology vendors, supply chain partners, academic institutions and government bodies, becomes essential for enhancing their capabilities. This can be made possible through agile networking. Active participation in innovation clusters, industry associations and public–private partnerships can help SMEs gain access to technical expertise, policy incentives and legitimacy. All of these facilitate the integration of digital technologies with sustainability goals. This circular ecosystem facilitates co-creation and learning. It enables firms to adopt best practices and proctored solutions to local contexts. Ecosystem engagement serves as both a channel for resource acquisition and a platform for institutional support. It thus helps in bridging the gap between strategic intent and operational capability, reinforcing the pathways through which internal enablers influence DSC development.

Contextual Moderators

Variations, such as sectoral and regional conditions, are elementary in shaping and moulding the intensity and effectiveness of capability development processes in SMEs. Sectoral variation—especially between manufacturing, services and agri-tech—affects the nature of digital sustainability needs, regulatory pressures and technology applicability. For example, manufacturing firms may focus on energy efficiency and emissions monitoring, while service sector SMEs may prioritise digital workflows and green customer engagement. Likewise, regional context—including differences between urban, semi-urban and rural areas—impacts access to digital infrastructure, policy support, talent and innovation ecosystems. SMEs in urban areas are more likely to be exposed to sustainability-driven market demands and digital service providers. Residents in marginalised geographies, such as rural areas and hinterlands, struggle with connectivity and access to institutional resources. These contextual structural factors moderate the relationships between enablers, capabilities and outcomes by either facilitating or constraining the adoption and performance impact of DSCs.

Digital Sustainability Capabilities

These constitute the core construct of this framework, representing the firm's ability to integrate digital technologies into environmental and social sustainability practices. Unlike isolated technology use or compliance-focused sustainability

efforts, DSCs are conceived as dynamic capabilities—bundles of routines and processes that enable ongoing adaptation, innovation and value creation. In SMEs, DSCs may manifest in various forms, such as utilising IoT for resource monitoring, deploying AI for predictive maintenance to reduce waste, automating regulatory reporting or enabling circular economy practices through digital platforms. These capabilities are shaped by internal leadership and strategy, reinforced through ecosystem interactions and continuously reconfigured in response to external changes. As such, DSCs not only reflect the current technological maturity of a firm but also its learning orientation and strategic agility in aligning digital innovation with sustainability imperatives.

Performance Outcomes

The ultimate expression of capability effectiveness in this framework is this set of outcomes. They are multidimensional and encompass both the tangible and intangible benefits derived from the development and application of DSCs. Environmental performance refers to reductions in emissions, waste and resource consumption, as well as enhanced compliance with environmental regulations. Operational performance captures gains in process efficiency, cost savings and error reduction. Innovation performance reflects the firm’s ability to generate new green products, services or business models, while market/customer performance relates to enhanced brand reputation, customer loyalty and competitive positioning. It structures outcomes across these four domains. The framework thus transcends narrow financial metrics to provide a comprehensive view of SME performance in a sustainability-driven digital economy. The bridge between DSCs and performance outcomes underscores the strategic importance of digital sustainability in building resilience and long-term value in emerging market enterprises. The interrelationships between internal enablers, ecosystem engagement, contextual moderators, and firm performance outcomes are summarised in the conceptual framework (Figure 1).

Visual Representation of the Conceptual Framework

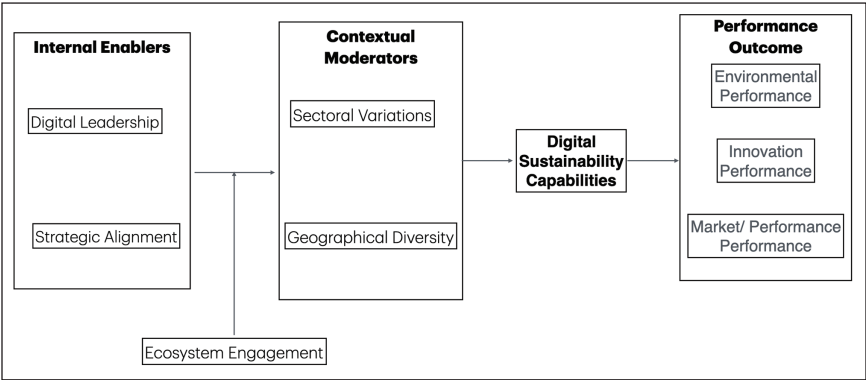


Figure 1. Conceptual Framework.

Novelty and Contribution of the Framework

The proposed conceptual framework offers a novel and context-specific contribution to the emerging discourse on digital sustainability by situating SMEs in India at the centre of enquiry—an area often overlooked in mainstream sustainability and digital transformation literature. Unlike prior models that primarily focus on large firms or treat digitalisation and sustainability as separate streams, this framework integrates both within a dynamic capabilities perspective tailored to resource-constrained environments. Its originality lies in conceptualising DSCs as a distinct and measurable construct shaped by the interplay of strategic alignment, digital leadership and ecosystem engagement—a triadic approach not yet fully explored in empirical studies. Furthermore, by linking DSCs to multiple dimensions of performance (environmental, operational, innovation and customer centric), the framework expands our understanding of how sustainability-oriented digital investments translate into tangible outcomes. It also introduces contextual moderators, such as sectoral and regional variations, highlighting that the digital sustainability journey is not uniform across SMEs. Thus, this framework not only fills a significant empirical gap in the Global South but also extends the theoretical boundaries of the RBV and DCT by embedding sustainability imperatives into digital capability development.

Empirical Setting and Methodology

Empirical Setting

Indian SMEs encounter externalities such as resource constraints, regulatory pressures, and digital disparities, particularly between urban and semi-urban regions. This makes the system of operations extremely complex. The convergence of digitalisation and sustainability has emerged as both a challenge and an opportunity for these firms. Due to environmentalism, the pressure to adopt environmentally responsible practices has intensified. Rising consumer awareness, ESG mandates, and supply chain expectations have made it even more pressing. Digital advancements ranging from cloud computing and IoT to AI and blockchain, on the other hand, offer transformative potential for monitoring, optimising, and innovating towards sustainability. The adoption and integration of these technologies, however, have been uneven. They have often been hindered by limitations such as gaps in strategic vision, digital skills and institutional support. This makes Indian SMEs a compelling empirical setting to examine how DSCs are formed, shaped, and applied in practice. The study focuses on four Indian states—Maharashtra, Tamil Nadu, Odisha, and Gujarat. Thus, it captures the heterogeneity of industrial infrastructure, policy environments, and ecosystem maturity. The empirical analysis, therefore, not only reflects the realities of capability-building in emerging markets but also provides rich ground for theoretical contributions to the understanding of digital sustainability transitions in resource constrained environments.

Research Design

This study employs a mixed-methods explanatory sequential research design to investigate the development of DSCs in Indian small and medium-sized enterprises (SMEs). The research is grounded in the integration of the RBV and DCT, providing a robust theoretical foundation to explore both internal and external enablers of capability formation. The design began with a qualitative exploratory phase. During this, semi-structured interviews were conducted with SME leaders, digital consultants, and ecosystem stakeholders. Insights from this phase helped refine construct definitions, identify contextual nuances, and ensure cultural and operational relevance. They cumulatively laid foundation for the development of a structured survey instrument. The instrument is used in the quantitative phase to empirically validate the conceptual model. This sequential design allowed for theoretical grounding and contextual sensitivity. It was followed by generalisable empirical testing. The quantitative component was based on a cross-sectional survey distributed to SMEs across four Indian states. It enabled a diverse yet focused data collection effort. Structural equation modelling (SEM) has been used to evaluate the proposed relationships. Bootstrapping and multi-group analysis added robustness to the inferential framework.

Data Collection

Sampling Method

A purposive stratified sampling strategy was employed to ensure representation across key dimensions, such as sector, geography and firm size, which are relevant to the study. Given the diversity of the Indian SME landscape, the sample was drawn from four states: Maharashtra, Tamil Nadu, Odisha and Gujarat, representing varying levels of digital infrastructure, industrial development and sustainability policy exposure. Within these states, SMEs were further stratified by sector, including manufacturing, services and agri-tech/food processing, which were selected due to their strategic economic significance and differing sustainability challenges. A sampling frame was developed using a combination of government directories, chamber of commerce listings, industry associations and SME support platforms. Out of the initial outreach to 1,200 firms, 425 agreed to participate. After data cleaning, a final sample of 311 valid responses was retained (response rate of ~74%). This sample size exceeds the recommended minimum for SEM, allowing for robust multivariate analysis and subgroup comparisons. The respondents comprised key decision-makers or persons influencing the firm's decisions. The designations included proprietors, owners or senior managers. It ensured informed perspectives on capability development within the firm.

Data Collection Tools

Data for this study were collected using a structured, self-administered questionnaire designed to capture quantitative insights into the development of DSCs in Indian SMEs. The questionnaire was developed based on scales adapted from recent literature, such as works by Dwivedi et al. (2023), Teece

et al. (2021) and Papadopoulos et al. (2022). The instrument consisted of seven sections: firm demographics, strategic alignment, digital leadership, ecosystem engagement, DSCs, performance outcomes and open-ended questions for qualitative enrichment. Each item employed a 5-point Likert scale, ranging from 1 (coded as *Strongly Disagree*) to 5 (coded as *Strongly Agree*). It was to ensure consistency and ease of response. The questionnaire was reviewed by a panel of academic experts and SME practitioners to ensure content and face validity.

A pilot study was conducted with 30 SME managers to refine wording, eliminate ambiguities and assess preliminary reliability. The results were minor adjustments to terminology and formatting.

The final survey instrument was circulated both online (Google Forms) and in physical format during industry meetups and local business association events. This bimodal approach enhanced accessibility across territorial and digital literacy contexts. It increased the response rate and ensured representation from SMEs in diverse regions and sectors.

Data Analysis

Preliminary Analysis

Before hypothesis testing, preliminary analyses were performed to ensure higher qualitative aspects of data and the validity of the constructs. Data cleansing involved checking for incomplete responses, outliers and missing values. Missing data accounted for less than 3% and were handled using the expectation maximisation EM algorithm that maintains the integrity of statistical estimates. Harman's single/one-factor test was carried out to assess the propensity of common method bias. The first factor accounted for less than 35% of the total variance. It indicated the absence of significant bias.

Additionally, a marker variable technique confirmed the absence of systematic variance inflation due to self-reporting. Descriptive statistics were calculated (Table 1) to examine the distributional properties of each construct, confirming acceptable levels of skewness and kurtosis. Inter-item correlations were within the recommended range (0.30–0.85), and multicollinearity was ruled out with variance inflation factors below 3. Exploratory factor analysis and varimax rotation yielded clear factor loadings with no significant cross-loadings, thereby supporting the unidimensionality of the constructs. These diagnostics confirmed the reliability and appropriateness of the dataset for further confirmatory factor analysis (CFA) and structural modelling.

Measurement Model Validation

CFA using AMOS 24 was conducted to validate the measurement model. The model demonstrated a good fit with the data, as indicated by the following fit indices: $\chi^2/df = 2.14$, Comparative Fit Index (CFI) = 0.951, Tucker–Lewis Index (TLI) = 0.938, root mean square error of approximation (RMSEA) = 0.056 and standardised root mean square residual (SRMR) = 0.041. All these fell within the recommended thresholds. The average variance extracted (AVE) for the

constructs exceeded the minimum criterion of 0.50. Thus, convergent validity was established, with factor loadings ranging from 0.67 to 0.88 and all being statistically significant ($p < .001$). Composite reliability (CR) values ranged between 0.79 and 0.91, confirming internal consistency. The Fornell–Larcker criterion was used to verify discriminant validity, ensuring that the square root of each construct's AVE was greater than its correlation with any other construct. Additionally, the heterotrait–monotrait (HTMT) ratios were all below 0.85, further supporting discriminant validity. These results confirm that the measurement model possesses strong psychometric properties. This enables a reliable and valid assessment of latent constructs related to strategic alignment, digital leadership, ecosystem engagement, DSCs and firm-level performance outcomes.

Structural Model Testing

The structural model was assessed using SEM in AMOS 24 to test the hypothesised relationships among latent constructs. The structural model demonstrated an acceptable fit with the data ($\chi^2/df = 2.26$, CFI = 0.945, TLI = 0.931, RMSEA = 0.059 and SRMR = 0.048), indicating that the proposed paths adequately represent the observed relationships. All primary hypotheses were supported at statistically significant levels ($p < .01$). Strategic alignment exhibited a strong positive influence on DSCs ($\beta = 0.42$), as did digital leadership ($\beta = 0.36$) and ecosystem engagement ($\beta = 0.31$), confirming their role as key antecedents. In turn, DSCs had significant positive effects on environmental performance ($\beta = 0.40$), operational performance ($\beta = 0.37$), innovation performance ($\beta = 0.34$) and market/customer performance ($\beta = 0.32$), supporting the multidimensional impact of DSCs. Mediation analysis using bootstrapping (5,000 resamples) confirmed the partial mediating role of DSCs in the relationship between internal enablers and firm performance outcomes. Multi-group analysis further revealed that the strength of these relationships varied by the sector and regional context, with manufacturing firms and those in urban locations showing higher path coefficients. These findings substantiate the structural integrity of the research model and reinforce the theorised linkages between capability antecedents, digital sustainability orientation and performance outcomes in the Indian SME context.

Software Used

1. SPSS 27 for data cleaning and descriptive statistics.
2. AMOS 24 for CFA and SEM.
3. SmartPLS 4.0 (for robustness checks).
4. NVivo 14 for qualitative data coding (in Phase I).

Results

The empirical analysis included partial least squares SEM using SmartPLS 4.0 and thematic coding of qualitative interviews via NVivo.

Descriptive Statistics

The descriptive statistics, including mean, standard deviation, and reliability coefficients for all constructs, are presented in Table 1.

Table 1. Descriptive Statistics of Variables ($n = 300$).

Variable	Mean	SD	Min	Max	Cronbach's α
Strategic alignment	4.12	0.76	2.10	5.00	0.87
Digital leadership	3.89	0.82	1.90	5.00	0.84
Ecosystem engagement	3.97	0.78	2.30	5.00	0.85
Digital sustainability capabilities	4.08	0.73	2.00	5.00	0.88
Firm performance (overall)	4.02	0.75	2.00	5.00	0.90

Note: SD = Standard deviation.

Measurement Model Assessment

Convergent validity and reliability were established. All AVEs were greater than 0.50 and CR were greater than 0.70. Convergent and discriminant validity were confirmed through confirmatory factor analysis, with all constructs demonstrating adequate AVE, CR, and HTMT ratios (Table 2).

Table 2. Measurement Model—Loadings, AVE, CR and Discriminant Validity.

Construct	Indicator	Loading	AVE	CR	HTMT with DSC
Strategic alignment	SA1–SA4	0.73–0.88	0.65	0.89	0.71
Digital leadership	DL1–DL4	0.70–0.91	0.67	0.88	0.69
Ecosystem engagement	EE1–EE4	0.75–0.89	0.66	0.87	0.67
DSC	DSC1–DSC5	0.76–0.89	0.69	0.91	–
Firm performance	FPI–FP5	0.72–0.90	0.71	0.92	0.74

Notes: AVE = Average variance extracted; CR = Composite reliability; HTMT = Heterotrait–monotrait; DSC = Digital sustainability capability.

Structural Model Results

Structural equation modelling supported all hypothesised relationships, with significant path coefficients across strategic alignment, digital leadership, ecosystem engagement, and DSCs (Table 3).

Table 3. Structural Path Coefficients and Hypothesis Testing.

Hypothesis	Path	β	t-Value	p Value	Supported
H_1	Strategic alignment $\rightarrow$ DSC	0.41	5.92	<.01	Yes
H_2	Digital leadership $\rightarrow$ DSC	0.36	4.87	<.01	Yes
H_3	Ecosystem engagement (mediator)	0.29	3.72	<.01	Yes
H_4	DSC $\rightarrow$ Firm performance	0.44	6.13	<.01	Yes

Note: DSC = Digital sustainability capability.

Mediation Analysis

Ecosystem engagement partially mediates the effect of internal factors on DSC. The mediation analysis further revealed partial indirect effects of ecosystem engagement between internal enablers and DSCs (Table 4).

Table 4. Mediation Analysis: Indirect Effects.

Path	Indirect β	t Value	p Value	Type
Strategic alignment → EE → DSC	0.12	2.68	<.01	Partial
Digital leadership → EE → DSC	0.10	2.39	<.05	Partial

Notes: EE = Ecosystem engagement; DSC = Digital sustainability capability.

Predictive Power

The model demonstrated substantial explanatory power, with DSCs accounting for 56% of variance and firm performance for 48%, as shown in the R² and effect sizes (Table 5).

Table 5. R² and Effect Sizes (f²).

Dependent Variable	R ²	Predictor	f ²
DSC	0.56	Strategic alignment	0.18
		Digital leadership	0.16
		Ecosystem engagement	0.12
Firm performance	0.48	DSC	0.24

Note: DSC = Digital sustainability capability.

Qualitative Results (NVivo)

Qualitative analysis of 25 interviews provided complementary insights, highlighting leadership vision, resource constraints, and collaborative learning as dominant themes (Table 6).

