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Reimagining Strategic Foresight through the Lens of Digital Technology Adoption

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Abstract

Purpose: This study aims to conceptualize the role of emerging digital technologies—Artificial Intelligence (AI), Internet of Things (IoT), Big Data Analytics (BDA), Blockchain, and Social Media Applications in developing strategic foresight among small and medium-sized enterprises (SMEs). In an increasingly volatile and technology-driven business environment, the study highlights how the adoption of these technologies enhances firms' ability to anticipate, interpret, and act upon future changes. **Methodology**: The paper adopts a conceptual and theoretical approach grounded in Dynamic Capability Theory (DCT). It synthesizes current literature, integrates findings from previous empirical works, and develops a conceptual framework linking digital technology adoption to strategic foresight dimensions, namely environmental scanning, strategic choice capability, and integration capability. The proposed framework will be validated through a mixed-method design involving qualitative interviews with SME managers and quantitative analysis using Smart PLS and NVivo for triangulation. **Findings**: The conceptual model proposes that advanced digital technologies collectively enhance SMEs' strategic foresight. Specifically, AI and BDA provide predictive insights; IoT enhances real-time situational awareness; blockchain ensures data transparency and trust; and social media platforms strengthen environmental scanning and stakeholder intelligence. Together, these technologies enable SMEs to move from reactive to

proactive strategies, fostering innovation, adaptability, and resilience. **Limitations**: As a conceptual study, empirical validation is yet to be conducted. Future research should test the proposed relationships across different sectors and regions. Moreover, contextual factors such as digital maturity, regulatory environment, and organizational culture may moderate the effects of technology adoption on foresight. **Practical Implications:** The study offers actionable insights for SME policymakers, managers, and technology developers. It suggests that structured foresight workshops, scenario planning, and trend monitoring can be enhanced through digital technologies. Policymakers can use the framework to guide SME digital transformation programs that emphasize long-term strategic agility instead of short-term survival. **Originality/Value**: This study extends Dynamic Capability Theory by positioning digital technology adoption as a critical enabler of strategic foresight in SMEs. It bridges a theoretical gap by explaining how multiple emerging technologies interact to build future-oriented decision-making capabilities, thus advancing the discourse on digital transformation and foresight integration in resource-constrained firms.
Keywords: Digital Technology Adoption, Strategic Foresight, Artificial Intelligence, Internet of Things, Big Data Analytics, Block chain Technology, Social Media Applications

Introduction

In the modern era, rapid technological advancements have revolutionized the businesses through competitiveness and agility across the globe. Consequently, the evolution of the digital technologies i.e., AI, IOT, Block chain, Big data analytics and social media has substantially transform the business operations and approaches to perform the tasks. Further, these advanced technologies fosters the efficiency in the existing systems and also advances the ability to overcome the emerging challenges through strategic foresight (Haarhaus & Liening, 2020).

On the other hand, the large scale firms has embraced the digital transformation at wide scope among their organizations, however, small and medium sized firms are struggling to adopt the advanced digital technologies due to limitations of the resources and skills (Zhang et al., 2022). Though the adoption of the advanced digital technologies is crucial to survive in the dynamic and competitive business environment. Digital technology adoption explains the integration of the emerging technologies all over the organization in order to improve the performance and collaboration and decision making process (Arroyabe et al., 2024; Nikou et al., 2022). The advanced digital technologies i.e., AI, big data, block chain and social media applications leads the business transformation and encourages the decision making (Mikalef et al., 2022). Specifically, AI fosters the cognitive abilities, IOT enhances the capability to monitors and connectivity, block chain increases the transparency in the transactions and social media applications influences the customer response and engages them with organization (Rane et al., 2024; Sjödin et al., 2023). All of these technologies combine lead the organizational ability of strategic foresight that exhibit the anticipation of the emerging challenges (Paramesha et al., 2024; Vecchiato, 2015).

