

DIGITAL STRATEGIC ALIGNMENT IN SMART ECOSYSTEMS: A SYNTHESIS OF STRATEGIC CAPABILITIES AND EMERGING TECHNOLOGIES

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Abstract:

Background: The rapid development of AI, IoT, Big Data, and Blockchain is reshaping business and management. While research has emphasized technical aspects, less is known about their strategic implications. This study explores how firms adapt managerial strategies within smart ecosystems.

Purpose: The study examines how organizations adjust strategic management to sustain competitiveness amid digital transformation, focusing on managerial perspectives in areas such as AI governance, data-driven decisions, and ecosystem collaboration.

Design/Methodology/Approach: A Systematic Literature Review (2010–2024) was conducted using peer-reviewed sources. Selected studies addressed strategic management excluding purely technical works and were categorized into AI strategy, Big Data analytics, Blockchain governance, and business models.

Findings/Result: Digital technologies enhance agility and innovation but pose challenges in cybersecurity, regulation, and interoperability. The study applies Dynamic Capabilities, Resource-Based View, and Ecosystem Perspectives, identifying gaps in AI governance, SME digital adoption, and sustainability.

Conclusion: Five strategic priorities emerge: predictive AI, real-time Big Data insights, secure Blockchain applications, robust cybersecurity, and dynamic capabilities. Firms leveraging collaborative and platform-based strategies adapt more effectively, though SMEs face significant constraints.

Originality/Value (State of the art): Unlike prior research emphasizing technical dimensions, this study highlights strategic implications of digital technologies for competitive advantage and sustainability. The SLR reveals key trends, challenges, and opportunities, offering actionable insights for managers and policymakers.

Keywords: artificial intelligence, big data, blockchain, smart ecosystems, strategic management

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INTRODUCTION

The rapidly evolving field of digital technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Big Data, and Blockchain is fundamentally reshaping approaches to strategic planning. These instruments make up the main structure of smart systems, helping businesses work better, learn from data, and come up with new ideas in areas such as factories, money, health care, and government services (Autio et al. 2022; Iansiti & Lakhani, 2021; Sarangdhar et al. 2024). As these instruments become more connected, they lead to changing and spread-out digital settings that react right away and connect different groups (Parker et al. 2020; Westerman et al. 2014).

Despite significant technological progress, a critical research gap remains: current strategic planning frameworks provide insufficient conceptual clarity and empirical evidence regarding how businesses adapt their strategies to the complex and interconnected nature of smart digital ecosystems. Past studies tend to look at what digital instruments can do on their own like how well they use math or machines but don't say much about how these instruments help build long-term strategic worth, flexible groups, and taking part in systems (Jorzik et al. 2024; Wang et al. 2023; Yoo et al. 2010). This split causes a big gap in ideas and management between using technology and its effect on strategy.

Especially, small and medium-sized businesses (SMEs) have bigger problems dealing with digital changes, because they don't have much digital setup, rules are unclear, and they don't have simple plans that fit their limited resources (Zhao et al. 2023; Shao & Liu, 2024; Christofi, 2024). These situations bring up important questions about how groups of different sizes can get a lasting edge over others in markets that are becoming more digital, using more data, and driven by systems.

To fix this gap, this study uses a careful review of existing writings, focusing on how groups change their strategic planning because of four basic digital instruments AI, IoT, Big Data, and Blockchain inside smart systems. The study looks at both idea-based plans (like Dynamic Capabilities, Resource-Based View, Ecosystem-Based View) and real-world uses, mainly focusing on mixing things together, being quick with strategy, and managing things in the context of digital

change. By looking at it this way, the research wants to point out key patterns, unsolved problems, and new chances, especially for SMEs, adding a solid plan to guide future studies and strategic work in the digital age.

Even though there is increasing research about the technical aspects of Artificial Intelligence, Big Data, Blockchain, and the Internet of Things, a lot of this work has focused on making things run better, automation, and systems that help with making decisions (Brynjolfsson & McAfee, 2022; Liu & Wang, 2024). Important ideas like the Dynamic Capabilities Theory (Teece, 2022), the Resource-Based View (Barney, 1991), and the Ecosystem-Based View (Adner, 2017) give us a way to think about how companies change their plans to deal with unstable situations. However, we still don't fully understand how these ideas work when digital instruments connect with each other in connected systems, especially when it comes to working together to create value, being quick to adapt, and working together across different groups (Jacobides et al. 2018; Verhoef et al. 2021).