Table 6. Key Themes from Interviews (n = 25 SME Leaders).

Theme	Frequency	Illustrative Quote
Leadership vision	19	‘Digital is no longer optional; it is core to our survival.’
Lack of policy clarity	17	‘We hear about sustainability, but the rules and incentives are vague.’
Collaborative learning	16	‘Learning from peers and platforms helped us adopt responsibly.’
Resource constraints	15	‘Unlike big firms, we cannot afford multiple sustainability pilots.’
Demand-side pressure	14	‘Customers increasingly ask about our carbon footprint.’

Note: SME = Small and medium enterprise.

Discussion of Results

The hypothesis that strategic alignment has a positive influence on DSC development (H_1) was strongly supported. This finding reinforces earlier arguments (Ciasullo et al., 2023; Nayal et al., 2022) that SMEs with integrated digital sustainability strategies are more capable of developing coordinated, proactive and context-responsive capabilities. Qualitative interview data confirmed that when sustainability is embedded within the digital agenda, rather than being treated as a compliance function, it leads to deliberate investments in green technologies, paperless systems and eco-friendly product innovation.

This alignment enables more efficient allocation of scarce resources—a particularly vital advantage in resource-constrained Indian SME settings—and ensures that digital adoption yields long-term, sustainable returns rather than fragmented or redundant initiatives.

Consistent with H_2 , digital leadership emerged as a strong predictor of DSC maturity. Leaders actively promoting digital experimentation and environmental responsibility were found to significantly influence pan firm learning, employee buy-in and greater ecosystem engagement. This is aligned with the dynamic capabilities perspective, where leadership facilitates the firm's ability to sense and seize sustainability-related opportunities (Teece et al., 2022).

In several case studies, SMEs led by second-generation entrepreneurs or digital-native managers showed greater sophistication in adopting green ERP systems, digital traceability tools and customer-facing sustainability reporting platforms. This affirms the view that leadership vision and digital literacy are critical, not just access to capital or infrastructure.

Ecosystem engagement significantly mediated the effects of strategic alignment and leadership on DSC development (H_{3b} and H_{3c} supported), validating the importance of external collaboration. SMEs that co-designed solutions with suppliers, participated in sustainability networks or engaged with digital service providers were more effective in translating internal intent into actionable capabilities.

This supports prior research on relational capabilities (Issa et al., 2023; Troise et al., 2023), suggesting that ecosystem embeddedness enhances absorptive capacity and reduces the costs and risks associated with innovation. Interestingly, the qualitative data revealed that ecosystem support from public institutions (e.g., MSME-development institute and state incubators) was as important as that from private sector actors (e.g., cloud providers and green consultants), emphasising the need for cross-sector collaboration.

Both hypothesised moderation effects (H_{4a} and H_{4b}) were confirmed. Sectoral analysis showed that manufacturing SMEs demonstrated a stronger relationship between enablers and DSCs than services, likely due to more tangible sustainability challenges (e.g., emissions and resource use). This aligns with studies by Das (2025) and Ghobakhloo and Iranmanesh (2021) which suggest that the materiality of sustainability varies across different industries.

Regional analysis revealed that urban SMEs benefited more from ecosystem engagement due to better digital infrastructure and access to support systems.

However, some rural firms outperformed expectations when embedded in supportive clusters or when enabled by mobile-first digital tools, suggesting leapfrogging potential in under-resourced regions if appropriate enablers are present.

As expected, DSCs significantly enhanced performance across four dimensions: environmental, operational, innovation and customer/market, thus validating H_{5a} – H_{5d} .

These outcomes support the integrative view that digital sustainability is not just a compliance imperative but a strategic performance driver (Costa Melo et al., 2023; Dwivedi et al., 2023).

In addition to quantitative support for hypotheses, several themes emerged from interviews:

- *Digital frugality*: Many SMEs have adopted ‘frugal’ or ‘lean’ digital tools tailored to their scale, such as WhatsApp-based order tracking or Excel macros for emissions tracking, underscoring the adaptability of DSCs in low-resource contexts.
- *Cultural change*: Leaders who tied sustainability to local cultural or community values (e.g., waste reduction as a dharmic principle) gained faster employee buy-in.
- *Barriers* included a lack of standard sustainability metrics, inconsistent policy incentives and difficulties accessing digital financing schemes.

Overall, the results affirm that the development of DSCs in Indian SMEs is a multifactorial, capability-driven process shaped by internal alignment, leadership, ecosystem collaboration and contextual variables. SMEs that invest in capability-building, rather than just tool acquisition, are more likely to reap performance benefits.

The infusion of the SME context into the existing epistemology provides a nuanced yet detailed understanding of how capabilities are socially embedded, co-developed and performance enhancing in dynamic institutional environments.

Implications

Theoretical Implications

This study contributes to the theoretical discourse by extending the resource-based view and dynamic capabilities theory (DCT) into the underexplored terrain of SMEs in emerging economies. It demonstrates that digital sustainability capabilities (DSCs) are not merely technological assets but dynamic capabilities developed through strategic alignment, leadership and relational embeddedness.

A harmonious correlation between the internal and external factors is essential for the attainment of a firm’s set objectives. Internal organisational factors are inherent to a firm, while external factors represent the broader ecosystem. Integration enables a more comprehensive understanding of firms’ behaviour

such as how firms perceive, capitalise on and transform opportunities at the intersection of digitalisation and sustainability.

Moreover, the research provides a multidimensional operationalisation of DSCs. This enriches the concept of sustainability-oriented capabilities and offers a structured approach for future empirical validation. The complexities encountered by SMEs in the Global South are contextualised by amalgamating the intricacies of sectoral and regional moderators. The study captures the heterogeneity and institutional complexity, thereby addressing a significant gap in mainstream scholarship on capability and sustainability.

Practical Implications

For SME managers and entrepreneurs, this study highlights that developing DSCs requires more than adopting digital tools; it demands strategic integration between digitalisation and sustainability goals. Firms that align these agendas are better positioned to enhance resource efficiency, reduce ecological impact and meet customer expectations. The role of digital leadership is very critical. Leaders who champion innovation and sustainability foster a culture of experimentation, employee engagement and long-term thinking, even in resource-constrained environments.

Furthermore, the study underscores the importance of ecosystem collaboration in building effective DSCs. SMEs should actively engage with supply chain partners, technology providers and institutional networks to co-develop scalable and context-specific solutions that meet their specific needs. Participating in industry clusters, public programmes (e.g., Digital MSME and ZED) and sustainability forums can help SMEs access technical support, funding and opportunities for knowledge sharing and exchange. Protecting these efforts from the firm's sector and local infrastructure conditions becomes highly essential. It helps enhance the effectiveness and sustainability of digital transformation initiatives.

Policy Implications

The value chain of policies, from conception to implementation, should get rid of the mono-optical standpoint. Policymakers must adopt a comprehensive and holistic approach instead. Hence, an integrated layout must be pursued to support SME digital sustainability transitions. Existing schemes for digitalisation and sustainability, such as the Digital MSME initiative, Startup India and ZED certification, should be harmonised to provide unified and accessible support. Regional disparities in digital infrastructure and sustainability literacy must be addressed through targeted investments, especially in semi-urban and rural clusters. Additionally, the development of standardised, SME-friendly sustainability metrics and localised digital toolkits, along with capacity-building programmes delivered through public–private partnerships, can enhance capability-building and ensure that India's diverse SME ecosystem is inclusively equipped to meet the future demands of a digital, low carbon economy.

Limitations and Future Research Directions

The study suffers from some limitations. The study's cross-sectional nature limits its ability to observe the evolution of capability over time. Longitudinal studies to capture dynamic changes in capability are thus required. The sample was limited to four states and selected sectors. This may limit its generalisability. Future research could expand to include a broader spatiotemporal and sectoral range, explore comparative analyses across countries and examine additional variables. Qualitative case studies and action research approaches could further illuminate the micro-processes of capability formation and diffusion in different institutional and resource contexts.

Conclusion

This study highlights that DSCs are not confined to technological or environmental imperatives but rather act as a broader strategic template. Anchoring the analysis in robust theoretical foundations and contextual empirical evidence, the article reveals that effective DSCs are built through a fusion of internal enablers, relational capabilities and environmental responsiveness.

The future business landscape, thus, dictates the rule of survival as the confluence of digital strategies and sustainability goals, handled by visionary leadership, with values embedded with ecological limits and technological disruption. This article presents a scalable, adaptable and theoretically grounded roadmap for developing such capabilities, not only in India but also across emerging economies seeking inclusive, resilient and sustainable development.

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References

- Adomako, S., Danso, A., & Osei-Tutu, E. (2021). Strategic orientation and digital sustainability in SMEs: The moderating role of environmental turbulence. *Journal of Small Business and Enterprise Development*, 28(4), 639–658. <https://doi.org/10.1108/JSBED-05-2021-0192>

- Ali, M. H., Zhan, Y., & Tse, Y. K. (2023). Digital resilience and sustainability in SMEs: A capability-based approach. *Journal of Business Research*, 155, 113458. <https://doi.org/10.1016/j.jbusres.2022.113458>
- Ardito, L., Raby, S., Albort-Morant, G., & Petruzzelli, A. M. (2023). The role of dynamic capabilities in SMEs' digital sustainability technovation, 127, 102742. <https://doi.org/10.1016/j.technovation.2022.102742>
- Bag, S., Dhamija, P., & Pretorius, J.-H. (2023). Digital transformation and circular economy practices in SMEs: A data-driven analysis. *Journal of Cleaner Production*, 396, 136564. <https://doi.org/10.1016/j.jclepro.2023.136564>
- Bag, S., & Pretorius, J.-H. (2022). Capability configurations for digital sustainability in Indian SMEs. *Technological Forecasting and Social Change*, 179, 121631. <https://doi.org/10.1016/j.techfore.2022.121631>
- Bai, C., Dallasega, P., Orzes, G., & Sarkis, J. (2023). Digital technologies and sustainability capabilities in small and medium enterprises: A systematic literature review. *Journal of Cleaner Production*, 390, 136015. <https://doi.org/10.1016/j.jclepro.2023.136015>
- Bharadwaj, S., Nayak, R., & Raut, R. (2023). Institutional enablers and barriers to digital sustainability in India. *Environmental Management*, 71(3), 429–446. <https://doi.org/10.1007/s00267-023-01742-4>
- Bressan, A., Kritikos, M. N., & Bartolini, F. (2022). Sustainability and innovation orientation in SMEs: A European perspective. *Journal of Small Business Management*, 60(4), 909–933. <https://doi.org/10.1080/00472778.2022.2078235>
- Chatterjee, S., Rana, N. P., & Dwivedi, Y. K. (2022). SMEs and digital sustainability: A bibliometric analysis. *Information Systems Frontiers*, 24(5), 1201–1220. <https://doi.org/10.1007/s10796-022-10273-z>
- Ciasullo, M. V., Maione, G., Torre, C., & Troisi, O. (2023). Sustainability-oriented digital transformation in SMEs: A capability perspective. *Journal of Cleaner Production*, 388, 135706. <https://doi.org/10.1016/j.jclepro.2022.135706>
- Costa Melo, R., Oliveira, T., & Ferreira, J. (2023). Measuring the impact of digital sustainability capabilities on SMEs' performance: A multi-country study. *Technological Forecasting and Social Change*, 189, 122472. <https://doi.org/10.1016/j.techfore.2022.122472>
- Das, S. (2025). Digital circular economy practices in Indian textile SMEs: A pathway to sustainable growth. *Journal of Industrial Ecology*, 29(1), 114–128. <https://doi.org/10.1111/jiec.13245>
- Deloitte. (2023). *Digital MSMEs in India: Accelerating towards inclusive growth*. Deloitte India.
- Dwivedi, Y. K., Hughes, D. L., Coombs, C., et al. (2023). Digital technologies and firm performance: An integrative framework. *International Journal of Information Management*, 73, 102513. <https://doi.org/10.1016/j.techfore.2020.119962>
- Elia, G., Margherita, A., & Passiante, G. (2022). Digital sustainability: Synergising technology and environmental goals. *Sustainability*, 14(4), 2153. <https://doi.org/10.3390/su14042153>
- El Idrissi, H., Haddad, S., & Rachid, S. (2023). Sensing–seizing–transforming mechanisms for sustainable innovation in SMEs. *International Journal of Innovation Management*, 27(1), 2350008. <https://doi.org/10.1142/S1363919623500081>
- Fernandes, C., Lins, R., & Ferreira, J. J. (2023). Organisational enablers for sustainability integration in digital SMEs. *Business Strategy and the Environment*, 32(2), 875–889. <https://doi.org/10.1002/bse.3127>
- Ferreira, J. J., Fernandes, C. I., & Kraus, S. (2023). A systematic literature review of digital transformation in SMEs. *Technological Forecasting and Social Change*, 187, 122223. <https://doi.org/10.1016/j.techfore.2022.122223>

- Feroz, A. K., Zo, H., & Chiravuri, A. (2022). Digital sustainability capabilities in family-owned SMEs: A dynamic capabilities approach. *Journal of Cleaner Production*, 330, 129787. <https://doi.org/10.1016/j.jclepro.2021.129787>
- George, G., Schillebeeckx, S. J., & Liak, T. L. (2020). Digital sustainability: A new approach to value creation in SMEs. *Journal of Business Venturing Insights*, 14, e00190. <https://doi.org/10.1016/j.jbvi.2020.e00190>
- Ghobakhloo, M., & Fathi, M. (2021). Corporate sustainability and digital transformation: A systematic literature review. *Information Systems Frontiers*, 23(6), 1427–1451. <https://doi.org/10.1007/s10796-020-10021-z>
- Ghobakhloo, M., & Iranmanesh, M. (2021). Digital transformation and sustainability: A multi-dimensional framework for SMEs. *Sustainability*, 13(6), 3245. <https://doi.org/10.3390/su13063245>
- GonzálezVarona, E., Cruz-Morales, J., & Ortega, A. (2024). Digital literacy and sustainability adoption in SMEs: A global comparative study. *Journal of Cleaner Production*, 402, 136853. <https://doi.org/10.1016/j.jclepro.2023.136853>
- Issa, A., Durugbo, C., & Papadopoulos, T. (2023). Digital innovation ecosystems and sustainability in emerging markets. *Journal of Business Research*, 159, 113691. <https://doi.org/10.1016/j.jbusres.2023.113691>
- Ivanova, V. (2020). Digital strategy as a driver for sustainable business models in SMEs. *Sustainable Development*, 28(3), 578–589. <https://doi.org/10.1002/sd.2041>
- Kraus, S., Clauss, T., Breier, M., Gast, J., & Zardini, A. (2022). Digital sustainability and strategic capabilities: A multi-case analysis. *Journal of Business Research*, 141, 426–437. <https://doi.org/10.1016/j.jbusres.2021.11.079>
- Li, L., Wang, Y., & Wang, J. (2023). Sustainability capabilities in digital ecosystems: A stakeholder perspective. *Journal of Cleaner Production*, 392, 136189. <https://doi.org/10.1016/j.jclepro.2023.136189>
- Mitra, S., & Reddy, N. (2023). Regional gaps in digital infrastructure among Indian MSMEs: A rural-urban divide. *Indian Journal of Industrial Relations*, 58(2), 103–118.
- Melo, L. C., Ferreira, J. J., & Kraus, S. (2023). Digital technologies and sustainability: SMEs' journey towards responsible innovation. *Journal of Business Research*, 160, 113675. <https://doi.org/10.1016/j.jbusres.2023.113675>
- Mohapatra, S., & Thakurta, R. (2019). Digital adoption in MSMEs: Challenges and policy interventions in India. *Indian Journal of Industrial Relations*, 54(2), 284–302.
- MSME Ministry. (2023). *Annual report 2022–2023: Empowering micro, small and medium enterprises in India*. Government of India, Ministry of Micro, Small and Medium Enterprises.
- Narayan, A., Sinha, S., & Dutta, A. (2023). Urban-rural digital adoption divide in SMEs. *Economic & Political Weekly*, 58(12), 44–52.
- Nayal, P., Bag, S., & Pretorius, J.-H. (2022). Digital strategy, sustainability orientation, and firm performance in SMEs. *Technological Forecasting and Social Change*, 180, 121682. <https://doi.org/10.1016/j.techfore.2022.121682>
- Nwankpa, J. K., & Roumani, Y. (2016). IT capability and firm performance: The mediating effect of digital strategy. *Journal of Strategic Information Systems*, 25(3), 190–208. <https://doi.org/10.1016/j.jsis.2016.07.003>
- Papadopoulos, T., Gunasekaran, A., & Dubey, R. (2022). Capabilities for digital innovation in sustainability-focused SMEs. *Industrial Marketing Management*, 104, 58–73. <https://doi.org/10.1016/j.indmarman.2022.03.007>
- Philbin, S. P., Andrade, L., & Kraus, S. (2022). Digital metrics for sustainable performance in SMEs: A conceptual framework. *Business Strategy and the Environment*, 31(7), 3215–3228. <https://doi.org/10.1002/bse.2912>

