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REVIEW

The impact of digital transformation on strategic management in the digital age: meta-analysis

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Digital transformation (DT) is one of the central aspects shaping the fundamentals of strategic management in a world of persistent and rapid digital change. This meta-analysis study analyzed data from various empirical studies to explore the implications of DT on strategic management processes across a number of industries. By reviewing the empirical research on DT from the last two decades, we find many implications of DT technologies such as big data analytics, artificial intelligence (AI), cloud computing, and digital platforms for strategic decision-making, organizational agility, organizational innovation, and competitive advantage. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to collect and synthesize information from databases (Scopus, Web of Science, Google Scholar, and EBSCO), we provide systematic analysis for sources published from 2017 to 2024. The results gathered show that incorporating traditional technological forces such as AI, big data analytics (BDA), cloud computing, blockchain, and Internet of Things (IoT) is a feature of the digital era. Participants from the different studies we reviewed stated that the result of DT has changed the way organizations operate, especially for strategic decision-making.

Keywords: digital transformation, strategic management, digital age, impact of digital, meta-analysis approach

Introduction

In these digitized marketplaces, organizations face an obligation to embrace new ways of thinking in regard to strategic management that shape corporations in the volatile, uncertain, complex, and ambiguous (VUCA) world. Organizations experience highly disruptive changes in today's fast-paced world, where businesses are constantly transforming and changing. Strategic management, as viewed by Hitt (1) and Volberda et al. (2), encompasses much more than integrating digital technologies. Strategic management will need to show a fundamental shift in how organizations operate, create value, and sustain their competitive advantage. Specifically, the advent and adoption of digital technologies impose continual strategic renewal on firms, which is necessary to achieve digital objectives and maintain competitive advantage (3). Digital transformation (DT) implies organizations have to modify their strategies to remain competitive in the marketplace, and this is also acknowledged by Goldman et al. (4). Research recognizes the crucial role of having a clearly defined DT strategy in helping organizations navigate this complex journey; it is the digital strategy that drives independent DT outcomes, not technology (5–7). Firms cannot rely solely on information technology (IT) investments; having a clear DT strategy is essential for reducing complexity and realizing performance benefits (7, 8).

The impact of DT on strategic management is complex, producing various changes throughout the firm. Digital technology, for example, is changing how organizations produce and capture value, enabling new innovations and the development of innovative business models (3). The

scope of transformation includes new ways to connect and engage with customers, growth of market access/sales, flexible operations, cost efficiencies, and organization-wide performance (6, 9, 10). In terms of the role of digital finance, specifically to provide additional funding, reduce risks, and facilitate innovations and digital solutions, it contributes to enterprises, especially in the context of new strategically emerging businesses (11). In the context of digitalization, there is a shift from centralized hierarchical organizations to more collaborative and decentralized decision-making processes (12). As a result of this change, leadership is changing with the development of new roles, such as Chief Digital Officer (CDO) or Chief Information Officer (CIO), leading transformation efforts (12). The characteristics of top management, such as heterogeneity, educational background, and experience in finance or international experience in the firm's digital orientation, influence the accident choices in the impacts on the firm's strategic position and adaptability (13).

The dynamic context of the digital environment requires organizations to be agile and strategically flexible (14–16). Substantive digital opportunities and innovation are best gained by organizations when they can collectively and rapidly adapt their business models, internal undertakings, products, and external relationships (6, 14–16). The capability of digital technologies to enhance an organization's strategic flexibility improves its international marketing capabilities and export performance when organizations are small- to mid-sized enterprises (SMEs) in emerging markets during crises (17, 18). Digital technologies provide a continuous flow of information and an exchange of knowledge to enhance the inherent flexibility and adaptability of management processes (19, 20). Moreover, data have become a cornerstone of competitiveness in the digital environment (21). Big data analytics enable managers to analyze large volumes of unstructured or fast-changing data, assisting them in making more effective and efficient decisions and promoting innovation (12, 21). Digital technologies enable the collection, management, processing, and presentation of data, supporting decision-makers in strategic planning, risk assessment, and developing insights into market needs (22, 23).