We do know that digital instruments give businesses new ways to be better than their rivals, allow them to analyze information as it happens, and help them react to changes in their plans (Geng et al. 2024; Sarangdhar et al. 2024). What we don't know as well, which means we need to study it more, is how companies use different digital instruments together to create complete strategic skills especially when they don't have a lot of resources, like small and medium-sized businesses (Zhao et al. 2023; Christofi, 2024). Also, people are still arguing about the moral and management issues of using AI, how well Blockchain works with current systems, and how digital changes will affect new ideas and sustainability in the long run (Cai et al. 2024; Shao & Liu, 2024; Kanungo et al. 2024).

This study tries to address these issues by putting together recent research results and ideas to create a clear way to think about changing strategies in smart systems. By using both well-known strategy ideas and the newest discussions about the digital world, this research wants to explain how companies especially small and medium-sized ones deal with the changing rules of strategy in a world that is becoming more intelligent, uses platforms more, and is driven by data.

The prevailing corpus of scholarship concerning digital transformation is predominantly characterized by investigations that concentrate on the technical implementations of nascent technologies, including but not limited to Artificial Intelligence (AI), Big Data, Blockchain, and the Internet of Things (IoT). Although significant research has delved into how these instruments facilitate automation, real-time analytics, and operational efficacy (Brynjolfsson & McAfee, 2022; Liu & Wang, 2024; Jorzik et al. 2024), a substantial portion of the extant literature tends to examine these technologies in isolation and within narrowly defined functional spheres. Consequently, there exists a conspicuous deficiency in comprehending how these digital innovations, when strategically amalgamated, can transform business paradigms, recalibrate competitive dynamics, and affect organizational adaptability within interlinked digital ecosystems. Foundational theoretical constructs such as the Dynamic Capabilities Theory (Teece, 2022), the Ecosystem-Based View (Adner, 2017), and the Resource-Based View (Barney, 1991) furnish conceptual instruments to investigate such transformations; however, there is a paucity of studies that employ them in a holistic manner to elucidate how organizations navigate the complexities and vicissitudes of the digital landscape (Jacobides et al. 2018; Verhoef et al. 2021).

Furthermore, despite the ascendancy of platforms and intelligent ecosystems as pivotal to value generation, the synergistic effects of technologies such as Blockchain, AI, and IoT remain inadequately explored. For example, while Blockchain has garnered significant focus in financial contexts, its function in ensuring data integrity and bolstering AI-informed decision-making within multi-party ecosystems has not been sufficiently scrutinized (Cai et al. 2024; Tapscott & Tapscott, 2023). Similarly, the role of Big Data in predictive strategic formulation and cross-sector integration continues to represent an emergent area of scholarly interest (Geng et al. 2024). Additionally, there exists a scarcity of research concerning governance, ethical dilemmas, and interoperability challenges that manifest when these technologies are collectively deployed particularly within resource-constrained environments such as small and medium-sized enterprises (SMEs) (Henderson et al. 2023; Zhao et al. 2023).

This research endeavor presents several noteworthy innovations in addressing these identified gaps. Firstly,

it propounds a comprehensive lens by scrutinizing the interactions and mutual reinforcement among AI, Blockchain, Big Data, and IoT within strategic management frameworks. Secondly, it amalgamates well-established theoretical paradigms to formulate a cohesive conceptual framework that correlates technological progression with strategic agility, ecosystem participation, and sustained competitive advantage. Thirdly, through the implementation of a Systematic Literature Review (SLR) grounded in the PRISMA methodology, this study synthesizes emerging patterns, delineates critical deficiencies, and offers actionable insights for both scholarly inquiry and practical application. Lastly, by integrating the frequently neglected aspect of SME digital transformation, this investigation underscores the necessity of inclusive strategies and policy interventions aimed at ensuring equitable and sustainable engagement in the digital epoch. In doing so, it effectively bridges the chasm between fragmented technical analyses and the strategic exigencies confronting contemporary organizations.