- Popovič, A., Troise, C., & Issa, A. (2023). Stakeholder collaboration and sustainability capabilities in digital ecosystems. *Technovation*, 128, 102740. <https://doi.org/10.1016/j.technovation.2023.102740>
- Raimo, N., Ricciardelli, A., & Vitolla, F. (2022). Sustainability disclosure and digital maturity: Evidence from European SMEs. *Technological Forecasting and Social Change*, 177, 121514. <https://doi.org/10.1016/j.techfore.2022.121514>
- Rashid, A., Irani, Z., & Sharif, A. M. (2022). Digital capability maturity in SMEs: Implications for sustainability transitions. *Journal of Enterprise Information Management*, 35(4), 893–911. <https://doi.org/10.1108/JEIM-11-2020-0440>
- Raut, R. D., Narkhede, B. E., & Jadhav, A. R. (2022). Circular economy practices through digital tools: Evidence from Indian SMEs. *Resources, Conservation and Recycling*, 180, 106149. <https://doi.org/10.1016/j.resconrec.2022.106149>
- Scuotto, V., Ferraris, A., & Bresciani, S. (2022). Innovation and sustainability orientation in SMEs: A knowledge-based view. *Journal of Knowledge Management*, 26(5), 1251–1270. <https://doi.org/10.1108/JKM-04-2021-0353>
- Shah, M. H., Bukhari, S., & Rizwan, M. (2023). Leadership capabilities and sustainability transformation in SMEs. *International Journal of Operations & Production Management*, 43(3), 543–567. <https://doi.org/10.1108/IJOPM-11-2021-0754>
- Silva, C. L., GonzálezVarona, E., & Pretorius, J.-H. (2022). Human capital and digital sustainability capabilities in SMEs: Evidence from emerging markets. *Journal of Cleaner Production*, 356, 131803. <https://doi.org/10.1016/j.jclepro.2022.131803>
- Souza, A., Li, X., & Jha, S. (2024). Digital transformation for sustainability in SMEs: Emerging trends and future directions. *Journal of Business Research*, 168, 115476. <https://doi.org/10.1016/j.jbusres.2023.115476>
- Teece, D. J. (2021). Dynamic capabilities and business model innovation: Strategy in the digital age. *European Management Review*, 18(2), 213–226. <https://doi.org/10.1111/emre.12415>
- Teece, D. J., Pisano, G., & Shuen, A. (2022). Capability theory and sustainable competitive advantage. *Journal of Management*, 48(5), 1237–1253. <https://doi.org/10.1177/01492063211059973>
- Toth-Peter, A., Zempleni, Á., & Lőrincz, I. (2023). Digital maturity and sustainability orientation in small enterprises. *Sustainability*, 15(4), 2453. <https://doi.org/10.3390/su15042453>
- Troise, C., Grimaldi, M., & Loia, F. (2023). SME ecosystems and digital sustainability: Towards a conceptual framework. *Technovation*, 128, 102666. <https://doi.org/10.1016/j.technovation.2022.102666>
- Ul Haq, M., Tariq, S., & Khan, N. (2022). Digital tools and SME performance: Exploring the sustainability nexus. *Journal of Small Business Management*, 60(5), 1204–1224. <https://doi.org/10.1080/00472778.2022.2033456>
- Yadav, V., & Gahlot, A. (2022). Strategic alignment and sustainability practices in SMEs: Evidence from India. *International Journal of Business Excellence*, 25(1), 1–19. <https://doi.org/10.1504/IJBEX.2022.10041992>
- Zahoor, H., & Lew, Y. K. (2023). Digital circular economy adoption in SMEs: Barriers and enablers. *Journal of Cleaner Production*, 389, 136043. <https://doi.org/10.1016/j.jclepro.2022.136043>
- Zangiacomi, A., Ferasso, M., & Sehnem, S. (2022). Readiness for digital sustainability: A comparative study of SMEs. *Technological Forecasting and Social Change*, 182, 121854. <https://doi.org/10.1016/j.techfore.2022.121854>

Exploring the Factors Influencing Consumers' Continuous Usage of a Digital Payment Platform: An Empirical Investigation of Mobile Wallets

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Abstract

The present study investigates the determinants contributing to the continuous usage intentions of existing m-wallet users. The current study's conceptual framework is based on the notion of stimulus organism response. Data from existing m-wallet users were collected using a carefully designed questionnaire. Once the data's authenticity and reliability were confirmed, structural equation modelling (SEM) analysis was executed. The findings of the SEM analysis indicated that the users' attitudes towards the m-wallet platform are positively influenced by cybersecurity knowledge, perceived usefulness, compatibility, facilitating conditions, convenience and touch-free transactions. Moreover, it has been shown that attitude has a beneficial influence on users' intentions to continue using the m-wallet platform. The current study provides practical consequences and recommendations for m-wallet service providers and marketers. These suggestions can assist in developing strategies for m-wallet usage, holding onto current users and influencing potential users on the platform.

Keywords

Mobile wallets, touch-free transactions, stimulus organism response model, cybersecurity knowledge, consumer attitude, continuous usage intention

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Introduction

Recently, there has been substantial growth in modern payment methods such as e-banking and digital wallets (Shetu et al., 2022). The need for electronic, digital and cashless transactions has expanded worldwide due to the substantial changes in payment methods for products and services in recent decades (Fahad & Shahid, 2022). Additionally, digital financial systems have revolutionised the payment industry, and a mobile-based payment mechanism called a mobile wallet (m-wallet) has gained acceptance worldwide (Kaur et al., 2020). A mobile wallet is an innovative idea in today's digital age, serving as a smartphone-based platform for conducting financial transactions and facilitating rapid payments (Esawe, 2022; Singh et al., 2017). Mobile wallets facilitate a wide range of transactions, including online purchases, expenditure payments, financial transactions, automated and fast cash transfers and expense management (Kapoor et al., 2022). Chawla and Joshi (2019) explained mobile wallets and their associated applications as digital platforms that store money and enable financial transactions through smartphones. Furthermore, proponents have contended that these payment systems surpass traditional ones in terms of user-friendliness and efficacy due to their ability to facilitate cashless transactions and support both local and remote transactions (Kapoor et al., 2022).

Furthermore, it is revealed that people have a positive reception towards digital payment technologies that are prompt, efficient and provide significant benefits (Fahad & Shahid, 2022). Standardisation, connectivity and simple approval processes are essential for rapidly adopting and continuously using digital payment systems (Mohd Thas Thaker et al., 2023; Shetu et al., 2022). In India, the proliferation of digital payments such as e-banking and m-wallets has been driven by the upsurge of electronic commerce, the widespread use of digital phones, affordable and accessible internet connections, and the willingness of users to embrace technological advancements (Afzal et al., 2024; Chawla & Joshi, 2021). The government's 'Digital India' initiative aims to convert India into a digital economy (Fahad & Shahid, 2022). Therefore, digital services like m-wallet have gained a significant portion of digital payment platforms (Chawla & Joshi, 2021; Kaur et al., 2020).

Prior research has extensively explored several aspects that influence the acceptability of mobile wallets, particularly in the Indian context (Chawla & Joshi, 2019; Singh et al., 2017). Yet, earlier studies have concentrated explicitly on accepting mobile wallets (Chawla & Joshi, 2021; Singh et al., 2020). Prior research has examined several internal and external factors of mobile wallets that impact users' decision to embrace and utilise them. Shin (2009) showed that users develop a favourable perception of the m-wallet platform due to its user-friendly nature and practicality. Additionally, a positive attitude, trust in the platform and perceived security all positively influence users' intentions. Studies have shown that the users' perceived utility, self-efficacy, trust in the platform and informal learning are some of the critical factors in the acceptance of the m-wallet (Shetu et al., 2022; Singh et al., 2020).

Upon conducting an extensive literature review, it has been discovered that a substantial body of research is available on m-wallets. The existing research primarily examined potential users' adoption, usage and behaviour towards the

m-wallet platform (Esawe, 2022; Madan & Yadav, 2016; Mombeuil, 2020; Singh et al., 2017). Since the introduction of the unified payment interface, a rival platform of m-wallets in India, many consumers are still using the m-wallet platform for financial dealings (Fahad & Shahid, 2022). Therefore, there is a need to empirically investigate the factors behind the continuous usage of m-wallets by existing users, because it will provide an understanding of the factors responsible for motivating users in the continuous usage of digital payment platforms like m-wallets. Moreover, past research has not sufficiently addressed the continuous usage intentions (CUI) of consumers in lower-middle income countries, such as Indian users. Hence, this study aims to employ the stimulus organism response (SOR) model in the conceptual model to address the research deficiencies in the existing literature on continuous usage of m-wallets from the perspective of a lower-middle income country. For this purpose, the users' stimuli of the m-wallet platform include compatibility, convenience, perceived usefulness (PU), facilitating conditions, cyber-security knowledge and touch-free transactions. The organism is represented by the users' attitude. Ultimately, their ongoing intention to use is regarded as the answer (response). The present study is anticipated to contribute to the existing theory and offer valuable recommendations to marketers regarding the retention of current m-wallet users and the attraction of new users to the platform.

Literature Review on the SOR Model and Mobile Wallets

SOR Model and Digital Platforms

Mehrabian and Russell (1974) elucidated that the SOR model examines users' affective states towards a product or service, taking into account its intrinsic and extrinsic characteristics and, consequently, its influence on the user's ultimate decision, generally referred to as the response. According to Islam et al. (2020), various stimuli can influence the psychological state of users and lead to specific behavioural responses. By considering the different aspects of a given product or service (stimuli), the user's emotional state is shaped (organism); ultimately, individuals either express a favourable or unfavourable reaction (response). In the existing research, authors have examined various attributes as stimuli, diverse orgasmic states and varied forms of users' responses (Islam et al., 2020).

Researchers have examined the technological and environmental factors of digital platforms as the stimulus, the emotional states of consumers as the organism, and the many sorts of user responses based on the study's objectives. A study examining the interaction between banking consumers and banks' websites identified five key features as stimuli: website interactivity, aesthetics, customisation, telepresence and simplicity of use. Simultaneously, customer engagement is seen as the core element, while banking customers' trust and retention are considered as the resultant response. Furthermore, the findings validate that all five characteristics benefit consumer interaction with the bank's website. This, in turn, leads to an improvement in customers' trust and loyalty, as demonstrated by their response (Islam et al., 2020). When consumers intend to make a repeat purchase online, factors such as security concerns, promotions and website appearance are

suggested to influence their decision. Trust is seen as the driving force behind their decision, and the actual repurchase is viewed as the consumers' response. These outcomes demonstrate the explanatory capacity of the SOR framework. The study by Zhu et al. (2020) found that factors such as security issues, advertising and the look of the website have a favourable influence on users' trust and, therefore, encourage them to intend to repurchase. The authors have confirmed the suitability of the SOR framework in the field of digital platforms, such as mobile auctions, online retailing by consumers and virtual tourism; this validation is supported by the results obtained in studies conducted by Kim and Lennon (2013) and Kim et al. (2020).

Related Work on M-wallet

Scholars have endeavoured to elucidate the diverse facets of the acceptance, utilisation and endorsement of m-wallets in various settings and geographical areas (Chawla & Joshi, 2021; Kapoor et al., 2022; Kaur et al., 2020; Mohd Thas Thaker et al., 2023). The existing literature on m-wallets presents many factors that contribute to the usage of m-wallets. For example, Singh et al. (2017) found that customers' impression of the m-wallet is significantly influenced by their preference and satisfaction, which in turn affects their usage of the m-wallet. Millennials found the m-wallet platform beneficial due to its user-friendly interface; furthermore, their behavioural intentions are driven by the platform's convenience and the trust they have in it (Sarmah et al., 2021). The users' behavioural intentions to directly embrace m-wallets are found to be impacted by the platform's ease of use, usefulness, compatibility and insecurity (Madan & Yadav, 2016; Mombeuil, 2020). Furthermore, there is a favourable relationship between the frequency of usage and the intention to use, as well as the level of insecurity, compatibility, utility and ease of use of the mobile wallet platform (Shetu et al., 2022). In most of the studies discussed above, continuous usage patterns of the users are not analysed adequately, especially from a lower-middle income country's perspective of India; therefore, it is necessary to investigate because it will provide a robust understanding of the motivators of the platform, which keeps motivating the users to engage with the platform continuously. Hence, we have utilised the SOR model to gain a comprehensive understanding of consumer continuous usage patterns of the m-wallet platform. This model helps us analyse the attitude and conduct of existing consumers towards the m-wallet platform and their plans to continue using it (see Figure 1).

Hypothesis Development

Perceived Usefulness and Attitude

PU refers to the assumption that technology-based modern and digital platforms can enhance the user experience (Davis, 1989). Furthermore, PU is described as the conviction held by m-wallet users to improve their experience when utilising the m-wallet (Sharma et al., 2021). Earlier studies on implementing digital

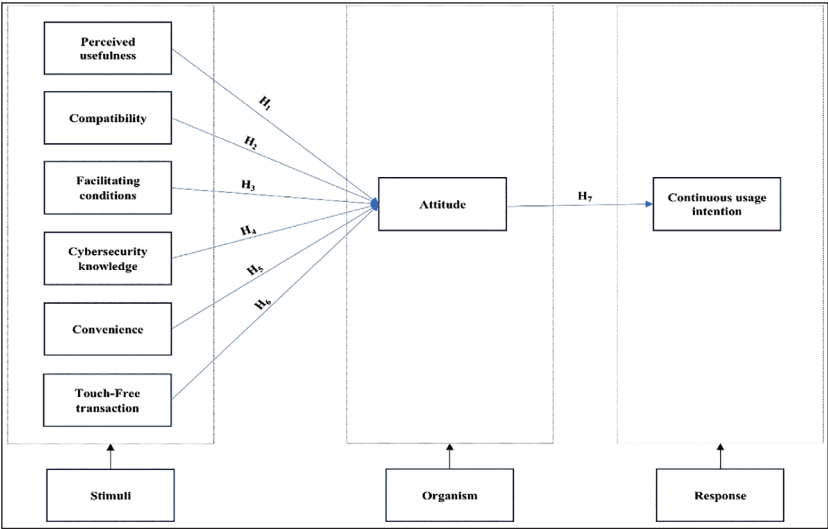


Figure 1. Theoretical Model of the Study.

payment platforms have identified PU as the primary factor influencing consumers’ sentiments (Qu et al., 2022). The research on modern banking users has established a clear and robust relationship between PU and consumers’ attitudes (Chawla & Joshi, 2019). This finding confirms the importance of PU in the context of the digital platform of m-wallet (Chawla & Joshi, 2021). Consequently, we hypothesise that PU as a stimulus will result in a favourable correlation with the organism, specifically in the form of positive user attitudes. Thus, we propose the following hypothesis;

H₁: PU will positively influence the attitude of the m-wallet users.

Compatibility and Attitude

Compatibility denotes the extent to which an invention meets the needs of potential consumers at a specific moment (Fahad & Shahid, 2022). Concerning the m-wallet, compatibility denotes the users’ confidence in the platform’s capability to meet their demands, suit their lifestyles and enhance their experiences (Hasan & Gupta, 2020; Kaur et al., 2020). Oliveira et al. (2016) presented the importance of compatibility in determining digital platform views and use intentions among potential consumers. The consumers’ attitudes towards a digital platform are contingent upon its alignment with their preferences and lifestyles (Chawla & Joshi, 2020). Kaur et al. (2020) verified that consumers are inclined to adopt the m-wallet platform due to its compatibility with their requirements. The consumers’ attitudes towards the m-wallet platform are contingent upon their perception of its compatibility with their lifestyle and current needs. If they perceive the m-wallet platform as compatible with meeting their needs, they will exhibit a positive attitude towards it. Thus, we formulated a hypothesis;

H_2 : Compatibility will positively affect the attitude of the m-wallet users.

Facilitating Condition and Attitude

Venkatesh et al. (2003) explained facilitating conditions (FC) as the extent to which individuals perceive that a framework is established at a technological and organisational level to facilitate the ease of system usage. In the realm of digital platforms for mobile wallets, factors such as familiarity with mobile devices, internet connectivity, accessibility and affordability of digital mobile devices, adherence to security and privacy regulations and other related components are seen as the FC of the platform (Chawla & Joshi, 2019). Authors have contended that in the current digital and modern technological era, FC substantially and directly influences consumers' attitudes (Rahman et al., 2020). Therefore, a positive FC will encourage consumers to embrace and utilise new products or services (Baabdullah et al., 2019). A study on e-wallets has affirmed the significance of FC in influencing consumers' attitudes towards embracing the platform and, ultimately, its value in determining consumers' intentions to continue using it (Mohd Thas Thaker et al., 2023). Based on the reasons outlined earlier, we expect that the FC associated with the m-wallet platform will have a beneficial influence on existing consumers' attitudes towards the platform. Thus, we formulated the following hypothesis;

H_3 : FC will positively influence the attitude of the m-wallet users.