Digital transformation has directly affected innovation and entrepreneurship. DT enables digital entrepreneurship and increases the potential for innovative solutions and new product development (24). It aims to remove barriers to entry, improve inclusion, and offer more affordable and environmentally friendly products and services, especially in emerging economies (6, 25, 26). Digitalization also promotes business innovation by leveraging business processes, transformations, and efficiency (27, 28). DT is increasingly associated with sustainability and focuses on sustainable development goals, leading to more desirable and effective use of resources, less waste, and more optimal energy consumption (29, 30). This allows organizations to incorporate sustainability concepts into a sustainable core-business strategy, making that to advance economic, social, and environmental objectives simultaneously (29).

Although there are numerous opportunities, organizations also face significant challenges in fully embracing DT. These challenges often include limited resources, a lack of qualified staff, misalignment of strategy, resistance to change, and issues around measuring the success and effectiveness of initiatives (6, 22). Many firms find unwinding unexploited areas for digital technologies difficult and find moving towards transformation especially challenging because of oversimplistic perspectives (22). The continual "strategy-execution gap" acknowledges the troubling complexity of managing the move from the current to the desired future state, often both of which can change directions and aims (31). This study reviews the literature on Scopus, uses a meta-analysis approach, and identifies the impact of DT on strategic management in the digital age. The outline of this study is provided through the research questions and hypotheses.

Main research question

What is the impact of DT on strategic management in the digital age?

Sub-research question

- What is the relationship between the impact of DT and strategic management in the digital age?

Hypothesis

- **Null Hypothesis (H01):** There is no significant relationship between the impact of DT on strategic management in the digital age.
- **Alternative Hypothesis (H11):** There is a significant relationship between the impact of DT on strategic management in the digital age.

This introductory section sets the stage for a deeper review and analysis of how DT is changing strategic management at the core of sustained and future transformation, while also highlighting how and where we need to change, as well as new opportunities, which will be examined in subsequent sections.

Literature review

The digitalization era and the emergence of new technologies are transforming the global business landscape at an

accelerated pace, and we need to seek a full understanding of what this looks like for many facets of organizations. This literature review synthesizes some of the main themes found in recent academic articles that deal with the impact of DT and provides a broad overview of an impact assessment of DT as well as several lenses to understand its impact on SMEs, strategically and managerially, as well as their need for innovation, and some of the barriers that enterprises may face in realizing all the possible opportunities.

The pervasive nature of digital transformation

Digital transformation is a major reorganization of industries and businesses, propelled by the advent of new information technologies, including artificial intelligence (AI), blockchain, cloud computing, big data, and the Internet of Things (IoT) (11, 32). As a result, this is a reorganization of organizational structures, business processes, and business models (32, 33). Digital technologies convert knowledge, experience, and social activities into new production factors of data, thus creating new forms of both the economy and the value of digital services (33, 34). They enable global contrasting, collaborative, or open activities and always have the potential for continuous connection (33). Evidence shows a significant increase in publications since 2020 on the subject of DT, which demonstrates its importance as a research area in strategic management and value creation (9, 35).

Emerging technologies are crucial to this process. Since the emergence of AI and blockchain in 2017, research interest in both technologies has been remarkably high (32, 36). Big data analytics has a direct impact on innovation in business models and an indirect impact on entrepreneurial orientation (37). Various technologies such as IoT, mobile Internet, and big data have been utilized extensively, and they have a great deal of application potential with vast value creation opportunities across use cases and have been used to drive strategic change within firms (5, 38). Digital medical technology has also changed the narrative in healthcare ecosystems (39, 40). Furthermore, the increasing use of digital technologies is corroborated by Kang et al.'s (41) findings of a substantive increase in academic publications linking the use of digital technologies to business and management.