To proficiently tackle the multifaceted challenges inherent in digital transformation and strategic management within intelligent ecosystems, this research employs a systematic and theory-driven problem-solving methodology. At the core of this methodology is the implementation of a Systematic Literature Review (SLR), which is informed by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework (Moher et al. 2009), thereby ensuring a structured, transparent, and replicable process for synthesizing evidence. This approach facilitates the identification, selection, and critical assessment of high-caliber academic and industry sources that investigate the convergence of AI, IoT, Big Data, and Blockchain in the context of strategic management. Through thematic analysis of the curated literature, the research delineates prevailing trends and insights while concurrently illuminating significant gaps and inconsistencies present in the existing body of knowledge. Moreover, the analysis is grounded in well-established theoretical frameworks specifically the Dynamic Capabilities Theory, Resource-Based View, and Ecosystem-Based View which serve to contextualize the strategic ramifications of digital technologies and inform interpretation. This integration of systematic evidence gathering and solid theoretical underpinnings fosters a holistic understanding of how organizations may recalibrate their strategic methodologies to adeptly navigate digital complexities. In addition, the study

advances a conceptual framework that amalgamates the roles of fundamental digital technologies, organizational competencies, strategic paradigms, and facilitating elements such as cybersecurity and regulatory compliance. By employing this multi-tiered analytical methodology, the research not only identifies the challenges but also provides actionable solutions and prospective research trajectories that promote both academic progress and practical implementation in the management of digital ecosystems.

The principal objective of this scholarly investigation is to examine the methodologies through which organizations recalibrate their strategic management frameworks in light of the rapid progression of digital technologies most notably Artificial Intelligence (AI), the Internet of Things (IoT), Big Data, and Blockchain within the framework of intelligent ecosystems. This inquiry aims to bridge the disconnect between technological innovation and strategic implementation by elucidating the mechanisms through which these technologies transform organizational architectures, business models, and competitive interactions. Specifically, the research endeavors to (1) augment strategic management theory by scrutinizing the impact of digital technologies on firm-level capabilities, adaptability, and long-term value generation; (2) synthesize the extant literature to reveal salient trends, challenges, and deficiencies in the strategic utilization of digital instruments; and (3) furnish actionable insights and strategic recommendations for organizations, including small and medium-sized enterprises (SMEs), that aspire to secure sustainable competitive advantages within digitally oriented markets. By developing a comprehensive framework grounded in the Dynamic Capabilities Theory, Resource-Based View, and Ecosystem-Based Perspective, the study also seeks to contribute to the discourse of future academic research and policymaking pertinent to digital transformation and strategic ecosystem design.

METHODS

As this investigation is predicated upon a Systematic Literature Review (SLR) methodology, it does not necessitate a physical research site in the conventional empirical context. Conversely, the inquiry was executed through comprehensive access to digital academic repositories, encompassing ScienceDirect, SpringerLink, IEEE Xplore, and Scopus, which constituted the primary sources for the aggregation of pertinent literature. The

research activities, encompassing data collection, screening, analysis, and synthesis, were performed over a duration of six months, spanning from Aug 2024 to Jan 2025. This interval facilitated a meticulous identification of peer-reviewed journal articles, industry reports, and authoritative publications that resonate with the study's thematic emphasis on digital transformation and strategic management within smart ecosystems.

This research is predicated solely on secondary data sourced from peer-reviewed academic literature and reputable industry publications. The dataset encompasses articles from peer-reviewed journals, proceedings from academic conferences, scholarly books, white papers, and institutional reports that pertain to the strategic utilization of digital technologies specifically Artificial Intelligence (AI), Big Data, Blockchain, and the Internet of Things (IoT) within advanced business ecosystems. The selection of data sources was predicated on factors such as relevance, credibility, and scholarly rigor, with a pronounced emphasis on materials disseminated in high-impact journals cataloged in databases including Scopus, ScienceDirect, IEEE Xplore, SpringerLink, and Google Scholar. To uphold the integrity and dependability of the data, only sources published in the English language and within the preceding decade (2014–2024) were deemed pertinent, although seminal theoretical works (e.g., Teece, 2022; Adner, 2017; Barney, 1991) were incorporated irrespective of their publication date. The amassed data were subsequently subjected to a methodical screening process and thematic categorization, in alignment with the PRISMA guidelines, to extract pertinent insights that resonate with the research objectives.