Cybersecurity Knowledge and Attitude

Cybersecurity knowledge in digital banking platforms denotes the user's understanding of the risks and consequences of cyber fraud related to internet operations (Abawajy, 2014). The significance of possessing cybersecurity knowledge has become apparent due to individuals' potential risks and vulnerabilities while utilising internet-based digital services (Zwilling et al., 2022). Consequently, users of digital banking platforms must possess the necessary cybersecurity knowledge and skills across various facets of the platform because it shapes their attitudes and use behaviour (Limna et al., 2023). According to the earlier authors, cybersecurity knowledge has a considerable influence on consumers' attitudes towards digital payment platforms (Afzal et al., 2024). Consequently, we assert that a greater understanding and knowledge of cybersecurity will have a beneficial influence on existing users' attitudes towards the m-wallet platform. Therefore, we formulated the following hypothesis;

H_4 : Cybersecurity knowledge will positively affect the attitude of the m-wallet users.

Convenience and Attitude

An m-wallet offers clients various advantages besides card and cash payment options, including making purchases anywhere and accessing financial transactions in real time. It also eliminates the inconvenience of carrying physical cash

and cards (Mallat, 2007). M-wallets are seen as convenient, as users are not obligated to input intricate login credentials during financial transactions, resulting in swift completion of transactions (Mombeuil, 2020). Adoption studies on m-wallets suggest that convenience plays a significant role in consumers' embracing of them. Consumers find m-wallets comfortable due to the fast completion of financial transactions on the m-wallet platform (Kaur et al., 2020). Hence, we contend that if existing users see the m-wallet platform as comfortable due to its widespread availability and the seamless execution of financial transactions, they will exhibit a favourable attitude towards the platform. Thus, based on the aforementioned factors, we formulated the following hypothesis:

H₅: Convenience will positively affect the attitude of the m-wallet users.

Touch-free Transaction and Attitudes

Auer et al. (2020) reported that the World Health Organisation has verified that exchanging coins, physical cards and paper money between customers and service providers facilitate coronavirus transmission. Touch-free or non-contact financial transactions offer numerous benefits from the user's standpoint. For instance, contactless payments are regarded as more convenient, efficient, secure and environmentally friendly. The study conducted by Kapoor et al. (2022) found a positive association between the acceptance of m-wallets and touch-free transactions, indicating that users' attitudes towards touch-free transactions were favourable. Given the COVID-19 outbreak, consumers currently prioritise their health and evaluate the advantages of touch-free purchases. Thus, we contend that the attributes and advantages of touch-free transactions on the m-wallet platform will continue to have a beneficial influence on the attitudes of existing m-wallet users. Thus, we formulated the following hypothesis;

H₆: Touch-free transactions will positively affect the attitudes of the m-wallet users.

Attitude and Continuous Usage Intention

The user's attitude and appraisal of a product or service determine the user's conduct. Consequently, users develop attitudes by assessing the digital platform's ease of use and usefulness (Afzal et al., 2024). Ultimately, they demonstrate a favourable mindset and a willingness to utilise the product or service through the platform (Shin, 2009). A study on m-wallets found that consumers who have trust in the platform, feel secure using it, find it beneficial, perceive it as supporting their needs and consider it compatible with their wants are probable to form a good attitude towards the platform; ultimately, a favourable mindset amplifies their inclination to utilise the platform (Chawla & Joshi, 2019). Earlier research has also validated a direct correlation between the attitudes of m-wallet platform users and their positive intentions towards the platform (Singh et al., 2020). Therefore, we contend that fostering a favourable disposition towards the

m-wallet platform will incentivise existing users to utilise the platform persistently. Given the aforementioned considerations, we propose the following hypothesis:

H₇: Attitude will positively influence the continuous usage intention of the m-wallet users.

Research Methodology

Instrument of Measurement

Prior research has indicated that maintaining the scale and content validity of items is crucial, as it is closely connected to the generalisability of the outcomes (Fahad & Shahid, 2022). Consequently, the questionnaire for the current study took into account items from previous studies (see Table 3). A questionnaire containing two sections was used to gather the necessary data from the current m-wallet users. The primary objective of the initial section of the questionnaire was to collect demographic details from the participants. The second component of the questionnaire collected responses pertaining to the study's requirements, utilising a five-point Likert scale. Under the current work's requirements, the second half of the questionnaire was kept intact, containing 22 items to collect study-specific information.

Questionnaire and Research Participants

The experts and scholars in the related subject were consulted regarding the study questionnaire and items, and as a result, some minor modifications were implemented. To assess the level of complexity and participants' comprehension of the items in the questionnaire, a pilot survey was conducted with 25 existing m-wallet users. The preliminary survey findings indicated that the respondents perceived the survey items as comprehensible, confirming their appropriateness for the intended objective. Furthermore, it was discovered that slight modifications in the wording of specific items were required based on the advice supplied by experts and participants in the preliminary survey. Consequently, these necessary modifications were implemented before disseminating the questionnaire. Moreover, the data collected in the last stage and throughout the pilot survey stage were not combined to prevent potential bias. Additionally, it was found that Cronbach's α during the pilot survey phase exceeded 0.70, indicating the validity of the questionnaire and its items.

The required data for the current work were collected from existing users of m-wallets using a purposeful sampling technique, which was under the study's requirements. Before gathering the necessary data from the participants, they were provided with information regarding the study's objective, methods, findings and importance. To obtain accurate and inclusive data, the Delhi NCR region was selected to get the required data because earlier authors have argued that Delhi NCR is a cosmopolitan city and attracts population from all areas of the

country (Madan & Yadav, 2016). As mentioned above, questionnaires were given to existing m-wallet users in the region. Out of the participants, 408 out of the 550 questionnaires were retrieved, resulting in a return rate of 74%. A multitude of unfinished questionnaires were discovered among the returned completed questionnaires; thus, they were meticulously extracted. Furthermore, after analysing the participants' responses, it was discovered that the completed questionnaires might have included some data points significantly different from the rest. However, these outliers were also eliminated to safeguard the correctness and reliability of the study's results. A total of 379 valid responses were included in the investigation. Most of the participants were young (67% approx.), graduates and postgraduates (65% approx.), and they mostly fell in the income group of 'Up to Rs 30,000'. Further details of the respondents' demographic information can be seen in Table A1 of the Appendix.

Data Analysis

In earlier works, authors have examined the study's data using various analytical techniques (Chawla & Joshi, 2021; Fahad & Shahid, 2022). IBM SPSS Statistics 20.0 was employed for the descriptive assessment of the current study, and AMOS 23.0 was employed for the confirmatory factor analysis (CFA) as well as structural equation modelling (SEM) analyses. As postulated in prior studies, we used a two-step data analysis process (Anderson & Gerbing, 1988). At the initial stage, we examined the fit indices of the measurement model. Before the study's hypotheses were analysed, the data's validity and reliability were evaluated. Then, we examined the structural model to analyse the present study's proposed hypotheses.

Findings

Common Method Bias (CMB)

According to Podsakoff and Organ (1986), the problem of CMB arises when the results of a study on the relationship between two or more variables are distorted due to the employment of the same measuring methods. Prior research has emphasised employing Harman's single-factor test for analysing the CMB (Podsakoff et al., 2003). In the analysis of the CMB, all the items under study were entered into SPSS IBM Statistics 20.0 simultaneously. The test results revealed that the variance attributed to a single factor was 43.8%, below the threshold limit of less than 50% suggested in previous studies (Podsakoff et al., 2003). Therefore, CMB was not relevant to the present study.

Measurement Model

According to previous studies, a CMIN/DF ratio of 3 or less indicates a robust model fit, whereas GFI, CFI and NFI values should be 0.90 or higher. Additionally,

the AGFI value must be equal to or larger than 0.80. Furthermore, the RMSEA value needs to be less than or equal to 0.08. Table 1 presents the fit indices of the current investigation and compares them with the specified thresholds, and it was found that the aforementioned fit indices were within the recommended limits as stated by Hu and Bentler (1999).

Convergent Validity and Discriminant Validity

As previously noted, to confirm content validity, the study items were carefully drawn from other pieces of related research. Table 3 presents the study items' source, SEM and CFA loadings. Furthermore, to uphold convergent validity, the prescribed conditions outlined in prior investigations are as follows: To ensure sufficient convergent validity, it is recommended that the measuring items should have loadings over 0.50, the average extracted variance (AVE) for each construct should be larger than 0.50, and the composite reliability (CR) should also be above 0.70 (Hair et al., 2006). The data utilised in this investigation fulfilled the aforementioned criterion, providing support for the convergent validity (see Table 2).

Table 1. Fit Indices and Limits of the Measurement and Structural Model.

Fit Indices	Limit	Measurement Model	Structural Model
AGFI	≥ 0.80	0.94	0.93
NFI	≥ 0.90	0.94	0.91
CFI	≥ 0.90	0.98	0.97
RMSEA	≤ 0.08	0.02	0.03
GFI	≥ 0.90	0.96	0.95
CMIN/DF	≤ 3.00	1.01	1.03

Table 2. Validity and Reliability of Data.

	CR	AVE	MSV	ASV	AT	PU	FC	CB	CK	TFT	CN	CUI
AT	0.94	0.85	0.34	0.23	0.92							
PU	0.93	0.82	0.34	0.23	0.58	0.90						
FC	0.93	0.88	0.29	0.19	0.54	0.50	0.94					
CB	0.93	0.82	0.23	0.14	0.47	0.43	0.48	0.90				
CK	0.93	0.83	0.25	0.12	0.39	0.50	0.27	0.28	0.91			
TFT	0.88	0.79	0.32	0.20	0.52	0.57	0.48	0.36	0.36	0.89		
CN	0.88	0.71	0.04	0.01	0.21	0.17	0.06	0.01	0.02	0.08	0.84	
CUI	0.93	0.83	0.32	0.20	0.57	0.50	0.48	0.37	0.38	0.57	0.15	0.91

Notes: AVE: Average variance extracted; AT: Attitude; CB: Compatibility; MSV: Maximum shared variance; CN: Convenience; FC: Facilitating condition; CR: Composite reliability; CK: Cybersecurity knowledge; ASV: Average shared variance; PU: Perceived usefulness; TFT: Touch-free transactions; CUI: Continuous usage intention. Bold values represent the square root of the AVEs.

According to previous research, to demonstrate discriminant validity, three specific characteristics must be fulfilled (Fornell & Bookstein, 1982). The three prerequisites are: (a) The ASV and MSV should be smaller than the AVEs; (b) The square root of the AVEs of each construct must be bigger than the correlation values with other constructs (as indicated boldly in Table 2); (c) The correlation between any two constructs must be below 0.80. The data in the present study fulfil all the criteria mentioned before, hence establishing the study’s discriminant validity (see Table 2).

Structural Model Results

Following the data and measurement model authentication, the study employed SEM analysis to assess the hypotheses and structural model. The

Table 3. Study Factors and Items, Cronbach’s α Values and Item Loadings in CFA and SEM.

Study Factors and Item Sources	Study Items	Cronbach’s α	CFA	SEM
Compatibility (CP) (Chawla & Joshi, 2019; Shetu et al., 2022)	CP1: Using a mobile wallet fits well with my lifestyle.	0.92	0.88	0.88
	CP2: I believe a mobile wallet is compatible with the way I shop online.		0.90	0.90
Perceived usefulness (PU) (Afzal et al., 2024; Shetu et al., 2022)	PU1: Using a mobile wallet would help to manage my expenses better.	0.92	0.90	0.90
	PU2: Using a mobile wallet improves the course of my daily life.		0.90	0.90
	PU3: Mobile wallet platform includes all the functions, which meet my daily financial needs.		0.90	0.90
Convenience (CN) (Shankar & Rishi, 2020)	CN1: I can avail of mobile wallet services anytime.	0.92	0.76	0.75
	CN2: I can easily complete my transactions using a mobile wallet.		0.88	0.88
	CN3: It does not take long to complete transactions over the mobile wallet platform.		0.88	0.87
Facilitating conditions (FC) (Chawla & Joshi, 2019; Venkatesh et al., 2003)	FC1: My mobile device is suitable for using a mobile wallet.	0.89	0.94	0.94
	FC2: I can easily find someone to help me if I get stuck using my mobile wallet.		0.93	0.93
	FC3: The cost of purchasing a mobile device suitable for using a mobile wallet is inexpensive to me.			

(Table 3 continued)

(Table 3 continued)

Study Factors and Item Sources	Study Items	Cronbach's α	CFA	SEM
Cybersecurity Knowledge (Afzal et al., 2024; Limna et al., 2023)	CK1: I know cybersecurity issues that lead to high threat and financial loss while using the m-wallet platform.	0.93	0.80	0.79
	CK2: I know that m-wallet platforms are more appealing to hackers and highly exposed to cyber fraud.		0.96	0.96
	CK3: I have proper knowledge of authentication mechanisms, which help me safeguard my financial transactions from cyberattacks.		0.96	0.96
Attitude (AT) (Davis, 1989; Venkatesh et al., 2003)	AT1: I feel using a mobile wallet is a good idea.	0.90	0.95	0.95
	AT2: I feel pleasant about using a mobile wallet.		0.93	0.93
	AT3: I value the benefits of a mobile wallet.		0.89	0.89
Continuous usage intentions (CUI) (Lin & Lee, 2023; Shetu et al., 2022)	CUI1: I will continue to use my mobile wallet.	0.94	0.92	0.91
	CUI2: I intend to continue using my mobile wallet rather than discontinue using it.		0.92	0.90
	CUI3: I intend to continue using a mobile wallet rather than any alternative means.		0.89	0.87
Touch-free transactions (TFT) (Kapoor et al., 2022)	TFT1: Touch-free transactions are more hygienic and safer compared to card and cash payments.	0.92	0.92	0.93
	TFT2: Merchants are also promoting customers for contactless payments to avoid contact and cash handling.		0.86	0.83

findings shown in Table 1 demonstrate that the SEM has a strong match, as all fit indices fall within the specified thresholds (Hu & Bentler, 1999). Furthermore, the results obtained from the SEM analysis provided evidence in favour of all hypotheses. The study found that PU ($\beta = 0.21, p < .001$), CB ($\beta = 0.25, p < .001$), FC ($\beta = 0.16, p < .001$), CK ($\beta = 0.13, p < .01$), CN ($\beta = 0.14, p < .001$) and TFT ($\beta = 0.26, p < .001$) are positively associated with the attitudes of existing m-wallet users. Moreover, the study reveals that attitude ($\beta = 0.66, p < .001$) has a significant and favourable impact on the CUI of m-wallet users, as depicted in Table 4 and Figure 2.

The respondent’s attitude, as indicated by R^2 value (squared multiple correlation) of 59%, demonstrates a significant level of variance in the structural model analysis. In addition, the intention to use continuously (with an R^2 of 44%) also exhibited substantial variance. The adequacy of the explained variance is supported by the R^2 values and recommendations from previous studies on consumer behaviour (Hair et al., 2006).

Table 4. Findings of the Structural Model.

Hypothesis	Path	<i>B</i>	<i>p</i>	Result
H_1	PU→AT	0.21	<.001	Accepted
H_2	CB→AT	0.25	<.001	Accepted
H_3	FC→AT	0.16	<.001	Accepted
H_4	CK→AT	0.13	<.01	Accepted
H_5	CN→AT	0.14	<.001	Accepted
H_6	TFT→AT	0.26	<.001	Accepted
H_7	AT→CUI	0.66	<.001	Accepted

Notes: AT: Attitude; CB: Compatibility; CN: Convenience; FC: Facilitating condition; CK: Cybersecurity knowledge, PU: Perceived usefulness; TFT: Touch-free transactions; CUI: Continuous usage intentions.

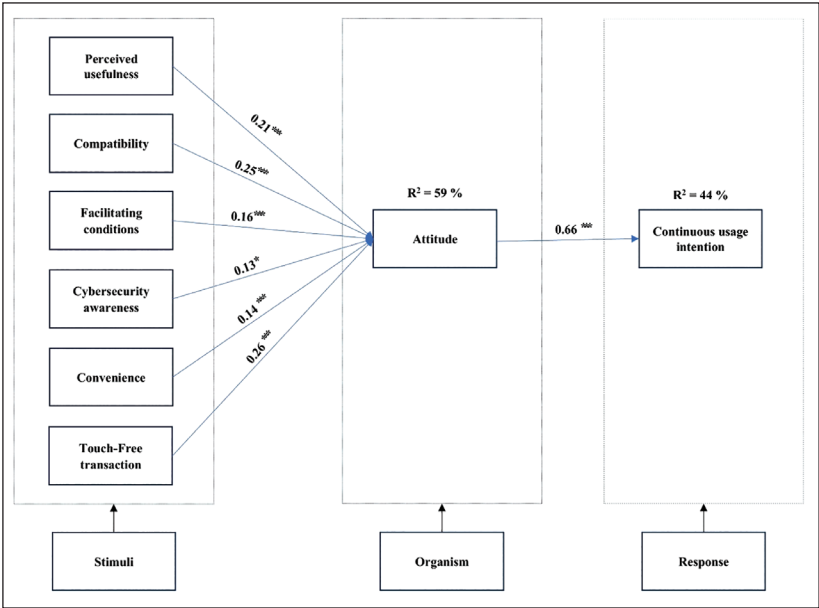


Figure 2. Result of the Structural Model.