Strategic implications and management of digital transformation

Digital technologies are drastically changing business strategies, capabilities, and products or services that change the logic and processes of innovation (30). In the digital era, strategic management must redefine the strategic imperatives and mechanisms for value creation (9, 35). The key for SMEs is aligning technological developments with strategic organizational goals (42–44). All of these aspects bear a distinct influence, as top management team (TMT) attributes, including diversity, level of education, age, tenure, and international or financial experiences, influence a company's concentration on digitalization (33). Effectively leading a DT in an organization means possessing strong digital leadership due to the complexities outlined previously and managing the complex DT process and big data while maximizing and continuously enabling the organization to act on technology aligned with strategic business objectives (45). DTs also guide organizations to adopt redefining that produces new titles at organizations like CDO or leads at the Senior Executive level, a rapidly occurring digitalization process within the firm (13).

The implementation of digital technologies signifies a shift in organizational strategy, as investments in direct digital business transformation and overall DT budgets are expected to total USD $3.4 trillion (3). Key strategic priorities include changes to business processes, improvements in operational efficiency, enhancement of customer experience, and the ability to facilitate remote working practices (3). Consequently, organizations face the challenge of constructing individual digital strategies and transformation pathways, realizing outcomes, aligning stakeholders, and facilitating collaboration (44). The traditional way of developing and deploying strategy and some elements of execution is progressively being replaced by an iterative process of developing and adjusting strategy through execution in dynamic digital markets (46). A digital strategy summarizes the focus, processes, and controls of DT (28). It is also important to recognize that strategy (not technology) drives DT (6, 44). In addition, the digital strategy serves as a mediator between IT infrastructure and enterprise DT, with top management being an important and positive influencer. Moreover, digital technologies enable new forms of value creation for customers and operational rationalization (35).

The role of innovation in the digital era

Digitalization propels innovation by facilitating the development of novel products, increasing cost efficiency, and fostering a global digital entrepreneurship landscape (24). Digital technology enhances organizational innovation capacity and enables companies to pursue data-driven strategies to maintain competitive relevance (35, 47). Dynamic capability theory posits that to maintain a competitive advantage through innovation, companies must engage in continuous learning, transformation, and alignment with environmental changes (44). This includes the reorganization and recombination of existing innovation elements to develop new ideas. Open innovation approaches, such as external technology acquisition and

exploitation, are essential for DT in SMEs in emerging markets, the development of technological capabilities, and the improvement of innovations (32). For instance, digital innovation hubs provide a vehicle for the orchestration of collaborative networks that augment technology development and technology adoption in SMEs and assist SMEs in overcoming cooperation barriers to achieve environmental sustainability goals. Digital innovation in technology also improves enterprise resilience by lowering information asymmetry and operational costs, increasing management units, and improving profitability in the market (19). Organizations with well-developed digital technologies have a better opportunity to optimize the trade-offs between economic direction, social responsibilities, and environmental considerations, and they are better able to integrate sustainability strategies into business processes (19).

Digital transformation in SMEs

SMEs face distinct challenges and opportunities regarding digitalization. While large corporations can quickly access advanced technologies, SMEs do not always have the same resources. They may also lack the skills they need internally, like the IT department staff, or externally, like the service providers that are not, or were not, cheap tech options (35). Moreover, SMEs may be strategically misaligned with digitalization (11, 35). However, digitalization can provide more opportunities for survivorship and competitive advantages, especially in developing markets (48, 49). Digital technologies can help SMEs overcome resource limitations and engage quickly with customers and partners globally (49). Digital facilitators such as e-commerce, e-marketing, and e-business platforms play a vital role in determining an SME's export management, strategic position, and ways to adapt their offerings (35, 50).

The digital landscape plays an important role in managing the link between disruptive technology and digital entrepreneurship in developing markets. This includes aspects such as data protection, customer privacy, and search engine optimization (SEO) algorithms (51). While innovations are less frequently commercially viable in emerging markets than in developed countries, disruptive technology is a vehicle for promoting digital entrepreneurship (52). This occurs by reducing barriers to entry and creating pathways for inclusion through sustainable, economic, and environmentally friendly products and services (52, 53). Studies on the wide-ranging importance of digital technology demonstrate how to become more competitive in the market, reduce risk exposure, and increase the efficiency of operations of Japanese SMEs (54, 55). In addition, digital capabilities are driving sustainable competitive advantages among manufacturing SMEs in emerging markets, including digital capacity, with digital leadership in a mediating role (56).