This investigation utilized a Systematic Literature Review (SLR) as its principal methodology for data acquisition to scrutinize management strategies within intelligent ecosystems. The SLR approach was selected for its systematic and evidence-driven framework, which facilitates an exhaustive comprehension of prevailing trends, obstacles, and prospects in the realm of digital transformation. The inquiry was exclusively dependent on secondary data, extrapolating from a diverse array of reputable sources including peer-reviewed academic journals, scholarly texts, industry analyses, white papers, and institutional publications. These resources were procured from esteemed academic repositories such as ScienceDirect, SpringerLink, IEEE Xplore, Scopus, and Google Scholar.

To ensure both relevance and scholarly rigor, the investigation employed a stringent selection protocol informed by explicitly articulated inclusion and exclusion criteria. Only articles composed in English, disseminated between 2014 and 2024, and pertinent to strategic management and intelligent ecosystems were incorporated. Research that concentrated exclusively on the technical dimensions of digital technologies devoid of managerial significance or lacking full-text accessibility was systematically omitted.

The comprehensive data collection methodology adhered to the PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which guarantees transparency and reproducibility. The four phases of this methodology encompass: identification (the aggregation of literature from principal databases), screening (the assessment of titles and abstracts), eligibility (the appraisal of full texts and the extraction of relevant themes), and synthesis (the analysis and categorization of findings).

In conclusion, the investigation employed Thematic Analysis to elucidate the gathered data. Through the process of thematic coding, the research outcomes were categorized into salient themes such as AI-driven business strategies, the contribution of Big Data in securing competitive advantage, and Blockchain governance within intelligent ecosystems. Thematic analysis also facilitated the recognition of research trends, emerging patterns, and significant voids in the extant body of knowledge, thereby establishing a robust foundation for forthcoming academic and practical contributions in the field of strategic management.

To be certain our information was accurate and suited our research aims, we set up specific guidelines for what qualified and what didn't. We only considered papers in English from 2014 to 2024 that discussed using modern technologies such as Artificial Intelligence (AI), Big Data, Blockchain, and the Internet of Things (IoT) in advanced setups. Moreover, we picked papers connected to important management concepts like Dynamic Capabilities, Resource-Based View, and Ecosystem-Based Perspective. We didn't use papers that just covered the technical details of these technologies if they didn't also talk about their impact on management. Also, we excluded papers not written in English and sources that we couldn't fully access or confirm as reliable academic material.

For our study, we used Thematic Analysis to spot, name, and group the key concepts from the papers. This let us find trends and important strategic insights into how AI impacts choices, how Big Data aids business competition, how Blockchain supports management, and how modern technologies integrate into broader strategic management approaches. After that, we utilized established ideas to interpret our discoveries, highlight patterns, identify gaps, and propose areas for future study. Our approach, featuring thorough data collection and theory, provides a solid foundation for understanding how businesses handle digital shifts and revise their strategies as technology evolves things. The analysis was conducted using a thematic coding approach based on the frameworks developed by Teece (2022) and Adner (2017) to ensure the validity and reproducibility of the findings.

This theoretical framework delineates the manner in which essential digital technologies Artificial Intelligence, Internet of Things, Big Data, and Blockchain function as fundamental enablers of strategic transformation (Figure 1). By cultivating dynamic capabilities (sensing, seizing, and transforming), organizations are positioned to devise efficacious digital strategies that are either predicated on platforms or oriented towards collaboration. These strategies are underpinned by facilitative factors such as cybersecurity, regulatory compliance, and digital leadership, which collectively propel strategic outcomes including competitive advantage and adaptability within intelligent ecosystems