Discussion

In this study, we proposed six hypotheses (H_1 – H_6) to examine the connection between various stimuli (PU, CB, FC, CK, CN and TFT) and the attitudes of existing m-wallet users (organism). The results obtained from applying SEM indicated that all the study hypotheses (H_1 – H_6) were accepted as initially stated. This confirms that PU, CB, FC, CK, CN and TFT positively correlate with existing consumers' attitudes towards the mobile wallet (see Table 4). Most of the aforementioned discoveries align with the contributions of previous studies in the relevant field. Therefore, it may be inferred that current m-wallet users perceive the platform as user-friendly, convenient and beneficial in everyday activities. They perceive the utilisation of m-wallets as compatible with their requirements and preferences. Existing users are familiar with the advantages and disadvantages of the m-wallet platform. These existing users have found the current FC of the m-wallet helpful.

Furthermore, users' understanding and knowledge of cybersecurity significantly improves their attitude towards the digital platform of m-wallet. The results of the SEM analysis were unexpected as they showed that H_6 was accepted. This suggests that TFT made through the m-wallet platform still influence users' attitudes towards the platform. The majority of the aforementioned results are consistent with previous research that has focused on the digital payment sector (Afzal et al., 2024; Kapoor et al., 2022; Sarmah et al., 2021; Shetu et al., 2022).

In this study, we hypothesised (H_7) that there is a connection between the attitude of current m-wallet users and their plans to continue using the platform. According to the results of the SEM investigation, it is believed that attitude has a favourable influence on the ongoing usage intentions of existing m-wallet users. It emphasised the significance of users' favourable attitudes when utilising digital payment platforms such as the m-wallet. Consistent with previous research, the current study's results also demonstrated that users with a favourable attitude desire to consistently utilise the digital payment platform (George & Sunny, 2021; Sarmah et al., 2021). Therefore, this study further validates the significance of a favourable attitude in influencing the usage patterns of users.

This study is a distinctive attempt to utilise the SOR framework to examine the continuous usage intents of existing m-wallet users in India. Based on the SOR framework, the study's conceptual model incorporates PU, compatibility, FC, cybersecurity knowledge, convenience and TFT as stimuli that influence the user's attitude (organism). The users' continual intention to use the m-wallet (in the form of response) is determined by their orgasmic states, that is, attitude. Prior research has concentrated on users' adoption and usage patterns towards the m-wallet platform. Most of these studies utilised technology adoption models such as TAM, UTAUT and DOI in their conceptual frameworks (Chawla & Joshi, 2020; Kaur et al., 2020). In our view, this study is one of the initial investigations on m-wallets that utilised the SOR model to establish a connection between the stimuli of the m-wallet platform, organism and response of the current m-wallet users. The study's findings showed the explanatory power of the SOR model in the ongoing utilisation of contemporary digital payment platforms.

Contributions of the Study

Theoretical and Practical Contributions

The current study has provided more value to the m-wallet field and contributed to the SOR framework in the following ways. The study has utilised users' cybersecurity knowledge as a factor influencing the attitudes of existing m-wallet users, which was not adequately used in prior related studies on m-wallets. Cybersecurity knowledge, PU, compatibility, FC, convenience and TFT were not previously considered in studies on m-wallet continuous usage (Chawla & Joshi, 2019; George & Sunny, 2021). Furthermore, the present work revealed that users' attitudes had a positive and influential impact on customers' intention to persist in using m-wallet services. Previous research only identified these factors as significant in the initial adoption of m-wallets. These findings will assist in advancing contemporary payment research, specifically concerning the continued usage of mobile wallets.

Furthermore, this study has demonstrated the explanatory potential of the SOR model in the context of digital payment platforms such as m-wallet. Moreover, we consider this study to be among the initial ones empirically examining the SOR model by integrating elements from various technology acceptance models. The study's conceptual model included the TAM model's PU and the DOI model's compatibility. The results have demonstrated the adaptability of the SOR model. Due to its adaptable nature, this study has allowed subsequent researchers to incorporate more elements into the SOR model in their ongoing technology or service consumption research.

It is one of the pioneering works that identifies the factors influencing the attitudes and intentions of existing m-wallet users in a lower-middle income country. Therefore, the potential contributions of the current study are as follows: Managers and policymakers worldwide of m-wallet service providers can consider the results of the present work in effectively managing their platforms and services. The current study has demonstrated the significance of cybersecurity knowledge, compatibility, convenience, TFT, perceived utility and FC in shaping the attitudes of current users of the m-wallet service. Therefore, marketers are advised to organise campaigns to improve the cybersecurity knowledge and awareness of current and prospective users. Moreover, it is recommended that managers and policymakers develop strategies to enhance the compatibility, convenience and usefulness of the m-wallet platform for users. This can be achieved by offering multiple language options and implementing a mechanism that provides round-the-clock assistance in resolving consumer issues. They may provide cashback and other incentives for transacting over the platform to retain loyal users and attract more potential users. Such measures will have a positive impact on user attitudes. In addition, the m-wallet application developer should consider the stimuli that have been found to impact the users' attitudes towards the m-wallet when building applications connected to it.

Limitations and Future Scope

Despite the excellent contribution, the present study has discovered certain limitations that can guide future research. The current work employs a theoretical model

that incorporates the SOR framework. This model focuses on a limited number of stimuli to precisely predict the attitudes of m-wallet users. Hence, it is recommended to incorporate additional significant factors such as trust, security and safety in future research, as they have a pivotal influence on consumer decision-making (George & Sunny, 2021; Prasad et al., 2017; Sankaran & Chakraborty, 2022). Furthermore, the m-wallet is a digital system that operates on mobile devices to facilitate financial transactions. As a result, it is natural for customers to have concerns regarding the security and privacy measures used on the platform. The current study does not encompass the aforementioned components of customer apprehension. Therefore, it is recommended that these essential factors be taken into account in future research. In future research, it may be beneficial to utilise a combination of several behavioural models to explain the continuous usage patterns of m-wallet users. For instance, when examining QR-code payment, a comprehensive model was determined to be satisfactory in describing the situation (Le, 2021).

Similarly, while investigating the ongoing utilisation of contemporary services, studies have found it advantageous to employ an integrated approach (Ng et al., 2024; Pattnaik & Shukla, 2021). Regarding mobile-based financial services, various factors affect urban and rural populations differently; age and generational differences play a significant role in adopting and continuously using financial innovations (Hameed & Nigam, 2023; Karjaluoto et al., 2021). Therefore, future research should focus on conducting a comparative analysis to understand these dynamics better.

Furthermore, the participants in the current investigation are identified as individuals who are younger and possess higher levels of education from a particular region of Delhi NCR, potentially impacting the outcomes of the study. Hence, it is advisable to employ a deliberate multi-stage sampling method in future studies to gather data from diverse age groups and users with varied backgrounds to extrapolate the obtained findings. Additionally, the study's legitimate responses are limited in number. It is recommended that future studies gather a more comprehensive dataset to enable the generalisation of the conclusions drawn. Due to the current study's cross-sectional nature, the results' reliability may be compromised. Therefore, it is recommended that future research on the ongoing use of m-wallets should be conducted longitudinally.

Declaration of Conflicting Interests

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References

- Abawayj, J. (2014). User preference of cyber security awareness delivery methods. *Behaviour & Information Technology*, 33(3), 237–248. <https://doi.org/10.1080/0144929X.2012.708787>
- Afzal, M., Ansari, Mohd. S., Ahmad, N., Shahid, M., & Shoeb, Mohd. (2024). Cyberfraud, usage intention, and cybersecurity awareness among e-banking users in India: An integrated model approach. *Journal of Financial Services Marketing*, 29(4), 1503–1523. <https://doi.org/10.1057/s41264-024-00279-3>
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411.
- Auer, R., Cornelli, G., & Frost, J. (2020). *Covid-19, cash, and the future of payments*. Bank for International Settlements.
- Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., & Patil, P. (2019). Consumer use of mobile banking (m-banking) in Saudi Arabia: Towards an integrated model. *International Journal of Information Management*, 44, 38–52.
- Chawla, D., & Joshi, H. (2019). Consumer attitude and intention to adopt mobile wallet in India—An empirical study. *International Journal of Bank Marketing*, 37(7), 1590–1618.
- Chawla, D., & Joshi, H. (2020). The moderating role of gender and age in the adoption of mobile wallet. *Foresight*, 22(4), 483–504.
- Chawla, D., & Joshi, H. (2021). Importance-performance map analysis to enhance the performance of attitude towards mobile wallet adoption among Indian consumer segments. *Aslib Journal of Information Management*, 73(6), 946–966.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Esawe, A. T. (2022). Understanding mobile e-wallet consumers' intentions and user behavior. *Spanish Journal of Marketing-ESIC*, 26(3), 363–384.
- Fahad, & Shahid, M. (2022). Exploring the determinants of adoption of Unified Payment Interface (UPI) in India: A study based on diffusion of innovation theory. *Digital Business*, 2(2), 100040. <https://doi.org/10.1016/j.digbus.2022.100040>
- Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19(4), 440–452.
- George, A., & Sunny, P. (2021). Developing a research model for mobile wallet adoption and usage. *IIM Kozhikode Society & Management Review*, 10(1), 82–98.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2006). *Multivariate data analysis* (6th ed.). Pearson Prentice Hall.
- Hameed, S., & Nigam, A. (2023). Exploring India's generation Z perspective on AI enabled internet banking services. *Foresight*, 25(2), 287–302.
- Hasan, A., & Gupta, S. K. (2020). Exploring tourists' behavioural intentions towards use of select mobile wallets for digital payments. *Paradigm*, 24(2), 177–194.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Islam, J. U., Shahid, S., Rasool, A., Rahman, Z., Khan, I., & Rather, R. A. (2020). Impact of website attributes on customer engagement in banking: A solicitation of stimulus-organism-response theory. *International Journal of Bank Marketing*, 38(6), 1279–1303. <https://doi.org/10.1108/IJBM-12-2019-0460>
- Kapoor, A., Sindwani, R., Goel, M., & Shankar, A. (2022). Mobile wallet adoption intention amid COVID-19 pandemic outbreak: A novel conceptual framework. *Computers & Industrial Engineering*, 172, 108646. <https://doi.org/10.1016/j.cie.2022.108646>

- Karjaluoto, H., Glavee-Geo, R., Ramdhony, D., Shaikh, A. A., & Hurlpaul, A. (2021). Consumption values and mobile banking services: Understanding the urban–rural dichotomy in a developing economy. *International Journal of Bank Marketing*, 39(2), 272–293. <https://doi.org/10.1108/IJBM-03-2020-0129>
- Kaur, P., Dhir, A., Bodhi, R., Singh, T., & Almotairi, M. (2020). Why do people use and recommend m-wallets? *Journal of Retailing and Consumer Services*, 56, 102091. <https://doi.org/10.1016/j.jretconser.2020.102091>
- Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention: Based on the stimulus-organism-response model. *Journal of Research in Interactive Marketing*, 7(1), 33–56. <https://doi.org/10.1108/17505931311316734>
- Kim, M. J., Lee, C.-K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. *Journal of Travel Research*, 59(1), 69–89. <https://doi.org/10.1177/0047287518818915>
- Le, X. C. (2021). The diffusion of mobile QR-code payment: An empirical evaluation for a pandemic. *Asia-Pacific Journal of Business Administration*, 14(4), 617–636. <https://doi.org/10.1108/APJBA-07-2021-0329>
- Limna, P., Kraiwanit, T., & Siripipattanakul, S. (2023). The relationship between cyber security knowledge, awareness and behavioural choice protection among mobile banking users in Thailand. *International Journal of Computing Sciences Research*, 7, 1133–1151.
- Lin, R.-R., & Lee, J.-C. (2023). The supports provided by artificial intelligence to continuous usage intention of mobile banking: Evidence from China. *Aslib Journal of Information Management*, 76(1). <https://doi.org/10.1108/AJIM-07-2022-0337>
- Madan, K., & Yadav, R. (2016). Behavioural intention to adopt mobile wallet: A developing country perspective. *Journal of Indian Business Research*, 8(3), 227–244.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments: A qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413–432. <https://doi.org/10.1016/j.jsis.2007.08.001>
- Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. The MIT Press.
- Mohd Thas Thaker, H., Subramaniam, N. R., Qoyum, A., & Iqbal Hussain, H. (2023). Cashless society, e-wallets and continuous adoption. *International Journal of Finance & Economics*, 28(3), 3349–3369.
- Mombeuil, C. (2020). An exploratory investigation of factors affecting and best predicting the renewed adoption of mobile wallets. *Journal of Retailing and Consumer Services*, 55, 102127. <https://doi.org/10.1016/j.jretconser.2020.102127>
- Ng, S. L., Rezaei, S., Valaei, N., & Iranmanesh, M. (2024). Modelling services continuance intention: Evidence from apps stores. *Asia-Pacific Journal of Business Administration*, 16(2), 256–281. <https://doi.org/10.1108/APJBA-08-2021-0408>
- Oliveira, T., Thomas, M., Baptista, G., & Campos, F. (2016). Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology. *Computers in Human Behavior*, 61, 404–414. <https://doi.org/10.1016/j.chb.2016.03.030>
- Pattnaik, P. N., & Shukla, M. K. (2021). Examining the impact of relational benefits on continuance intention of PBS services: Mediating roles of user satisfaction and engagement. *Asia-Pacific Journal of Business Administration*, 14(4), 637–657. <https://doi.org/10.1108/APJBA-03-2021-0123>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and

- recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organisational research: Problems and prospects. *Journal of Management*, 12(4), 531–544.
- Prasad, S., Gupta, I. C., & Totala, N. K. (2017). Social media usage, electronic word of mouth and purchase-decision involvement. *Asia-Pacific Journal of Business Administration*, 9(2), 134–145. <https://doi.org/10.1108/APJBA-06-2016-0063>
- Qu, B., Wei, L., & Zhang, Y. (2022). Factors affecting consumer acceptance of electronic cash in China: An empirical study. *Financial Innovation*, 8(1), 1–19.
- Rahman, M., Ismail, I., & Bahri, S. (2020). Analysing consumer adoption of cashless payment in Malaysia. *Digital Business*, 1(1), 100004. <https://doi.org/10.1016/j.digbus.2021.100004>
- Sankaran, R., & Chakraborty, S. (2022). Factors impacting mobile banking in India: Empirical approach extending UTAUT2 with perceived value and trust. *IIM Kozhikode Society & Management Review*, 11(1), 7–24. <https://doi.org/10.1177/2277975220975219>
- Sarmah, R., Dhiman, N., & Kanojia, H. (2021). Understanding intentions and actual use of mobile wallets by millennial: An extended TAM model perspective. *Journal of Indian Business Research*, 13(3), 361–381.
- Shankar, A., & Rishi, B. (2020). Convenience matter in mobile banking adoption intention? *Australasian Marketing Journal*, 28(4), 273–285.
- Sharma, A., Dwivedi, Y. K., Arya, V., & Siddiqui, M. Q. (2021). Does SMS advertising still have relevance to increase consumer purchase intention? A hybrid PLS-SEM-neural network modelling approach. *Computers in Human Behavior*, 124, 106919. <https://doi.org/10.1016/j.chb.2021.106919>
- Shetu, S. N., Islam, Md. M., & Promi, S. I. (2022). An empirical investigation of the continued usage intention of digital wallets: The moderating role of perceived technological innovativeness. *Future Business Journal*, 8(1), 43. <https://doi.org/10.1186/s43093-022-00158-0>
- Shin, D.-H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, 25(6), 1343–1354. <https://doi.org/10.1016/j.chb.2009.06.001>
- Singh, N., Sinha, N., & Liébana-Cabanillas, F. J. (2020). Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence. *International Journal of Information Management*, 50, 191–205. <https://doi.org/10.1016/j.ijinfomgt.2019.05.022>
- Singh, N., Srivastava, S., & Sinha, N. (2017). Consumer preference and satisfaction of M-wallets: A study on North Indian consumers. *International Journal of Bank Marketing*, 35(6), 944–965.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Zhu, B., Kowatthanakul, S., & Satanasavapak, P. (2020). Generation Y consumer online repurchase intention in Bangkok: Based on stimulus-organism-response (SOR) model. *International Journal of Retail & Distribution Management*, 48(1), 53–69. <https://doi.org/10.1108/IJRDM-04-2018-0071>
- Zwilling, M., Klien, G., Lesjak, D., Wiecheteck, L., Cetin, F., & Basim, H. N. (2022). Cyber security awareness, knowledge and behavior: A comparative study. *Journal of Computer Information Systems*, 62(1), 82–97. <https://doi.org/10.1080/08874417.2020.1712269>

Appendix

Table AI. Demographic Details of the Respondents.