Challenges and limitations

Organizations face many challenges along the path of DT despite the perceived opportunities it presents. Some of these challenges include skills gaps, resource constraints, compliance with regulations, data protection, customer data privacy, and the necessity of new regulations for AI technologies and blockchain (57, 58). A significant barrier to DT is measuring success and performance; many DT projects do not measure either of these (59). The differing definitions and approaches to DT can further complicate the comparison of studies and the use of findings in practice. DT and associated research are often limited to studies of large firms in developed markets; therefore, it should come as no surprise that little research addresses the role of DT in smaller firms or developing markets (13). Most studies are largely qualitative, and there is a lack of large-scale longitudinal empirical studies. The limitations identified in the literature include the use of a single database or language for the selected studies and the scope of the keywords used in systematic reviews (35). Therefore, this study adds to the literature by offering a meta-analysis to help explain the implications of DT on strategic management in the digital age, sourced from several databases.

Theoretical framework

The present study adopts the Diffusion of Innovations (DOI) theory as its theoretical framework to examine how innovations are adopted and disseminated within social systems. The DOI theory, originally developed by Rogers, integrates rational perspectives from sociology, management, and communication studies to offer a robust and predictive understanding of the innovation diffusion process (60). This framework is particularly useful for technology implementers aiming to promote the adoption of emerging technologies. Traditionally, DOI theory has been applied to explain individual-level decisions or intentions to adopt innovations, especially in contexts involving clearly defined technologies and relatively homogeneous populations. According to Rogers (61, p. 5), diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system." This definition underscores diffusion as a distinct form of communication, wherein individuals exchange information to achieve mutual understanding. Importantly, the innovative nature of the message introduces an inherent degree of uncertainty, which serves as a core characteristic of the diffusion process.