Previously, strategic foresight has gained the substantial attention due to rising uncertainty and market volatility all over the world (Asmai et al., 2022). Under such ambiguous situation, strategic foresight increases the manager's ability to assess the changes happening in the business environment and translate the potential business opportunities (Paramesha et al.,

2024). However, how these diverse digital technologies paly their role among the manufacturing SMEs of the developing economies is rarely focuses in the existing literature. The present study advances this gap by proposing a unified framework in which multiple digital technologies collectively enhance the three pillars of strategic foresight (environmental scanning, strategic choice capability, and integration capability). Unlike earlier foresight models, this framework conceptualizes digital technologies as core enablers, rather than peripheral tools, that strengthen sensing, interpreting, and strategic integration activities across SMEs. This theoretical advancement is anchored in Dynamic Capability Theory (Teece, 2007), demonstrating how digital technologies reinforce the sensing–seizing–reconfiguring sequence essential for future-oriented decision-making. By synthesizing foresight constructs with emerging technological capabilities, the study offers an updated and contextually relevant model tailored for SMEs in developing economies. This comparative positioning establishes the theoretical novelty and highlights how the proposed model modernizes classical foresight thinking to reflect current digital realities. Therefore, for the holistic understanding of how the digital technologies combine foster the strategic foresight, the current study investigates the integration of AI, BDA, IoT, Block chain, and Social Media applications towards strategic foresight.

Problem Statement

In the recent decade, the technology is rapidly changing and business practices are continuously evolving that encourages the organizations to adopt their ability to see the emerging changes in the business environment. It is also noted that the firms across several sectors are experiencing the substantial disruption due to the continuous technological and customer preferences changes (Demneh et al., 2023). However, SMEs are struggling to take potential benefits of these emerging technologies and the absence of their integration across the several domains of the firms (Luu, 2024). Additionally, literature has highlighted how AI and IOT are associated with the innovation and higher performance (Luu, 2024), however, the literature on how the advanced digital technologies collectively can foster the strategic foresight is in its infancy.

Thus, the currents study aims to investigate how AI, IOT, block chain, big data analytical capabilities and social media application can leads the strategic foresight together. The understanding of the relationship among the construct in this study will prove the useful insights to the managers and policy makers of the SMEs towards successful transformation of these businesses through integration of advanced digital technologies and ultimately enhance their foresee ability to adapt with the emerging changes.

Literature Review

The study's approach is based on Dynamic Capability Theory (DCT), which describes how businesses adjust to changing market conditions and maintain their competitiveness. Dynamic capabilities are the firm's capacity to recognize opportunities, take advantage of them successfully, and reallocate resources in order to sustain long-term success, as Teece (2007) emphasizes. In other words, it's not just about having resources; it's also about understanding how to use and replenish them when circumstances change. Hence, current study conceptualizes that how the advanced digital technologies i.e., block chain, big data analytics, artificial intelligence (AI), the Internet of Things (IoT), and social media apps, equip the firms to meet the emerging challenges. These technologies jointly enhances the ability for

strategic foresight, enabling it to spot emerging trends, respond to change more swiftly, and make better informed judgments. Hence, the digital technologies improve the foresight among the firms and ultimately influences the adaptability.

The organizational ability to gather insights from massive data refers the big data (Kozanoglu et al., 2022). Additionally, big data analytics encompasses three essential competencies: big data technology, big data management, and big data analytics skill (Yasmin et al., 2020). Automation is the term used to describe circumstances in which machines take the place of humans, such as when robots operate on an assembly line. This claim is true for the automation that AI makes possible, but it ignores the profound shifts that AI causes (Gupta & George, 2016). Thus, more challenging cognitive functions like learning and problem-solving may be automated by AI technology. In order to improve the customer experience, AI may offer customers digital services and robots in the service environment (Prentice & Nguyen, 2020). Additionally, businesses nowadays must make judgments based on vast amounts of data and information as well as the necessary cognitive and intellectual capacity. Therefore, using AI to generate insights and make rational decisions from such vast volumes of data might be beneficial (Borges et al., 2021). Businesses are finding it more crucial to use AI in the research of opinions, attitudes, and feelings related to a particular commodity or service in order to have a comprehensive grasp of how their customers see their offers (Bytniewski et al., 2020; Jelonek et al., 2020).