Variables	Frequency (%)
Gender	
Male	232 (61.2)
Female	147 (38.8)
Age group	
18–29	254 (67.0)
30–40	94 (24.8)
41–50	28 (7.4)
51 and above	03 (0.8)
Educational qualification	
Up to intermediate	72 (19.0)
Graduate	125 (33.0)
Postgraduate	123 (32.4)
Doctorate and above	59 (15.6)
Employment status	
Full-time salaried	173 (45.6)
Part-time salaried	91 (24.0)
Self-employed	37 (9.8)
Unemployed	47 (12.4)
Public sector employee	31 (8.2)
Monthly income (in Indian Rupees)	
Up to ₹30,000	199 (52.5)
₹30,001–₹50,000	134 (35.4)
₹50,001–₹75,000	35 (9.2)
₹75,000 and above	11 (2.9)

Decoding Ambience, Servicescape, and Satisfaction: Insights from the Wilcoxon Signed-rank Method in Indian Urban Context

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Abstract

This study investigates how ambient conditions, specifically lighting, scent, music, and temperature, affect customer satisfaction in Indian urban restaurants. Grounded in Bitner's servicescape model and the stimulus–organism–response (S-O-R) framework, the research aims to measure expectation–perception gaps across these sensory dimensions and assess their impact on overall satisfaction. A structured survey was administered to 250 respondents using a 5-point Likert scale to capture both expectations and perceptions of ambient conditions. The Wilcoxon signed-rank test, a nonparametric method suitable for ordinal data, was applied to examine significant differences between expectation and perception scores for each factor. Results reveal statistically significant differences across all four ambient variables. Lighting, scent, and music exceeded customer expectations, indicating positive disconfirmation and enhanced satisfaction. Conversely, temperature fell short of expectations, highlighting discomfort as a key dissatisfaction driver. The findings affirm that ambient cues are not peripheral but central to shaping experiential quality in hospitality settings. This study contributes by integrating servicescape and S-O-R theories with a nonparametric statistical

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approach to empirically test expectation–perception gaps in an Indian context. It highlights dimension-specific insights, offering actionable guidance for restaurant managers to refine sensory strategies for competitive advantage.

Keywords

Servicescape, S-O-R Model, Consumer Satisfaction, Consumer Expectation and Perception

Introduction

In today's competitive hospitality industry, the differentiation of services extends beyond culinary excellence into sensory and experiential design. The servicescape coined by Bitner (1992) refers to the physical and atmospheric environment that subtly but powerfully influences customer behavior. This includes lighting, scent, music, and thermal comfort. Drawing on the stimulus–organism–response (S-O-R) framework, which explains how environmental stimuli elicit emotional and behavioral responses, this study aims to quantify the contribution of each ambient variable. Recognizing the limitations of linear regression in dealing with ordinal data and potential nonnormal distributions, we incorporate the Wilcoxon signed-rank test to examine perceived changes in customer satisfaction associated with each environmental factor. In the increasingly competitive restaurant industry, a comprehensive understanding of the determinants of customer satisfaction has become essential. While food quality and service excellence remain critical, emerging scholarship emphasizes the importance of the servicescape, the physical and sensory environment in which services are delivered, as a key driver of customer experience. The concept of servicescape, introduced by Bitner (1992), encompasses the physical surroundings that influence customer expectations, perceptions, and behaviors within service settings. Among its core dimensions, ambient conditions including lighting, temperature, scent, and background music play a particularly influential role in shaping customers' affective and cognitive evaluations of their dining experiences.

These ambient elements form the sensory backdrop of the dining environment and exert a largely subconscious yet powerful effect on customer moods and perceptions. They significantly contribute to how individuals assess service quality and overall satisfaction, especially in urban restaurant settings where experiential quality increasingly differentiates service offerings. In this evolving landscape, restaurants are no longer evaluated solely on culinary performance; rather, experiential immersion shaped by thoughtfully curated sensory stimuli is a central aspect of competitive positioning. The theoretical foundation for understanding this dynamic lies in the S-O-R framework proposed by Mehrabian and Russell (1974). This model posits that environmental stimuli (e.g., music or scent) impact the organism (i.e., the customer) by eliciting emotional and cognitive responses, which in turn influence behavioral outcomes such as satisfaction, loyalty, and word-of-mouth behavior. Within the context of restaurant services, ambient stimuli can be strategically manipulated to positively shape the emotional tone of the

dining experience, ultimately enhancing consumer satisfaction and long-term engagement. Despite growing recognition of the servicescape's relevance, there is a notable dearth of empirical research that quantitatively measures the impact of ambient conditions on customer satisfaction, particularly in emerging markets such as India. While conceptual discussions and anecdotal evidence abound, few studies employ rigorous statistical techniques such as regression or nonparametric tests to isolate and evaluate the effects of specific ambient attributes. Furthermore, the interaction effects among multiple sensory elements, for example, how lighting might alter the perception of scent, or how temperature may moderate music's influence, remain insufficiently examined. Urban Indian restaurants, especially those located in Orissa and Kolkata, provide an ideal setting for such empirical inquiry. These restaurants operate within complex socio-cultural environments and cater to a demographically diverse clientele. Moreover, these urban spaces are shaped by regional climatic variability, spatial constraints, and evolving consumer expectations, making them fertile ground for analyzing how ambient design elements influence satisfaction across different customer segments. In response to these research gaps, the present study adopts a robust quantitative approach to examine the differential impact of lighting, scent, temperature, and music on customer satisfaction in Indian urban restaurants. By anchoring the analysis within the servicescape and S-O-R frameworks, this research not only contributes to the growing body of knowledge in hospitality and service marketing but also offers practical insights for restaurant managers seeking to enhance experiential value through sensory design strategies.

Literature Review

According to the "social-servicescape model" put forth by Tombs and McColl-Kennedy (2003), consumer behavior is influenced by both the social and physical aspects of the environment, including other customers and service providers. "The design of the physical environment and service staff qualities that characterize the context which houses the service encounter, which elicits internal reactions from customers leading to the display of approach or avoidance behaviors" is the term used to describe the servicescape by Bitner (1992). In conclusion, it has been said that the servicescape consists of both tangible and intangible components, such as contextual, social, and psychological features. Within the servicescape literature (Areni & Kim, 1993; Baker et al., 1992; Dubé et al., 1995; North et al., 1999; Yalch & Spangenberg, 1988, 1990). The customers' behavioral intentions and level of satisfaction are influenced by numerous factors. The majority of the research has been on the service organization's interior physical appearance, including its furnishings, décor, lighting, music, odor, color, and so forth. The next section provides a quick overview of earlier servicescape research. A single environmental stimulus does not determine a customer's assessment of a specific service. Generally speaking, customers evaluate servicescapes holistically and consider a variety of factors when determining how satisfied they are (Bitner, 1992; Lin, 2004). Customers' holistic views (i.e., perceived quality) and

subsequent internal (i.e., contentment with the servicescape) and external (i.e., approach/avoidance, remaining, resupport) responses are influenced by the primary characteristics of the servicescape, according to Bitner (1992). Lin and Mattila (2010) state that customers consider both the servicescape and interactions with employees when evaluating service experiences. According to research, music has a significant role in servicescapes because it evokes strong feelings, influences customers' perceptions, moods, and purchasing decisions (Areni & Kim, 1993) and affects their level of relaxation and contentment (Ryu & Han, 2010). According to studies done in hotels and restaurants, the tempo of the music can influence how quickly people shop, how long they stay, and how much money they spend. Furthermore, loudness and noise typically have a negative impact on customers. People have said that noise is disagreeable and bothersome (Kryter, 1985). One element that might be disagreeable if not properly managed is temperature. Customers may feel negatively about an environment that is too hot or cold (Medabesh & Upadhyaya, 2012). A consumer's urge to buy can be influenced by scent or odor. "Pleasant scents encourage customers to spend more time in the servicescape," determined Morrin and Ratneshwar (2003). According to Hirsch's (1991) research, bakeries can boost sales by 300% by using scent strategically. In the service setting, coffee chains such as Starbucks place a lot of attention on scent (Hunter, 1995). According to research, one of the most potent physical triggers in restaurants can be the lighting. People's emotional reactions and their preferred lighting levels are related; for example, bright lighting at fast-food restaurants (like McDonald's) may represent prompt service and reasonably priced food. Conversely, dim illumination could represent complete service and expensive costs (Ryu & Han, 2010). Because it provides customers with implicit cues about the standards and expectations for behavior in the servicescape (Bitner, 1992), décor—the caliber of materials used in construction, artwork, and floor coverings is a visual symbol used to create an appropriate atmosphere within the servicescape (Nguyen & Leblanc, 2002). In the social context of a restaurant, décor is significant because it influences human behavior, especially social intimacy (Gifford, 1988). Similar to this, a customer's perception of a restaurant's success or failure, price or affordability, and reliability can all be influenced by its décor (Bitner, 1992; Nguyen & Leblanc, 2002). Customers' perceptions of quality and enthusiasm levels may be directly impacted by furnishings, and their willingness to return may be indirectly impacted (Ryu & Han, 2010). Customers' comfort levels and opinions of the quality of the service are influenced by the furnishings in a restaurant (Arneill & Devlin, 2002; Baker, 1987; Bitner, 1992). Wakefield and Blodgett (1996, p. 54) point out that as "customers remain in the same seat for extended periods of time," comfort becomes crucial. One important aspect of the service environment has been identified as cleanliness (Turley & Milliman, 2000). Customers' satisfaction levels and perceptions of service quality are impacted (Wakefield & Blodgett, 1996). It affects how consumers perceive the service at first and, consequently, whether they plan to use it again (Harris & Sachau, 2005). Basic contentment results from expectations being confirmed when cleanliness meets expectations. Positive disconfirmation and positive emotions occur when servicescape cleanliness surpasses initial expectations (Vilnai-Yavetz & Gilboa,

2010). According to a study by Hoffman et al. (2003), consumers blamed service-escape failures on unclean rooms and other areas. Customer retention rates were lowest for businesses with the worst cleanliness issues. Lucas (2003) discovered a correlation between a casino's cleanliness and its patrons' pleasure with the service, willingness to promote it, intention to return, and desire to stay. In their study, Vilnai-Yavetz and Gilboa (2010) discovered that cleanliness influences patrons' inclination to return to the restaurant and is a significant predictor of approach behavior. According to Eiseman (1998), color is a powerful visual element of an interior environment. Color has been found to influence people's emotions and moods. Brightly colored walls and seats may be more visually appealing than dull facades and seats (Tom et al., 1987). As a result, at a restaurant, the appropriate color schemes will either energize or calm patrons. Superior table décor, including glasses, cutlery, flatware, and table coverings, can affect how patrons see the entire caliber of restaurant service. Additionally, table décor (such as candles and fresh flowers) might give patrons the impression that they are in a fine dining establishment. A restaurant's spatial arrangement, including the placement of the service areas, restrooms, entry, doors, and corridors, is crucial. In service areas that are easily accessible, customers might spend more time. This could raise the probable amount of money they spend. Time and money spent in hotels are positively correlated, according to research in the hotel industry (O'Neill, 1992). Communication can be greatly aided by signage that subtly conveys to patrons the restaurant's image, standards, and anticipated conduct. The perceived quality of the servicescape may also be improved by additional interior design elements such as banners, photos, ornamental signs, and other fixtures. Service presentation is associated with the staff's demeanor, credentials, and conduct. Employees in restaurants have a big impact on patrons' opinions, intentions to buy, and loyalty. Customers' opinions of a service are greatly influenced by the actions of frontline service providers (Lin & Mattila, 2010). The service experience can be substantially improved by the way the employees look (Baker, 1987, p. 81). According to Hutton and Richardson (1995, p. 59), a service organization's image is largely shaped by the physical attractiveness of its employees, or "a pleasing physical demeanor through clean and colorful uniforms and proper personal grooming." In their study, Vilnai-Yavetz and Gilboa (2010) discovered a favorable correlation between the customers' perceptions of the waiter's appearance and their sentiments of trust and friendliness. Customers' initial perception of a restaurant and its offerings is shaped by its physical space. As a result, the restaurant's layout, architecture, appearance, furnishings, and personnel all play a significant role in how guests perceive it right away; the restaurant's servicescape is significant for customer experiences (McDonnell & Hall, 2008). Consumers evaluate the restaurant's physical layout, external and interior features, and surroundings, all of which have an impact on patron satisfaction and enjoyment (Lin & Mattila, 2010). When customers evaluate the quality of a restaurant and the eating experience, the servicescape may also elicit cognitive or perceptual reactions (service quality, disconfirmation, value) in them (Kim & Moon, 2009). According to Reimer and Kuehn (2005), servicescapes have an impact on how long patrons want to stay at a restaurant and if they plan to return, which in turn

affects how well they perceive the overall quality of the establishment. Customers may encounter a variety of cues in a service setting that could influence their behavior, purchases, and level of pleasure with the experience, according to Herrington (1996). Studies on how consumers react to servicescapes demonstrate that they serve as indicators for assessing the quality of services provided (Baker, 1987; Bitner, 1992). Customers' purchasing decisions are influenced by the atmosphere, which includes things such as music, temperature, lighting, colors, and aroma (Kotler, 1973). Emotions are influenced by the restaurant's ambiance since a pleasant ambiance heightens feelings of happiness. Positive feelings also raise client satisfaction. Furthermore, consumer happiness has a significant impact on behavioral loyalty. Customer satisfaction influences their future behavior since happy patrons are more likely to return, suggest the restaurant to others, eat there more frequently, spread the word about it, and be willing to pay more. The décor and artifacts, the layout, and the ambient conditions have a favorable correlation with the perceived value of the patrons, according to Han and Ryu (2009). Customers' perceived value was a direct and positive antecedent of customer satisfaction, according to Patterson and Spreng's (1997) analysis of the role of perceived value in explaining consumer behavior in a service setting. In their research on restaurants, Harris and Ezeh (2008) discovered that five aspects of the servicecape cleanliness, staff physical attractiveness, furnishing, customer orientation, and implicit communicators/aesthetic appeal were very influential in influencing patrons' intentions to remain loyal. In 1981, Booms and Bitner developed the concept of servicecape to suggest the entirety of the physical state of the administrative underpinnings.

Objectives of the Study

1. To analyze the individual impact of lighting, music, temperature, and scent on customer satisfaction using the Wilcoxon signed-rank method.
2. To assess whether ambient sensory changes significantly alter consumer perceptions within urban dining contexts.

Theoretical Framework

The hospitality industry, particularly the restaurant sector, has seen a paradigm shift where customer satisfaction is increasingly influenced not just by food and service quality, but by the physical and sensory elements of the service environment. In this context, Bitner's (1992) servicecape model serves as a foundational framework. The model conceptualizes the physical environment as a significant variable influencing customer and employee behavior. It breaks down the servicecape into three dimensions: ambient conditions, spatial layout and functionality, and signs, symbols, and artifacts. For the purpose of this study, the focus is specifically on ambient conditions, including lighting, scent, temperature, and music, which are considered the most immediate and influential sensory cues in shaping customer perceptions and emotional responses in restaurant settings.

Ambient conditions, as conceptualized in the servicescape model, form the atmospheric backdrop that impacts customers at both conscious and subconscious levels. These sensory elements are particularly relevant in urban Indian restaurants, where intense competition has led establishments to invest heavily in experiential differentiation. A well-designed servicescape not only enhances aesthetic appeal but also affects how customers interpret service quality, comfort, and emotional well-being. However, the extent to which these ambient conditions meet or fall short of customer expectations has not been widely measured in empirical studies, especially in the Indian context. This research thus seeks to bridge this gap by comparing customer expectations and perceptions of these ambient features to evaluate their influence on satisfaction outcomes.

To interpret the psychological effects of the servicescape more comprehensively, this study also draws upon the S-O-R model proposed by Mehrabian and Russell (1974). According to this model, external environmental stimuli (S) affect internal emotional and cognitive states (O), which in turn produce observable behavioral outcomes (R), such as satisfaction, loyalty, or intent to return. In the restaurant setting, sensory stimuli such as lighting or scent serve as external cues, influencing a customer's internal state, such as comfort, arousal, or pleasure, which then shapes their overall evaluation of the dining experience. The S-O-R model thus complements the servicescape framework by embedding customer psychology within the analysis of environmental influence.

This dual-framework approach provides both a structural and psychological lens to examine how restaurant environments affect satisfaction. While the servicescape model outlines what components to evaluate, the S-O-R model explains how and why these components influence behavior. Integrating these models enables a robust conceptual foundation for understanding the link between physical design and consumer experience. In this study, satisfaction is positioned as the final response (R), influenced by organismic states (emotions/perceptions) triggered by sensory stimuli (ambient conditions). The expectation–perception gap is treated as a proxy for these emotional and cognitive evaluations, thus grounding the methodology in well-established theoretical constructs. A distinctive feature of this study is its application of the Wilcoxon signed-rank test to statistically assess the differences between expectations and perceptions across the four ambient dimensions. Unlike traditional regression approaches that assume normally distributed interval data, the Wilcoxon method is nonparametric and better suited for ordinal data derived from Likert scales. It also allows for paired comparisons in this case, between a customer's anticipated experience and their actual experience, which aligns with the theoretical premise of the S-O-R framework. By identifying whether the gap between expectation and perception is significant for each sensory variable, the study operationalizes the servicescape and S-O-R models within a robust empirical strategy.

The integrated theoretical structure of this research is summarized in Table 1. Ambient conditions (lighting, scent, temperature, and music) are analyzed as stimuli in the S-O-R framework and as core environmental dimensions within the servicescape model. Customer emotions and perceptions, inferred through the difference between expectations and perceptions, serve as the organismic element.

Table 1. Tabular Representation of Theoretical Framework.