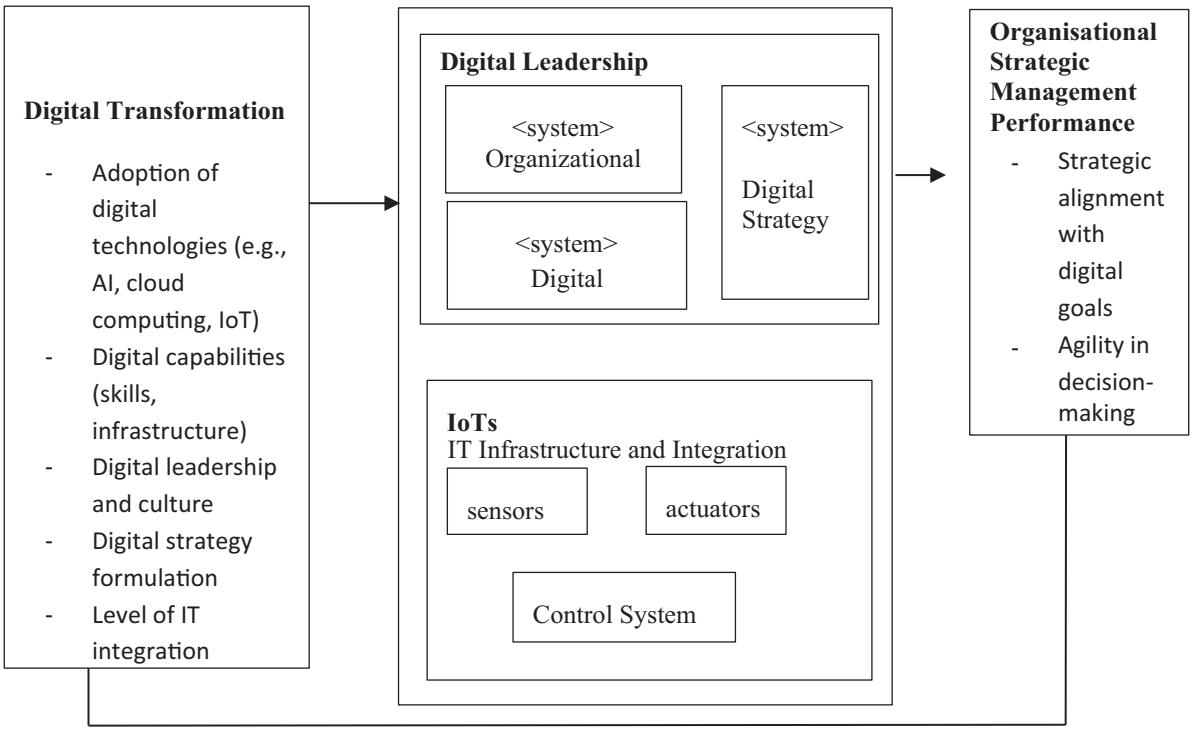

FIGURE 1 | Conceptual framework. Source: Authors' conceptualisation (2025).

Conceptual framework

Figure 1 illustrates the relationship between the independent variable, DT, and organizational strategic management performance, mediated by digital leadership. This demonstrates how these elements influence one another through the adoption of the IoT, thereby facilitating strategic alignment with digital goals within an organization.

Methodology

The examination of literature relevant to the impact of digitalization in the digital era on strategic management was guided by robust inclusion and exclusion statements. A structured review was a requirement of this research because the examination of literature also required a systematic review. Part of this required reviewing literature published, with use of secondary sources, in peer-reviewed articles listed in Scopus, Web of Science, Google Scholar, and EBSCO, which discussed DT and strategic management published between the years 2017 and 2024. The review process adopted the PRISMA approach to systematic review, and it consisted of three stages, i.e., the identification of articles, the screening of articles, and the synthesis of articles. The articles and their data were reviewed and synthesized to identify the key research themes relevant to the topic.

TABLE 1 | Summary of findings.

No	Hypothesis	Finding	Decision accept/reject
1	*H1*	The present study found that there is no relationship between the impacts of DT on strategic management in the digital age.	**Accept**
2	*H2*	The present study found there is a relationship between the impacts of DT on strategic management in the digital age.	**Reject**

Summary of findings

This study sought to confirm the hypotheses provided in Table 1, summarizing the key findings of the literature review on the impact.

Summary of key findings

Alzoubi et al. (62) underscore that the introduction of emerging technologies, including AI, big data analytics, cloud computing, blockchain, and the IoT, has become representative of the digital era. Their research shows that the evolution of DT has dramatically changed how organizations

function, specifically in the domain of strategic decision-making. In a similar vein, Schneider and Kokshagina (22) observe that it is the pace, breadth, and depth of digital technology take-up that characterize usage of digital technology, as opposed to previous usages of IT. Further, Schneider and Kokshagina (22) suggest that organizations must navigate a VUCA world, in which case the adaptation to digital technology is strategically important.

Discussion

Recent research has illustrated how digital technologies are changing how organizations think about strategy, innovation, and leadership. Zhou et al. (30) and others claim digitalization is redefining the logic of strategy and reshaping organizational capabilities in ways that change the way products and services are delivered. According to Secundo et al. (35), these recent changes can best be described as structural, compelling organizations—especially SMEs—to rethink their innovation processes and value-creation mechanisms.

Spilotro et al. (9) argue that strategic management must change to address a new digital landscape, in which organizations need to be more responsive to the markets, create more value, and be more agile. Following their line of reasoning, Wang et al. (44) suggest SMEs must not only ensure their DTs align with the ultimate business objectives of the organization in order to achieve a positive return on investment but that their overall profitability and competitive advantages are also improved. In addition, Li and Shao (33) offer strong evidence regarding the importance of the characteristics of the TMT when considering the firm's overall digital orientation. TMT characteristics, such as a firm's level and quality of educational experience, age, tenure, and international or financial experience, were found to impact the strategic priorities that guided their DT initiatives.

Limitations and areas for further research

This research was restricted to a review of the literature examining the effects of DT action on strategic management in the digital age. Data were acquired only from secondary sources relevant to business intelligence (BI), performance, and strategy peer-reviewed literature published between 2017 and 2024. Secondary data sources were systematically collected and synthesized from academic repositories/Scopus, Web of Science, Google Scholar, and EBSCO. This research suggests future research to be focused on factors not included in this review. In addition, researchers should consider examining areas not included in this research in the future, especially those related to the impact of DT action on strategic management in the digital age.