IOT refers the capability to monitor the real time operations and generated the data driven intelligence (Raj et al., 2020). Further, IOT can be helpful for the firms in the identification process of the emerging changes in the production, supply chain and customer usage patterns and trends. Block chain technology offers digital transactions and supply chains transparency, traceability, and trust (Gilchrist, 2016). Further, decentralized structure of the block chain application guarantees data accountability and integrity, both of which are critical for strategic decision-making and well-informed foresight.

Social media platforms enable businesses detect external environmental cues by providing real-time engagement and customer sentiment monitoring (Prentice & Nguyen, 2020). Social medial applications are also helpful in identifying the trends, crises, and possibilities for innovation, these tools help them develop strategic foresight (Kohler, 2021). The use of strategic foresight allows the management of companies to make defensible decisions in the present while keeping the short, medium, and long-term futures in mind (Murphy et al., 2021). Strategic foresight exhibits three key elements i.e., environmental scanning, strategic choice capability and integration capability (Paliokaitė, 2013) which are explained in the following: Globalization has increased the competition all over the world and firms are looking for the ways to overcome the competition while creating a difference from other competitors and achieve a competitive advantage. However, creating differentiation from others is complex over the time as technology and business practices are changing rapidly. Thus, firms should understand the internal and external environment to achieve success. To achieve this objective environmental scanning can provide useful outcomes as it considers the external environment of the company and manage the organizational strategy accordingly (Qahtan & Al Himyari, 2022). Further, Environmental scanning is described as the firm's ability to manage the information available in the internal and external environment to determine the response regarding future changes and uncertainties (Amuna et al., 2017). The integration of

the organization with the external environment and its response are significantly associated (Flaih & Chalab, 2022). Precisely, environmental scanning can be described as the ability to sense the signals sent by the internal and external environment of the organization.

Strategic choice capabilities are organizational capabilities that enable an organization to systematically understand the business environment and mobilize its finite resources to achieve an ideal future. These capabilities are the subset of strategic foresight (Miethke et al., 2021). It is already noted that firms should gather and sort technology, market, and competitive data at times of new opportunities are unveiled to understand their significance (Danneels, 2008). The capacity for strategic decision-making is associated with a methodical visioning process and certain modalities that support long-term ambitions communication and foster consensus about the organization's vision at all organizational levels. Further, strategic planning provides the support while ensuring people, skills and process integrates with the vision and organizational procedures (Rhisiart et al., 2015). More specifically, the capabilities of strategic choices can be explained as the ability of the organization to select data and information that comprehend the basis of future knowledge and identification of right choices for the manifestation of vision and strategic plan (Kozanoglu et al., 2022). Integrative capabilities play a significant role in the dissemination, replication, and preservation of external knowledge within the organization once it has been identified and chosen. Because they are linked to organizational culture and the human element, they can serve as a partial substitute for foresight processes and are therefore important enabling factors for visible success (Wyrwicka & Erdeli, 2018). However, the inability of the firm's top management to foresee the future, ignorance towards the vision and limited interest from stakeholders make it difficult to integrate the organizational system into the external environment and ultimately influence the achievement of the competitive advantage (Paliokaitė, 2013). An organization's integration capabilities reflect its capacity to coordinate and integrate its knowledge base, as well as its possession of the leadership skills and qualifications necessary for effective integration of organizational resources with foresight processes (Paliokaitė, 2013).

Digital Technology Adoption and Strategic Foresight

Digital technology adoption exhibits the integration of several digital tools to lead the operation efficiency and agility in innovation (Warner & Wäger, 2019). The advanced digital technologies are helpful to the SMEs to overcome their resource limitations through providing the smart and data driven decision making.

Artificial Intelligence (AI) and Strategic Foresight

Artificial intelligence (AI) assists companies in identifying patterns that could otherwise be missed by processing and evaluating enormous amounts of structured and unstructured data (Wamba-Taguimdje et al., 2020). With this knowledge, SMEs would be better equipped to understand how markets are changing, what customers might want next, and possible risks and opportunities. Additionally, AI-powered systems may foresee demand changes, evaluate many business scenarios, and track competitor activity prior to making choices.