Model	Component	Operational Variable	Application in Study
Servicescape Model	Ambient conditions	Lighting, scent, temperature, music	Independent variables measured via expectation and perception ratings
	Spatial layout and functionality	Not included	Outside study scope
	Signs, symbols, artifacts	Not included	Outside study scope
S-O-R Model	Stimulus (S)	Ambient sensory inputs	External environmental cues that influence customers
	Organism (O)	Emotional and cognitive states (via perception gaps)	Mediating variables inferred from expectation–perception differences
	Response (R)	Customer satisfaction	Final behavioral outcome

Finally, satisfaction is treated as the behavioral response demonstrating the combined influence of physical environment and psychological processing. This framework not only validates the relevance of sensory design in service environments but also provides a quantitative pathway for assessing its real-world impact.

Analytical Framework

The sensory environment of a restaurant, commonly referred to as the servicescape, plays a critical role in shaping customer satisfaction. In the context of India's urban hospitality sector, where competition is high and experiential quality is a key differentiator, understanding the gap between customer expectations and their actual perceptions becomes essential. To address this, we employed the Wilcoxon signed-rank test, a nonparametric statistical method ideal for comparing paired samples from the same subjects (i.e., each respondent's expectation vs perception). This analysis aims to evaluate the statistical significance of gaps across four ambient dimensions: lighting, scent, temperature, and music.

Methodology Overview

A sample of 250 respondents was surveyed, each providing ratings on a 5-point Likert scale for both expectation and perception related to each of the four ambient variables. The Wilcoxon signed-rank test was chosen over parametric alternatives (e.g., paired *t*-test) due to the ordinal nature of the data and the absence of a guaranteed normal distribution. This test evaluates whether the median difference between expectation and perception scores is significantly different from zero.

The variables under scrutiny include:

Table 2. Demographic Profile.

Demographic Variable	Category	Frequency (<i>n</i>)	Percentage
Gender	Male	138	55.2%
	Female	110	44.0%
	Other	2	0.8%
Age Group	18–25 years	70	28.0%
	26–35 years	85	34.0%
	36–45 years	55	22.0%
	46–55 years	30	12.0%
	≥56 years	10	4.0%
Educational Level	Secondary	30	12.0%
	Higher secondary	45	18.0%
	Graduate	100	40.0%
	Postgraduate	65	26.0%
	Others	10	4.0%
Occupation	Student	55	22.0%
	Service (private)	90	36.0%
	Service (government)	45	18.0%
	Business	40	16.0%
	Others	20	8.0%
Monthly Income	<₹20,000	60	24.0%
	₹20,001–₹40,000	80	32.0%
	₹40,001–₹60,000	55	22.0%
	₹60,001–₹80,000	35	14.0%
	>₹80,000	20	8.0%

Lighting: Visual atmosphere, brightness, and comfort.

Scent: Ambient fragrance or aroma associated with the dining space.

Temperature: Thermal comfort of the environment.

Music: Background sound and its congruence with the dining theme.

Hypotheses

H_{01} : There is a significant difference between customers' expectations and perceptions of lighting in urban restaurants.

H_{02} : There is a significant difference between customers' expectations and perceptions of scent in urban restaurants.

H_{03} : There is a significant difference between customers' expectations and perceptions of temperature in urban restaurants.

H_{04} : There is a significant difference between customers' expectations and perceptions of music in urban restaurants.

Table 3. Results of the Wilcoxon Signed-rank Test.

Variable	Mean Expectation	Mean Perception	Z-Statistic	p Value	Significance
Lighting	3.648	3.836	427.5	.000	Significant
Scent	3.568	3.940	240.0	.000	Significant
Temperature	4.032	3.672	525.0	.000	Significant
Music	3.716	4.024	528.0	.000	Significant

Based on Table 3, the following gaps have been observed as the outcomes of hypotheses:

- H_{1a} : Customers' perceptions of lighting are significantly higher than their expectations.
- H_{2a} : Customers' perceptions of scent are significantly higher than their expectations.
- H_{3a} : Customers' perceptions of temperature are significantly lower than their expectations.
- H_{4a} : Customers' perceptions of music are significantly higher than their expectations.

Theoretical Linkages to Servicescape and S-O-R

In the view of servicescape: It is depicted that ambient conditions are core drivers of evaluative judgments in hospitality environments. The heterogeneity of gaps suggests treating ambient conditions as distinct levers (not a monolith), each with different thresholds for guest satisfaction. S-O-R: Ambient stimuli (S) shape internal affective/cognitive states (O) that drive satisfaction and downstream behavior (R). Positive gaps in scent/music/lighting imply positive arousal and congruence, while the negative gap in temperature suggests aversive arousal that can suppress overall satisfaction even when other cues perform well.

Expectation–disconfirmation: Results exemplify positive disconfirmation (delight) for enhancement cues and negative disconfirmation (dissatisfaction) for temperature. Consistent with loss-gain asymmetry, shortfalls in comfort often weigh more heavily than equivalent exceedance in aesthetics. Methodological contribution: The Wilcoxon approach is appropriate for paired ordinal data, avoids normality assumptions, and centers interpretation on the median difference, a robust choice for Likert measures.

Based on Table 4, the Wilcoxon signed-rank analysis reveals a nuanced interplay between customer expectations and sensory experiences in Indian urban restaurants, with divergent patterns emerging across ambient factors.

Lighting emerged as a notable overperformer, with perceptions surpassing expectations by +0.188 points on a 5-point scale. This indicates that contemporary restaurants are succeeding in crafting visually appealing atmospheres, possibly through adaptive lighting schemes, use of warm tones, and integration with thematic décor. Within the servicescape model, lighting is recognized as a dominant environmental cue influencing affective and cognitive evaluations. A well-lit

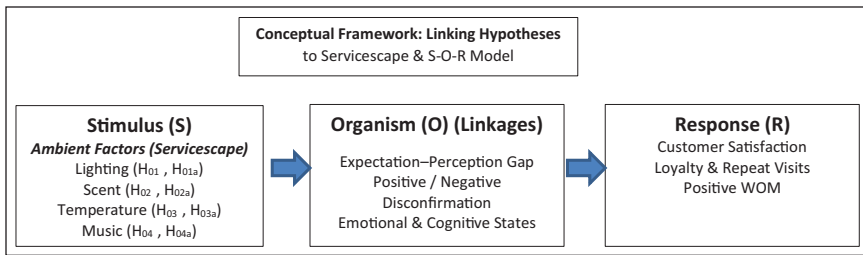


Figure 1. Linkages to Servicescape and S-O-R.

environment not only enhances aesthetic appeal but also contributes to perceptions of hygiene, service promptness, and overall ambience.

Scent recorded a perception gain (+0.372), marking it as the most improved dimension relative to expectations. Olfactory stimuli operate at a subconscious level, triggering emotional and mnemonic associations that can significantly enhance the dining experience. As theorized in the S-O-R framework, scent serves as a powerful external stimulus that shapes internal emotional states, leading to favorable behavioral outcomes such as increased dwell time and repeat visitation. The results imply that select urban Indian restaurants are effectively employing scent management either intentionally through aroma diffusion or indirectly through open-kitchen concepts, thus achieving a competitive edge.

In the context of temperature, a negative gap (−0.360) was presented, signifying that thermal comfort is a persistent operational challenge. Given India's climatic diversity, this finding underscores the importance of adaptive climate control strategies. Even marginal deviations from the thermal comfort zone can detract from perceived service quality, as physical discomfort often overrides other positive sensory inputs. This supports Bitner's assertion that ambient conditions serve as baseline qualifiers in the servicescape; when these are unsatisfactory, they can disproportionately impact overall evaluations.

Music showed a moderate positive shift (+0.308), suggesting that auditory ambience is being leveraged effectively to enhance dining experiences. While music tends to be less consciously evaluated compared to visual or tactile elements, its role in shaping mood, regulating the pace of service, and reinforcing brand identity is well established in hospitality literature. The statistically significant improvement in perceptions suggests that restaurants are increasingly curating playlists that align with their thematic positioning and customer demographics, thus enhancing experiential coherence (See Table 2).

Based on the above discussion, the analysis confirms that ambient conditions collectively exert a significant influence on customer satisfaction, with scent and music exceeding expectations, lighting performing reliably well, and temperature management emerging as an area for urgent operational attention. These findings not only validate the integrative use of the servicescape and S-O-R models in hospitality research but also provide actionable insights for practitioners aiming to refine sensory strategies for competitive advantage (See Figure 1).

Table 4. Detailed Interpretation of Expectation–Perception Gaps in Ambient Factors.

Ambient Factor	Mean Expectation	Mean Perception	Gap Direction and Magnitude	Wilcoxon Result (Z, p)	Interpretation
Lighting	3.648	3.836	+0.188 (perception > expectation)	$Z = 427.5,$ $p = .000$	Perception exceeding expectations suggests that restaurants have invested effectively in lighting design. This could be due to the adoption of adjustable illumination, thematic décor integration, and warm lighting schemes that enhance ambience. Lighting is a primary visual cue influencing cleanliness perception, mood, and comfort, aligning with Bitner’s servicescape theory, where visual ambience strongly shapes the service image.
Scent	3.568	3.940	+0.372 (perception > expectation)	$Z = 240.0,$ $p = .000$	The higher-than-expected perception reflects an underappreciated strength in olfactory branding. Restaurants that leverage mild, cuisine-relevant aromas may create subconscious emotional connections, stimulating appetite and recall. Scent directly engages the limbic system, influencing mood and memory, consistent with the S-O-R model. This demonstrates a strategic advantage, as scent marketing remains less saturated in Indian urban dining, providing differentiation potential.
Temperature	4.032	3.672	−0.360 (perception < expectation)	$Z = 525.0,$ $p = .000$	The negative gap indicates a shortfall in thermal comfort delivery. Customers expect optimal climate control, but perceptions suggest variability in temperature regulation, possibly due to inadequate heating, ventilation, and air conditioning (HVAC) calibration or seasonal inefficiencies. As physical comfort is a prerequisite for extended stays and positive evaluations, this gap signals a latent dissatisfaction driver that may reduce dwell time and repeat patronage.
Music	3.716	4.024	+0.308 (perception > expectation)	$Z = 528.0,$ $p = .000$	Positive perception scores indicate successful integration of music into the dining experience. Music congruence matching genre, tempo, and volume with dining themes can regulate customer mood, influence eating pace, and foster brand identity. The relatively small but significant improvement suggests that restaurants are achieving a subtle yet effective alignment of auditory cues with customer expectations.

Theoretical Implications

The present analysis advances theoretical understanding in services marketing, environmental psychology, and hospitality management by empirically validating the integrated applicability of Bitner's Servicescape Model (1992) and the S-O-R framework (Mehrabian & Russell, 1974) within the context of Indian urban restaurants.

First, the findings reinforce the core tenet of the servicescape model that ambient conditions are not peripheral but central determinants of customer evaluations. The statistically significant differences between expectation and perception for all four sensory dimensions (lighting, scent, temperature, and music) confirm that customers are highly sensitive to the physical and atmospheric environment, even in the presence of other service quality indicators such as food taste and staff behavior. The magnitude and direction of these gaps underscore that different ambient factors influence satisfaction in distinct ways, with scent and music often exceeding expectations, lighting performing reliably, and temperature lagging behind. This heterogeneity suggests the need for refining the servicescape model to incorporate dimension-specific performance thresholds rather than treating ambient conditions as a homogeneous construct.

Second, the study provides empirical grounding for the S-O-R model's sequential pathway from external stimuli to internal emotional states to behavioral outcomes. The expectation-perception gap functions here as a proxy for organismic emotional and cognitive states, capturing the dissonance (negative gap) or positive disconfirmation (positive gap) experienced by customers. The positive gaps observed in scent and music indicate that positive sensory surprises can enhance affective states and elevate satisfaction, whereas the negative gap in temperature illustrates how sensory discomfort can undermine overall evaluations even when other conditions are favorable. This supports the argument that ambient cues operate through dual channels, both as independent contributors to satisfaction and as moderators of the perceived quality of other service attributes.

Third, the application of the Wilcoxon signed-rank test, a nonparametric method, contributes to methodological discourse in hospitality research by demonstrating that ordinal-scale sensory data should be analyzed using distribution-free statistical techniques. This methodological choice addresses the limitations of parametric tests in handling Likert-scale responses and highlights the importance of matching analytical tools to the data's measurement properties, thereby enhancing the robustness of environmental psychology research.

Fourth, the results suggest an experiential asymmetry consistent with prospect theory whereby negative sensory disconfirmation (temperature discomfort) carries a stronger potential to diminish satisfaction than positive disconfirmation (pleasant scent or music) has to enhance it. This aligns with behavioral economics perspectives that losses loom larger than gains in shaping subjective evaluations. Integrating this principle into the servicescape and S-O-R frameworks could refine their predictive capacity by recognizing that sensory deficits may disproportionately influence overall service evaluations.

Conclusion

On the basis of the above study, the Wilcoxon signed-rank test provides strong empirical support for the argument that gaps between expectation and perception across sensory dimensions significantly affect satisfaction in Indian urban restaurants. This study not only quantifies the perceptual mismatch but also underscores the strategic importance of harmonizing the ambient environment to create holistic and satisfying customer experiences. Future research could incorporate demographic segmentation and emotion tracking technologies to further enrich the understanding of servicescape dynamics. Finally, the study extends the cultural contextualization of servicescape theory. Much of the existing literature is grounded in Western service environments, yet this research demonstrates that the foundational models remain relevant in an emerging market context like India, albeit with contextual nuances. For instance, the pronounced temperature gap highlights the climatic variability and infrastructural challenges of Indian cities, suggesting that environmental comfort factors may require greater weighting in tropical and subtropical hospitality contexts than in temperate climates.

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References

- Areni, C. S., & Kim, D. (1993). The influence of background music on shopping behaviour: Classical versus top-40 music in a wine store. In L. McAlister & M. L. Rothschild (Eds), *Advances in consumer research* (Vol. 20, pp. 336–340). Association for Consumer Research.
- Arneill, A. B., & Devlin, A. S. (2002). Perceived quality of care: The influence of the waiting room environment. *Journal of Environmental Psychology*, 22(4), 345–360.
- Baker, J. (1987). The role of the environment in marketing services: The consumer perspective. In J. A. Czepiel, C. A. Congram, & J. Shanahan (Eds), *The service challenge: Integrating for competitive advantage* (pp. 79–84). American Marketing Association.
- Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. *Journal of Retailing*, 68(4), 445.
- Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57–71.
- Dubé, L., Chebat, J., & Morin, S. (1995). The effects of background music on consumers' desire to affiliate in buyer–seller interactions. *Psychology & Marketing*, 12(4), 305–319.
- Duncan Herrington, J. (1996). Effects of music in service environments: A field study. *Journal of Services Marketing*, 10(2), 26–41.
- Eiseman, L. (1998). *Colors for your every mood*. Capital Books.
- Gifford, R. (1988). Light, décor, arousal, comfort, and communication. *Journal of Environmental Psychology*, 8(3), 177–189.
- Han, H. S., & Ryu, K. (2009). The roles of the physical environment, price perception, and customer satisfaction in determining customer loyalty in the family restaurant industry. *Journal of Hospitality & Tourism Research*, 33(4), 487–510.
- Harris, L. C., & Eze, C. (2008). Servicescape and loyalty intentions: An empirical investigation. *European Journal of Marketing*, 42(3/4), 390–422.

- Harris, P. B., & Sachau, D. (2005). Is cleanliness next to godliness? The role of housekeeping in impression formation. *Environment and Behavior*, 37(1), 81–101.
- Hirsch, A. R. (1991, October). *Nostalgia: A neuropsychiatric understanding*. Paper presented at the Annual Meeting of the Association for Consumer Research.
- Hunter, B. T. (1995). The sales appeals of scents (Using synthetic food scents to increase sales). *Consumer Research Magazine*, 18(10), 8–10.
- Hutton, J. D., & Richardson, L. D. (1995). Healthscapes: The role of the facility and physical environment on consumer attitudes, satisfaction, quality assessments, and behaviors. *Health Care Management Review*, 20(2), 48–61.
- Kim, W. G., & Moon, Y. J. (2009). Customers' cognitive, emotional, and actionable response to the servicescape: A test of the moderating effect of the restaurant type. *International Journal of Hospitality Management*, 28(1), 144–156.
- Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing*, 49(4), 48–64.
- Kryter, K. D. (1985). *The effect of noise on man*. Academic Press.
- Lin, I. Y. (2004). Evaluating a servicescape: The effect of cognition and emotion. *International Journal of Hospitality Management*, 23(2), 163–178.
- Lin, I. Y., & Mattila, A. S. (2010). Restaurant servicescape, service encounter, and perceived congruency on customers' emotions and satisfaction. *Journal of Hospitality Marketing & Management*, 19(8), 819–841.
- Lucas, A. F. (2003). The determinants and effects of slot servicescape satisfaction in a Las Vegas Hotel Casino. *UNLV Gaming Research and Review Journal*, 7(1), 1–19.
- McDonnell, A., & Hall, C. (2008). A framework for the evaluation of winery servicescapes: A New Zealand case. *Pasos: Revista de Turismo y Patrimonio Cultural*, 6(2), 231–247.
- Medabesh, A., & Upadhyaya, M. (2012). Servicescape and customer substantiation of star hotels in India's metropolitan city of Delhi. *Journal of Marketing and Communication*, 8(2), 39–47.
- Mehrabian, A., & Russell, J. A. (1974). The basic emotional impact of environments. *Perceptual and Motor Skills*, 38(1), 283–301.
- Morrin, M., & Ratneshwar, S. (2003). Does it make sense to use scents to enhance brand memory? *Journal of Marketing Research*, 40(1), 10–25.
- Nguyen, N., & Leblanc, G. (2002). Contact personnel, physical environment and the perceived corporate image of intangible services by new clients. *International Journal of Service Industry Management*, 13(3/4), 242–262.
- North, A. C., Hargreaves, D. J., & McKendrick, J. (1999). The influence of in-store music on wine selections. *Journal of Applied Psychology*, 84(2), 271.
- O'Neill, R. E. (1992, December). How consumers shop. *Progressive Grocer*, 71, 62–64.
- Patterson, P. G., & Spreng, R. A. (1997). Modelling the relationship between perceived value, satisfaction and repurchase intentions in a business-to-business, services context: An empirical examination. *International Journal of Service Industry Management*, 8(5), 414–434.
- Reimer, A., & Kuehn, R. (2005). The impact of servicescape on quality perception. *European Journal of Marketing*, 39(7/8), 785–808.
- Ryu, K., & Han, H. (2010). Influence of physical environment on disconfirmation, customer satisfaction, and customer loyalty for first-time and repeat customers in upscale restaurants. *International CHRIE Conference-refereed Track*, 13, 1–13.
- Tom, G., Barnett, T., Lew, W., & Selman, J. (1987). Cueing the customer: The role of salient cues in consumer perception. *Journal of Consumer Marketing*, 4(1), 23–28.
- Tombs, A., & McColl-Kennedy, J. R. (2003). Social-servicescape conceptual model. *Marketing Theory*, 3(4), 447–475.