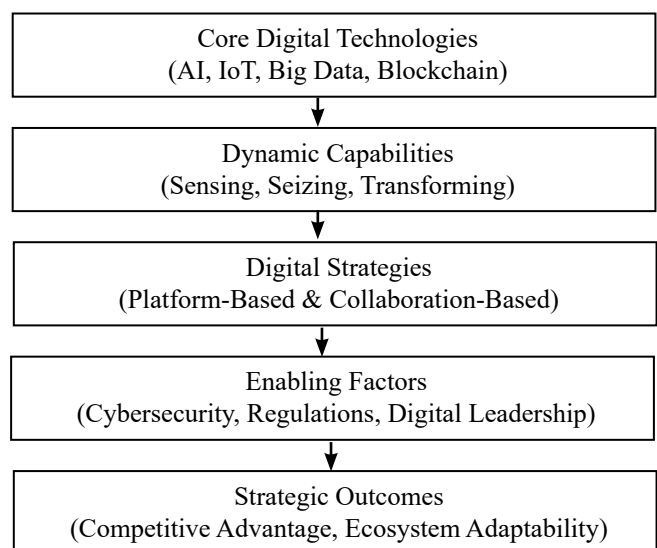


Figure 1. Digital strategy and competitive advantage framework

RESULTS

This study is projected to produce an integrative conceptual model that maps the interrelationships between core digital technologies, dynamic capabilities, and applicable strategic outcomes, particularly for SMEs under pressure from smart ecosystems. The expected results also include a classification of digital strategies based on platform orientation and collaboration, as well as a cyber risk mitigation framework.

The results of this research show a big change in smart systems, moving from standard setups focused on single platforms to complex, connected business networks. This change happens mostly because of using Artificial Intelligence (AI), Big Data, Blockchain, and Cloud Computing together, which helps companies become more flexible, use data better, and respond to market changes. These new technologies have gone beyond just being instruments for daily tasks and have become important parts of managing business strategy.

We can best understand this change by looking at it through three basic ideas: Dynamic Capabilities, Resource-Based View, and Ecosystem-Based View. First, like the Dynamic Capabilities Theory (Teece, 2022), the research shows that digital technologies help companies sense (like watching the environment with real-time data), seize (like making strategic decisions with AI), and transform (like changing the organization with platform-based models). However, the research also finds that some companies, especially small and medium-sized ones, have trouble developing these capabilities because they don't have enough resources to fully use dynamic responses, which shows a problem with the theory when used in places with limited resources.

Second, from the Resource-Based View (Barney, 1991), the digital instruments found in this review from AI programs to data setups are valuable, rare, and hard to copy. Still, the review results say that getting ahead of competitors comes not just from having these resources, but from using them in the right way, in the right situation, and with good management. This supports concerns that the RBV is not dynamic enough to understand fast-changing digital environments unless it includes building capabilities and strategic coordination.

Third, the Ecosystem-Based Perspective (Adner, 2017) is becoming more important in understanding the move toward connected, platform-based business models. The research finds that companies are working together more on innovation, combining their businesses, and sharing data systems to create value together. Yet, even though the theory focuses on growing together, the results show gaps in understanding how problems with management, limits to working together, and unequal power affect these systems. This points to a difference between what the models say and what actually happens in digital collaborations.

Overall, while the three theories give a basic understanding, this research finds that their ability to explain things needs to be changed to fit the many levels, boundaries, and new features of digital change. The framework suggested in this research tries to fix these problems by bringing together key technologies, organizational skills, supporting factors, and strategic results. It gives a picture of how companies, especially small and medium-sized ones, can change their strategies during fast technological change and growing dependence on ecosystems. Future research should do long-term studies and compare different industries to better prove these results and improve the theory.

As illustrated in Table 1, the investigation elucidates the unique contributions of various digital technologies to business strategy. Artificial Intelligence (AI) has emerged as a pivotal instrument for automation, predictive analytics, and the customization of services, whereas Big Data facilitates real-time decision-making and organizational agility. Conversely, Blockchain technology is being increasingly embraced in supply chain and financial applications through the utilization of smart contracts and decentralized frameworks. Nevertheless, in spite of these advancements, the integration of AI, Internet of Things (IoT), and Blockchain remains constrained, indicating a notable deficiency in both scholarly research and practical application within the industry. These results not only corroborate but also expand the existing body of literature, positioning this inquiry in relation to and beyond prior investigations concerning digital transformation.