Internet of Things (IoT) and Strategic Foresight

Through networks of devices, sensors, and systems that gather and share data in real-time, IoT gives businesses a clear, up-to-date view of their operations, supply chains, and customer

interactions. (Sallam et al., 2023). This continuous flow of data aids managers in monitoring performance, identifying inefficiencies, and identifying early warning indications of change before issues worsen. For instance, IoT-enabled devices may alert business executives to equipment malfunctions, supply shortages, or changes in client demand, enabling them to take prompt and efficient action (Sallam et al., 2023). The capacity of a business to stay vigilant, adjust to changing circumstances, and be ready for whatever the future holds is enhanced by IoT, which turns routine operating data into insightful knowledge.

Big Data Analytics (BDA) and Strategic Foresight

Big Data Analytics (BDA) converts vast amounts of complex data into clear insights, enabling SMEs to make better strategic decisions (Zhang et al., 2022). Managers may use BDA to identify important patterns and trends, such as shifting customer preferences, untapped market opportunities, or potential risks, rather than relying just on intuition or speculation. This data-driven approach may assist SMEs in making better, more certain judgments while being flexible and prepared in an unpredictable economic climate.

Block chain Technology and Strategic Foresight

Block chain technology improves operational transparency, accountability, and trust, allowing SMEs to build strategic foresight (Rakshit et al., 2024). Block chain technology might be tremendously beneficial to SMEs in detecting and avoiding difficulties like as fraud, supply chain disruptions, and contract disputes before they escalate (Sun et al., 2021). Block chain technology provides real-time, immutable data, allowing for more confident and informed decision-making. SMEs that employ this technology are thus more placed to anticipate potential problems, maintain stable connections, and endure in today's quickly changing and unpredictable marketplaces.

Social Media Applications and Strategic Foresight

Social media applications are vital for keeping SMEs updated about their surrounds and prepared for future developments (Rozak et al., 2021). These insights enable businesses to detect new opportunities, changes in client preferences, and adapt their strategy before others (Andersen et al., 2022). As a result, social media is more than just a way to engage audiences; it is also an early warning system that helps SMEs anticipate demands, be adaptable, and sustain competitiveness in a quickly changing digital market.

Conceptual Framework

Based on the explanation above, a conceptual framework was proposed as Figure 1.

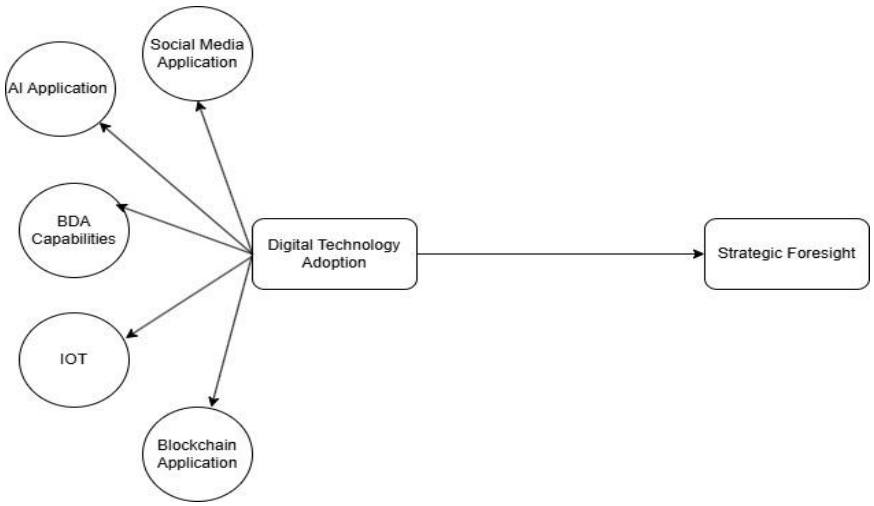

Figure1: Theoretical Framework

Research Methodology

This study employs a five-phase mixed-method approach to examine how digital technology adoption enhances strategic foresight among SMEs.