- Turley, L. W., & Milliman, R. E. (2000). Atmospheric effects on shopping behaviour: A review of the experimental evidence. *Journal of Business Research*, 49(2), 193–211.
- Vilnai-Yavetz, I., & Gilboa, S. (2010). The effect of servicescape cleanliness on customer reactions. *Services Marketing Quarterly*, 31(2), 213–234.
- Wakefield, K. L., & Blodgett, J. G. (1996). The effect of the servicescape on customers' behavioural intentions in leisure service settings. *Journal of Services Marketing*, 10(6), 45–61.
- Yalch, R. F., & Spangenberg, E. (1988). An environmental psychological study of foreground and background music as retail atmospheric factors. In *AMA educators' conference proceedings* (Vol. 54, pp. 106–110). American Marketing Association.
- Yalch, R., & Spangenberg, E. (1990). Effects of store music on shopping behavior. *Journal of Consumer Marketing*, 7(2), 55–63.

A Study on Content Marketing Strategy to Influence Customer Purchasing Decision

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Abstract

In the midst of the rapidly evolving digital landscape, content marketing has emerged as an essential strategy for influencing consumer buying habits, particularly in business-to-consumer economies. This theoretical research examines the effect of various content marketing strategies—narrative approaches, personalized messages, social media engagement and search engine optimization on consumer attitudes, trust levels and purchasing habits. By moving away from traditional push-style promotion approaches to value-centric and emotionally engaging content, brands are able to develop closer bonds with target consumers, yielding increased levels of brand loyalty and higher conversion rates. The article also considers the growing significance of video content, influencer marketing campaigns, and data-driven personalization in maximizing the effectiveness of content strategies. Based on a meticulous review of current scholarly literature, this research discovers the pivotal role of content marketing in building digital consumer experiences and offers insights into emerging trends and future research directions.

Keywords

Content marketing, consumer attitudes, search engine optimization, influencer marketing, video content

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Introduction

Online marketing, or digital marketing, is the practice of promoting the use of the internet and other digital media channels, such as search engines, websites, social media, e-mail, mobile apps, text messages and online advertisements, to connect brands with consumers. The best method to become familiar with and engage your audience is through online marketing. You can try out promotions and messages to observe when individuals are most likely to visit your site. You can build relationships with them more quickly and easily if you have a social media strategy, which you should. Establish credibility by knowing your audience, and you will be able to get ahead of the pack. Digital marketing is less expensive than traditional marketing methods. There is less overhead. With one of the numerous templated systems or by paying a little more for a custom design, you can build a sleek, business-oriented website for relatively little money. Free social media sites can be created, and for a moderate price, you can use an e-mail newsletter service. Digital marketing is appropriate even for the smallest firms because it is very affordable.

Content marketing is another major engine of digital marketing, encompassing all approaches and strategies tailored to a business's particular clientele and exceeding the norm for typical business advertisements. While both may be intended to generate sales, normal advertising usually compels its products or services onto clients. Content marketing provides a source of regular, relevant, valuable content to attract a clearly defined audience towards a profitable customer action while enhancing the long-term relationship as well. Many people have contributed to the voluminous scholarly literature advocating the virtue of content marketing concerning creating awareness, carrying out engagement with consumers, search engine optimization (SEO), lead generation and building trust among consumers. This indeed is the primary advantage of content marketing: creating brand recognition and visibility. Many studies indicate that the strength of consistent good-quality content is evident in brand-consumer perception. Pulizzi (2010), the father of content marketing, puts it this way: Brands cannot rely on old advertising because modern consumers are looking for organic and engaging content. In line with this thinking, Holliman and Rowley (2014) state that content marketing has enabled brands to stand out in an increasingly competitive digital space. Companies can now establish themselves as thought leaders in their respective industries by offering valuable insights, educational material and entertaining content. Furthermore, Baltes (2015) also states that firms that invest in content marketing enjoy better brand memory among consumers, as it translates to high loyalty from consumers and, thus, greater profitability in the long term.

Literature Review

Online marketing has grown more and more essential in the time of digitization as a part of the marketing strategy applied by business organizations of every size and type. Since content marketing is essential for online marketing, the efficiency

of an enterprise's online communications is greatly dependent on the quality of its content marketing. In order to adapt their content and select the most appropriate means of promotion in this case, online marketers need to study their target audience along with promoting high-quality content marketing (Baltes, 2015).

Content Marketing: Strong Tool for Customer Retention

In today's information-based, digital age, content marketing has evolved into a powerful marketing tool. While it is not a new idea, content marketing is gradually gaining popularity with companies. Brands will now attain their marketing goals by creating and sharing the most valuable content in the world for that particular niche, instead of mainly on interruptive media. Though content marketing existed earlier, very few companies utilized it then. However, due to the latest changes in customer behaviour and technology advances, it is becoming the new trend in marketing. Customers have realized the importance of information and how it will affect their selection of products. Therefore, they begin to demand more information. Also, they are getting smarter and smarter, and there is no option for marketers but to develop incredible and authentic content because in this era of the internet, manipulation of information does not work. Since users are not paid to endorse certain products, customers believe that user-generated content is much more credible. Lastly, it is important for companies to engage with the public ethically and authentically. The public hates to be lied to and manipulated like a tool. For trust and client loyalty to be maintained, content marketers need to ensure that content is genuine and transparent. Publishing is taking over marketing due to the prevalent marketing trend (Kee, 2015).

Converting Leads to Potential Customers Using Content Marketing Strategy

The term 'content marketing' describes all the marketing plans that involve creating or distributing content in order to engage with current and new customers. To be successful in the long run, a firm needs to employ content marketing, and it has applications in nearly all sectors. It has been easier due to technology, and internet-based marketing is evolving rapidly. One billion search results are generated daily by portals such as Yahoo and Google. Marketers continuously seek innovative ways to reach out to potential customers. The greatest challenge lies in reaching these customers and surprising them. Marketing professionals feel that content marketing provides a much-needed break from the tried-and-tested marketing strategies and has opened doors for the sector to evolve. Customers are now able to interact with each other differently. A bad product will no longer be aided by expensive advertising to grow and thrive. Content marketing is sometimes called New Age marketing, but it is actually new wine in an old bottle. Many marketers have challenged this idea because they feel these new developments have immobilized them.

Content Marketing: Marketer's Best Practices for B2B Business

Business digital content marketing is an inbound marketing style that employs websites, social media and valuable content. It is believed to be an effective aid in creating and sustaining a valued brand position. Brands need to employ a 'publishing' approach in order to offer content that is useful to B2B audiences. This approach involves acquiring information on the informational needs and the purchasing process of the target audience. Valuable, relevant, interesting and timely are all terms to describe worthwhile content. To properly utilize content marketing, a cultural shift from 'selling' to 'helping' must occur. This movement requires distinct marketing objectives, plans, KPIs and skills from those brought to more traditional marketing methods (Geraint Holliman, 2014). Moreover, social media awareness has also become an instrumental tool for generating digital literacy, health and wellness (Sengupta, 2024).

B2B vendors are motivated to create online content that invites prospective buyers to interact with their company by the increasing importance of the internet to B2B client buying decisions. A new model called 'content marketing' has been established as a consequence of this phenomenon (Jarvinen, 2016).

Role of Content Marketing in Social Media

It adopts the consumer's point of view to create alliances. Most of the past research on social media communities has focused on social media marketing and virtual brand communities, typically overlooking contentmarketing's vital and underemphasized role in social media content communities (Plessis, 2017).

Social Media Content Marketing in Banking Sectors

The economy is making a shift from market-based to network-based as a consequence of technological development, and social networking has captured the top IT movements of the technological industry. The banking sector also got entangled in the internet wave, and as they notice a rapid transformation in customer attitude and buying trends, the banks are compelled to concentrate their efforts and redefine their digitalization process. Banks can now be powerful instruments for facilitating customers' businesses as well as acquiring the target prospects due to social media and digital marketing. One of the most important elements of the whole digital marketing strategy is content marketing, which is crucial for measuring the success and effectiveness of an organization's online communications. Apart from the quality of the material, the marketers must know and think about their specific target audiences as they distribute and market the information (Sawhney, 2022).

Increase of Brand Awareness

In a world that has been globalized and touches people's lives, the role of the internet is becoming more important these days in various aspects of socioeconomic and political life. A person's daily life can no longer be separated from the need that is

the internet. The internet can be utilized in seeking and satisfying nearly all consumer needs. The company applies online marketing strategies as a strategy to increase sales of the products it produces to the public (Budiman, 2022).

Research Objectives

- The purpose of the research is to study how content marketing helps the digital marketers of B2C industries to grow their business and engage customers.
- Content marketing is the best way to change the customer's mind and customer perception.
- Focus strongly on video graphics content, which will have a positive impact on the customer's mind.

Research Gap

From the above literature, it has been observed that content marketing has emerged as a dominant strategy in digital marketing communication, but more research is needed on how content marketing influences customers with video animated advertisements or how it will influence normal customers and change them into loyal and frequent customers through social media marketing tools.

Research Methodology

This research uses a qualitative conceptual approach to study the impact of content marketing strategies on consumer purchase decisions in the business-to-consumer (B2C) landscape. A thorough literature review of scholarly writings and reports on digital marketing, consumer behaviour and content marketing supplied all necessary secondary data. The study's methodology relies on thematic analysis, concentrating on major strategic tenets that include storytelling, personalization, SEO, video and social media marketing. The ability to combine prior research and theoretical insights with the evolving role of content marketing in fostering brand visibility and consumer trust and loyalty defines this conceptual approach. The research also highlights the limited focus in the literature on the influence of video and animated content on consumer conversion and aims to identify the gaps as areas that need more empirical research. The study does not include primary data collection and statistical analysis, as the theoretical research was designed to provide a starting point for more thorough empirical research in later stages.

Discussions

Content marketing went on to be one of the most powerful strategies in the B2C sector, influencing customer perceptions, engagement and purchasing behaviour. Contrary to the traditional methods that insist on pushing a sales agenda, content

marketing actually creates, disseminates and promotes invaluable content tailored to attract and retain customers. As the scepticism of consumers about advertisements continues to rise, the trust factor, relationship nurturing and eventually sales generation are what brands seek from content marketing. A conceptual study on the content marketing strategy in B2C sectors shows that it plays an important role in influencing consumer purchasing decisions with a strong emphasis on digital engagement, emotional appeal, personalization and trust-building mechanisms.

However, the major focus of content marketing in B2C industries is to engage the prospective buyer with useful information or entertainment. Whereas traditional advertising is considered disruptive, content marketing is thought to cater to relationship building using value offerings from the consumer perspective. It is very key in the customer journey in terms of all the possible ways of guiding the buying decision through awareness to purchase via blogs, social media posts, videos, infographics, podcasts and e-mail newsletters. One obvious advantage of content marketing is that it creates awareness of the brand.

Consumers are now always exposed to digital content; thus, there is a need for brands to create more unique and appealing materials to garner attention. Content-heavy establishments stand out in the jam-packed marketplace, enabling potential customers to identify and recall them during the purchase consideration. With content marketing, businesses earn the right to be trusted by the consumer through the provision of relevant information and value. Well-researched articles, case studies and expert opinions can position themselves as an industry leader in the minds of consumers, making them less sceptical about trusting or buying their product. The more the brand generates and disseminates content, the more exposure it gets. Being in search engines, social feeds and inboxes increases the chances of brand recall and hence, conversion.

Before making a purchase decision, it is commonplace for consumers to seek information online. Providing educational content that addresses customer pain points allows brands to portray themselves as problem solvers, exerting influence on purchasing decisions. How-to guides, FAQs and explainer videos serve this purpose excellently. Then, interactive content by way of quizzes, polls and videos is a great way to trigger consumer participation and engagement. An engaged customer is more likely to develop an emotional connection with the brand, which facilitates their journey towards purchase. User-generated content, testimonials and reviews are what ultimately sway potential buyers. Content marketing strategies that draw on customer feedback and experiences provide authenticity and credibility, thus pushing new customers into the purchasing decision. A big part of content marketing is SEO.

Creating keyword-oriented content allows the brand to get better ranking on Search Engine Result Pages, enabling consumers to spot them when looking up relevant products and services. Consumers prefer personalized experiences in tune with their interests and needs. Using data analytics and AI-based tools, companies can develop customized content that builds rapport with various customer segments. Emotionally driven content marketing allows a personal connection with consumers. While telling an engaging story of its own, a brand can highlight

real stories from customers about their positive experiences with the product or service, or even discuss the corporate social responsibility angle.

Video content today dominates social media marketing. It engages consumers in a much more appealing way than any other medium. Compared to static posts, video content grabs attention better, improves engagement rates and increases brand recall. Video-driven content is prioritized by platforms such as Instagram, TikTok, Facebook and YouTube, so it has to be included in any digital marketing strategy. Brands can deliver powerful messaging through short-form videos, live streaming, video product demos and storytelling techniques. Video content fosters emotional connections, makes complex information digestible and builds conversion by demonstrating products at work. Companies that realize present consumer tendencies favouring video-viewing and incorporate far-reaching video marketing strategies are likely to build brand loyalty and increase sales. Managers should determine what the video content should achieve, whether increasing brand awareness, engagement or sales and align video content with the market plan accordingly. Managers should also measure concrete KPIs, such as views, engagements and conversions, that can help in optimizing future video content strategies. By encouraging their customers to create and share videos with their brand, companies can foster authenticity and create community engagement.

Conclusion

Digital marketers should think that content is the backbone of digital marketing to grow their audience or fan base. So they should be more focused on the business model and awareness of the people by conducting a survey to ensure the smooth use of the content marketing tool for business promotion or customer engagement. Digital marketers should ensure the use of content for promotion frequently, which will help customers get additional and detailed information. There are many customers who are not only influenced by e-posters or newsletter content. They should also create and focus on some videoanimated or audio-related graphical content, which will strongly convey some useful information to the customers about their products and services. The video-related content for the product or service advertisement should be unique and should be related to the organization.

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References

- Baltes, L. P. (2015). Content marketing: The fundamental tool of digital marketing. *Bulletin of the Transilvania University of Braşov Series V: Economic Sciences* 8(57), 111–118.
- Budiman, A. (2022). Efforts to increase brand awareness of compass shoes through digital marketing activities. *Budapest International Research and Critics Institute-Journal*, 5(2).
- Holliman, G., & Rowley, J. (2014). Business to business digital content marketing: Marketers perception of best practice. *Journal of Research in Interactive Marketing*, 8(4), 269–293.
- Jarvinen, J. (2016). Harnessing marketing automation for B2B content marketing. *Industrial Marketing Management*, 54, 164–175.
- Kee, A. W. (2015). The review of content marketing as a new trend in marketing practices. *International Journal of Management, Accounting and Economics*, 2(9), 1055–1069.
- Plessis, C. D. (2017). The role of content marketing in social media content communities. *South African Journal of Information Management*, 19(1), a866.
- Pulizzi, J. (2010). Get content get customers: Turn prospects into buyers with content marketing. *NSB Management Review*, 2(2), 98–100.
- Sawhney, A. (2022). Drivers of social media content marketing in the banking sector: A literature review. *Research Anthology on Social Media Advertising and Building Consumer Relationships*, 396–418.
- Sengupta, S. (2024). Social media for digital health management. *Journal of Business Strategy Finance and Management*, 6(2). <http://dx.doi.org/10.12944/JBSFM.06.02.02>

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