Table 1. Examination of trends and patterns in strategic management within smart ecosystems

| Category | Key Trends | Identified Patterns | Implications for Strategic Management |
|-------------------------|---|--|---|
| Digital Transformation | Digitalization enhances efficiency but poses adaptation challenges. | Companies that succeed in digital transformation adopt more flexible and data-driven structures. | Businesses need to invest in workforce training and technology adoption to remain competitive. |
| Artificial Intelligence | AI is widely used for decision-making and service personalization. | AI is applied in predictive analytics, business automation, and customer management. | A clear AI regulatory framework and business adaptation strategies are required to manage AI-related risks. |
| Big Data | Data has become a crucial business asset. | The use of real-time data analytics and machine learning is growing. | Companies must develop strong data management capabilities and clear data privacy policies. |
| Blockchain | Blockchain is being adopted in supply chains and finance. | Decentralized models and smart contracts are increasingly utilized. | Businesses should explore integrating Blockchain with AI and IoT for greater efficiency. |
| Digital Ecosystems | Platform-based business models are becoming dominant. | Digital ecosystems foster data-driven competition and cross-industry collaboration. | Companies need to build agile digital strategies focused on innovation and adaptability. |
| Cybersecurity | Cyber threats are increasing alongside cloud adoption. | Many companies struggle with regulatory compliance and risk mitigation. | AI and Blockchain-based security measures should be implemented to enhance digital resilience. |

An in-depth examination of strategic orientation indicates that enterprises predominantly adopt two digital strategies: platform-based strategies, which consolidate value creation and user engagement; and collaboration-centric strategies, which harness inter-firm cooperation to foster innovation. Nonetheless, both methodologies encounter implementation hurdles, particularly concerning cybersecurity and system interoperability. The escalating dependence on digital platforms and AI-driven operations has exacerbated exposure to cyber threats. Recent data from the World Economic Forum (2023) reveals a 45% increase in cyberattacks targeting digital enterprises over the past three years. In response, organizations are incorporating AI-enhanced threat detection and Blockchain-supported data integrity systems. Concurrently, the disjointed nature of industry standards for digital interoperability continues to impede seamless integration across various systems, platforms, and partnerships.

This predicament is particularly acute within small and medium-sized enterprises (SMEs), which are often devoid of the financial and technical capabilities that characterize larger corporations. As articulated by Henderson et al. (2023), SMEs face disproportionately significant barriers in the implementation of digital strategies, ranging from inadequate digital literacy

to onerous regulatory stipulations. The research substantiates that in the absence of inclusive policy interventions and customized strategic frameworks, SMEs may face the peril of being marginalized during the transition to intelligent ecosystems. Furthermore, although digital transformation has engendered observable short-term operational efficiencies, there remains a scarcity of longitudinal empirical investigations assessing the extensive ramifications of digital strategy on sustainability, innovation potential, and profitability over extended periods (Wang et al. 2023). These deficiencies in scholarly inquiry highlight the imperative for the development of more holistic performance assessment models.

Table 2 elucidates the identification of these scholarly deficiencies and delineates prospective avenues for further inquiry. It is particularly noteworthy that there exists a dearth of comprehensive examination regarding AI governance, the ethical implications inherent in algorithmic decision-making, and the adaptability of digital business models across varying regulatory contexts. In addition, the capacity of Blockchain to facilitate collaborative endeavors across multiple industries, along with the formulation of cybersecurity frameworks tailored specifically to intelligent ecosystems, necessitates more profound scrutiny.