1. **Phase 1 – Literature Review & Situation Analysis:**
   Reviews prior studies and conducts preliminary interviews with SME stakeholders to assess current digital and foresight readiness.
2. **Phase 2 – Instrument Development:**
   Develops and pretests interview protocols and survey instruments based on insights from Phase 1.
3. **Phase 3 – Model and Hypothesis Formulation:**
   Establishes hypothetical relationships between AI, IoT, BDA, blockchain, social media, and strategic foresight, using validated measurement scales.
4. **Phase 4 – Data Collection:**
   Conducts pilot testing and full-scale data collection through surveys of SME managers, ensuring reliability and validity.
5. **Phase 5 – Data Analysis:**
   Uses **Smart PLS** for quantitative testing and **NVivo** for qualitative thematic analysis, integrating results through triangulation.

Overall, this design ensures both theoretical rigor and empirical validation in exploring how digital technologies build foresight capabilities within SMEs. Table 1 exhibits the details.

Table 1
Details on Research Methodology

No.	Phase	Methodology	Outcome
1.	**Phase 1: Literature Review and evaluation of the current situation** Initially study of the SMEs' strategic foresight and technology adoption. • Review on BDA and AI capability of SMEs • Review of the strategic foresight capability of SMEs	• In-depth discussions with SME regulatory authority, SME owners and managers will be done. • A preliminary interview with SMEs manager, owners • Published literature will be analyzed	Clarity regarding the recent standing of SMEs towards foresight.
2.	**Phase 2: Interview protocol development** • Development of the instrument based on the literature, interview discussion, and current situation assessment	• Develop interview protocol from phase 1 • Instrument pretest • Interview of 10-12 SMEs managers and owners who are responsible for strategic decision making • Snowball sampling	-Interview protocols will be finalized for qualitative analysis. -Data mapping -Framework development
3.	**Phase 3: Hypothetical Relationship development towards SMEs' strategic foresight**	• The scale for measurement will be finalized. • The scale will be adopted for quantitative analysis based on a 7-point Likert scale. • Purposive sampling will be used to select SME owners, managers, and decision-makers who have direct involvement in digital adoption and strategic planning activities.	-Comprehensive analysis of the contributing factors towards the SMEs' strategic foresight that can stimulate SME's success in the longer run. -Clear inclusion criteria for targeted respondents
4.	**Phase 4: Data Collection** • Reliability • Validity	• Pilot testing from small population through convenient sampling • Full survey: deploy to purposively selected SMEs	-Complete assessment of quantitative instrument for full data collection. -Sufficient data for PLS-SEM.

5.	**Phase 5: Findings** Data analysis through software (Quantitative and Qualitative)	• Quantitative: Smart PLS (measurement & structural model, predictive checks) • Qualitative: NVIVO (Thematic Analysis from the development of themes after interview) • Triangulation of qualitative and quantitative data (build an integration matrix to compare paths (e.g., AI→ Foresight) with interview themes, examine convergence/divergence to reduce bias and ensure coherence.	-Interpretation of both qualitative and quantitative data -Integrated interpretation; richer explanations of statistical links. -Strengthened validity through triangulation.

Finding and Discussion

The central finding of this conceptual study is the development of a comprehensive framework that explains how emerging digital technologies support the formation of strategic foresight capabilities among SMEs. By synthesizing insights from Dynamic Capability Theory and prior literature on digital transformation, the framework demonstrates that AI, IoT, big data analytics, blockchain and social media applications collectively strengthen the three pillars of strategic foresight: environmental scanning, strategic choice capability and integration capability. This finding highlights the interactive and complementary nature of digital technologies, showing that their combined use can enhance the ability of SMEs to sense changes in the environment, interpret strategic options and reorganize internal resources to respond effectively.

In discussing this framework, several observations emerge. First, the framework suggests that strategic foresight is not solely a cognitive or planning activity but is increasingly shaped by digital infrastructures that provide real time data, predictive insights and transparent information flows. Second, the finding emphasizes that digital technologies create value for SMEs by reducing uncertainty and supporting more informed decision making. Third, the discussion highlights that SMEs in developing economies may experience distinctive challenges related to resource constraints, capability gaps and readiness for digital integration. These challenges suggest that the effectiveness of the framework may vary across different sectors and organizational contexts.

Therefore, the conceptual framework provides a structured understanding of how digital technologies can be used to cultivate strategic foresight in SMEs, offering both theoretical insights and practical pathways for future empirical investigation.