Table 2. Recognition of research gaps within the digital ecosystem

| Category | Existing Research Focus | Identified Research Gaps | Future Research Directions |
|-------------------------|---|--|---|
| Smart Ecosystems | Studies focus on technology adoption and platform models. | Limited research on long-term business sustainability within smart ecosystems. | Investigate how smart ecosystems contribute to long-term profitability and competitive advantage. |
| Artificial Intelligence | AI is widely studied in automation, decision-making, and business efficiency. | Lack of research on AI governance, ethical concerns, and regulatory challenges. | Explore responsible AI adoption and policy frameworks to address risks and biases. |
| Big Data | Focus on real-time analytics, market prediction, and operational efficiency. | Few studies examine data privacy, security risks, and ethical implications. | Study the impact of data governance regulations on business operations and innovation. |
| Blockchain | Research primarily covers secure transactions and smart contracts. | Limited studies on Blockchain's integration with AI and IoT for business innovation. | Examine how Blockchain can enhance cross-industry collaboration and supply chain efficiency. |
| Cybersecurity | Emphasis on threat detection and risk management strategies. | Lack of studies on cybersecurity frameworks tailored for smart ecosystems. | Develop comprehensive cybersecurity models that address vulnerabilities in digital ecosystems. |
| Digital Business Models | Existing research explores platform-based and collaboration-based models. | Minimal focus on scaling challenges, adaptability, and regulatory impacts. | Analyze how businesses can scale and sustain digital business models in evolving markets. |
| SME Digital Adoption | Research highlights challenges in technology adoption for SMEs. | Few studies on SMEs' resilience and long-term adaptation strategies. | Investigate policy interventions and support mechanisms for SMEs in digital transformation. |

In order to address these discrepancies, the present research advocates for a conceptual framework—the Digital Strategy and Competitive Advantage Framework—illustrated in Figure 2. This framework delineates the intricate relationships among four fundamental components: foundational technologies (Artificial Intelligence, Internet of Things, Big Data, Blockchain), dynamic capabilities (sensing, seizing, transforming), strategic paradigms (platform-oriented and collaboration-focused), and enabling factors (cybersecurity, regulatory frameworks, digital leadership). Collectively, these components play a significant role in influencing organizational outcomes, including enhanced adaptability, digital resilience, and sustained competitive advantage.

These results reinforce the theoretical validity of Dynamic Capabilities and the Ecosystem-Based View, but also show that the context of limited resources in SMEs can lead to practical deviations from theoretical predictions. Therefore, this study suggests that the scope of these models needs to be expanded to be more inclusive of diverse organizational structures and capacities.

Managerial Implications

From a theoretical perspective, this study highlights the need to redefine dynamic capabilities so that they are not solely based on sensing and seizing, but also include aspects of cross-platform collaboration and inclusive AI governance. In practical terms, managers need to strengthen cross-functional capabilities to drive technology integration and create value in an increasingly interdependent and open landscape.

This research illustrates that managerial personnel must engage in activities that extend beyond the mere adoption of novel technologies. They are required to formulate explicit digital strategies that align with their long-term objectives and facilitate the agility and competitiveness of their organizations. The application of Artificial Intelligence, Big Data, Blockchain, and the Internet of Things should not only enhance operational efficiency but also foster innovation and collaborative efforts. It is imperative for managers to give considerable attention to cybersecurity by implementing intelligent systems that safeguard data and ensure compliance with regulatory frameworks. The deployment of Artificial Intelligence, Big Data, Blockchain, and the Internet of Things ought to not only augment operational efficacy

but concurrently promote innovation and collaborative initiatives. In support of this assertion, Chen et al. (2023) demonstrated that machine learning, especially within intelligent manufacturing contexts, is pivotal in enhancing competitive advantage via automation and sophisticated analytical techniques.

Given that numerous digital systems remain inadequately interconnected, organizations should collaborate with peers within their industry to establish shared standards that facilitate smoother integration. Additionally, targeted assistance is essential for small and medium-sized enterprises (SMEs), which frequently encounter deficiencies in the instruments and resources necessary for digital transformation. Equipping them with training, financial support, and streamlined regulations will enable them to remain competitive.

Furthermore, it is crucial for managers to establish guidelines governing the utilization of data and artificial intelligence, to ensure that practices are equitable, secure, and responsible. Finally, organizations should not solely concentrate on immediate outcomes but should also monitor the impact of digital transformations on long-term growth, innovation, and sustainability. To flourish in the digital age, enterprises must continuously engage in learning, adaptation, and refinement of their strategies.

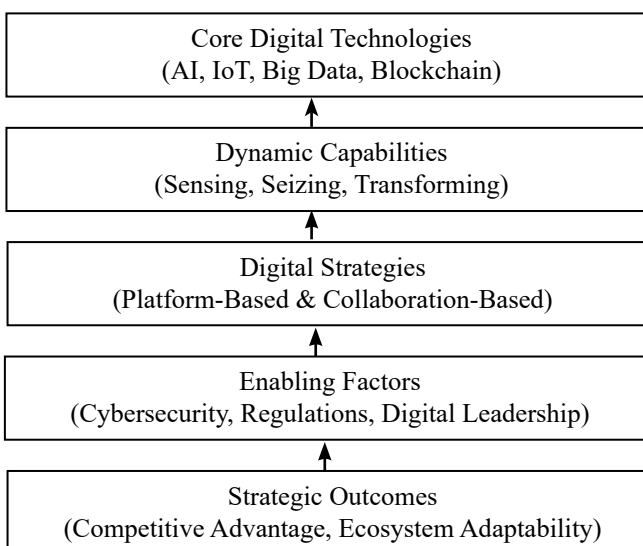


Figure 2. Digital strategy and competitive advantage framework

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study demonstrates that smart ecosystems enabled by Artificial Intelligence (AI), the Internet of Things (IoT), Big Data, and Blockchain are profoundly transforming the practice of strategic management in the contemporary digital landscape. The results mostly match what other research has said about how digital instruments greatly affect how quickly organizations can adapt and how well they can compete (Brynjolfsson & McAfee, 2022; Iansiti & Lakhani, 2021; Gawer & Cusumano, 2022). Specifically, this study backs up what Teece (2022) suggested: that being able to sense, seize, and change is key to staying strategically important in fast-changing situations.

However, the study also shows some important differences from what was previously thought. While earlier studies often saw digital instruments as helpful for everyone, this study's results show that their strategic effect greatly depends on the organizational situation, especially for companies with limited resources like SMEs. This idea goes against some ecosystem studies that focus on being able to grow and standardize (Jacobides et al. 2018), and instead points out that there are still differences in how well companies can use digital instruments for their strategies. Also, unlike past studies that mainly looked at how many technologies were being used, this study highlights governance, being able to work together, and making sure different organizations are aligned as important but not well-studied things that affect the results of digital transformation (Shao & Liu, 2024; Zhao et al. 2023). Thus, this study expands and sharpens the conclusions of Iansiti & Lakhani (2021) and Verhoef et al. (2021), which tend to emphasize large companies, by emphasizing that SMEs need a measured and flexible approach so that they are not left behind in the era of ecosystem-based digital transformation.

By looking at how these results compare to the larger amount of research available, this study helps give a more detailed and complete understanding of how digital strategy works in real life. Using different theoretical view points Dynamic Capabilities, Resource-Based View, and Ecosystem-Based View allows for a broad way of looking at how organizations adjust their strategic plans when technology is rapidly changing. Future studies should build on this idea

by seeing how different types of organizations (like public versus private, or developed versus developing markets) go through digital ecosystem changes, and by testing the suggested conceptual framework with real-world data.

Recommendations

Based on what this study found and how it understands things, here are some ideas for people in education, management, and government. For those in education, new studies should use real-world data to check if the ideas in this study work in different types of businesses and sizes of organizations, to see if they hold up and can be used in many places. It is especially a good idea to do studies over a long time to see how digital changes happen and how digital plans help with new ideas, staying strong, and where a company fits in the bigger picture.

For those in management, companies need to do more than just use technology; they need to make digital instruments a key part of how they plan. It is suggested that companies especially small and medium-sized enterprises (SMEs) create clear ways to manage digital instruments, put money into training people in digital skills, and create ways to change as needed that fit with working with others in their business area. Also, they should focus on making sure different systems work together and can share data, so that AI, IoT, Big Data, and Blockchain technologies can be used together to make things better and stand out from the competition.

Those who make policies and work in government groups should create complete plans for digital changes that offer clear rules, ways to stay safe online, and money-based help for SMEs and new markets. This means helping new business areas grow, teaching people about digital instruments, and making it possible for government and private companies to work together to bridge the gaps in digital access and make sure everyone can take part in smart business areas.

In the end, the link between how we plan strategically and how we use new digital instruments must keep changing. New studies should look at new topics such as what is right and wrong with AI, when algorithms are unfair, who controls data, and how to keep things sustainable in online business areas. By tackling these hard topics, future studies can make our understanding of digital strategy better and more helpful to society.

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