Conclusion

Theoretical Implications

This conceptual study shows that the ability of SMEs to survive and grow in turbulent environments depends on their capacity to adopt emerging digital technologies and apply them strategically to strengthen foresight. When SMEs integrate AI, IoT, big data analytics, blockchain and social media applications, they enhance their dynamic capabilities to sense early signals of change, seize opportunities through informed decisions and reorganize resources with greater agility. The framework presented in this study explains how these

technologies collectively reinforce the three main pillars of strategic foresight, namely environmental scanning, strategic choice capability and integration capability. Through digital transformation, foresight becomes a continuous organizational practice that informs everyday decisions rather than an occasional planning activity. SMEs that cultivate these capabilities are better positioned to anticipate disruptions, respond proactively to evolving market conditions, maintain competitiveness and contribute to economic resilience in developing economies.

Managerial and Policy Recommendations

In line with these insights, several actionable recommendations are proposed for SME managers. First, managers can begin with simple and affordable digital tools such as cloud based analytics, basic IoT devices and social media monitoring platforms to strengthen early sensing without significant financial burden. Second, SMEs can build internal data literacy by offering short and practical training to staff so that digital insights can be interpreted correctly and used in strategic discussions. Third, firms can establish small technology foresight teams to monitor market signals, customer trends and operational data on a regular basis. Fourth, managers can use AI assisted tools for basic forecasting and scenario development to support timely and evidence based decisions. These actions help SMEs embed foresight within daily operations even when resources are limited.

At the policy level, governments and support agencies in developing economies can play an important role in facilitating this transition. Public institutions may introduce subsidized digital adoption programs to help SMEs acquire essential technologies and analytics tools. Shared digital platforms can be developed to provide SMEs with access to market intelligence, training resources and technology support. Policymakers can also establish regional foresight hubs in collaboration with universities to produce periodic reports on technological trends and sector specific risks. Public and private partnerships can encourage SMEs to participate in pilot projects that promote digital experimentation in supply chains, manufacturing and service delivery. Such initiatives lower capability barriers and create more inclusive pathways for SMEs to develop strategic foresight.

Limitations and Future Research Roadmap

Although this study presents a conceptual framework that links emerging digital technologies with the development of strategic foresight in SMEs, several limitations should be noted. The framework is conceptual and does not include empirical evidence. This means that the strength, direction and significance of the proposed relationships remain to be tested. Future empirical work is needed to confirm whether digital technologies such as AI, IoT, big data analytics, blockchain and social media applications consistently influence the three pillars of foresight across different SME contexts.

The framework also does not address sector specific variations. SMEs in manufacturing, services and retail operate within different regulatory conditions, technological infrastructures and market environments. These differences may affect how digital technologies are adopted and how foresight capabilities emerge. In addition, the study does not capture the temporal nature of digital capability development. Both technology adoption and foresight are dynamic processes that evolve over time. Without longitudinal evidence,

the framework may not fully reflect how SMEs progress through different stages of digital maturity or how foresight becomes embedded in organizational routines.

Internal factors such as leadership style, organizational culture, innovation climate and resource availability were acknowledged but not examined. These elements may strongly influence how digital technologies are implemented, interpreted and used in strategic decision making. Finally, the focus on SMEs in developing economies may limit generalizability to larger firms or organizations in advanced markets with different institutional and infrastructural conditions.

To address these limitations, future research can follow a structured empirical roadmap. The first step is cross sectional testing of the conceptual model across a broad sample of SMEs to validate the measurement scales and examine the proposed relationships. A second step involves sector level comparisons to determine whether the framework operates similarly across manufacturing, services and retail sectors. Such comparisons can highlight sector specific drivers and constraints that influence digital adoption and foresight development.

A third step is longitudinal research to observe changes in digital capabilities and foresight practices over time. This approach can provide insights into causality, capability accumulation and the long-term impact of digital transformation. Finally, mixed method approaches such as case studies, panel interviews and digital maturity assessments can offer deeper contextual understanding, help explain quantitative results and reveal mediating factors that shape the relationship between digital technologies and foresight capabilities.

Together, these directions provide a comprehensive pathway for validating, refining and extending the conceptual framework, and they offer opportunities for both scholars and practitioners to advance understanding of how SMEs can use digital technologies to prepare for future challenges.

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