Conclusions and recommendations

Digital technologies are reshaping fundamentally how businesses create and carry out their strategies—particularly with respect to innovation. For SMEs, this evolution means examining their strategic priorities to be in line with technological advancement. The role of the TMT holds primary importance in this evolution of practices, with the emergence of roles such as CDO showing the extent to which specialist leadership is required to lead and drive digital projects.

For businesses to fully realize the benefits of DT, firms must also be creating integrated strategies to plan for the adoption of technology within their overall aspirations for value creation. Integrated strategies must not only include existing technologies but must also reimagine how value is created and perceived, which together will create innovation for new ways of doing business (3). Additionally, organizations are encouraged to use digital platforms and new ways of interacting to provide better engagement with customers and increase their presence in targeted markets for improved customer relationship management, sales expansions, and overall enhanced performance (6, 9, 10).

New ventures should also consider using digital financial instruments available to companies to mobilize capital from strategic and supportive investors, develop risk management, and promote innovations that enhance competitive position and long-term value for the company (11). As the DT matures, these organizational structures must also transform. As hierarchical organizations make way for flexibly networked organizations centered around radical agility, firms are making the change to decentralized structures focused on teams to support real-time use, innovation, and faster decision-making (12). As those use cases for digital capabilities proliferate, companies must strengthen their digital leadership capabilities, hiring leaders who can learn rapidly and undertake leadership roles in a more digitally intensive time (12). This includes the move from introducing only 2 C-level executives being digitally specialized to finding ways to plug in new positions in real time with all staff; CDOs and CIOs have rendered the strategic necessity of organizations that are going more digital.

In addition, the firm's ability to manage TMT diversity is pricier and unique in terms of educational background, international experience, and financial literacy—it will have an impact on the firm's digital orientation and participation in a digital economy (13). DT is now inherent in strategic management in terms of strategic management; it is no longer an option. It is an aspect of managing more agile, innovative, and predominantly

data-driven organizations which are critical for competitive success. However, DT involves measuring success such as strategic clarity, sustainable leadership practices, adaptable management culture, and measures of digital competencies. Even as the change falters in speed and velocity, consistent investment, awareness, and re-stacking into digital capabilities and developing strategic frameworks are pertinent to long-term success.

Data availability statement

This review paper does not report any original data. All data and materials analyzed in this study are publicly available from the cited published literature and databases.

Author contributions

ARA: Conceptualization, Resources, Writing – original draft, Writing – review and editing, Supervision, Project administration. NA: Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review and editing, Supervision, Project administration. All authors have read and agreed to the published version of this manuscript.

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Consent to publish statement

This study did not involve human participants, and no identifiable personal data was collected or used. Therefore, informed consent to publish was not required.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

1. Hitt MA. The new frontier: transformation of management for the new millennium. *Organ Dyn.* (2000) 28(3):7–17. doi: 10.1016/S0090-2616(00)88446-6
2. Volberda HW, Khanagha S, Baden-Fuller C, Mihalache OR, Birkinshaw J. Strategizing in a digital world: overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms. *Long Range Plann.* (2021) 54(5):102110. doi: 10.1016/j.lrp.2021.102110
3. Bonaccorsi A, Chiarello F, Fantoni G, Kammering H. Emerging technologies and industrial leadership. A Wikipedia-based strategic analysis of industry 4.0. *Expert Syst Appl.* (2020) 160:113645. doi: 10.1016/j.eswa.2020.113645
4. Goldman SP, Van Herk H, Verhagen T, Weltevreden JW. Strategic orientations and digital marketing tactics in cross-border e-commerce: comparing developed and emerging markets. *Int Small Bus J.* (2021) 39(4):350–71. doi: 10.1177/0266242620962658
5. Chen K-Z, Wang IK, Seidle RJ. Navigating digital transformation: the role of management innovation in achieving digital maturity. *Learn Organ.* (2025) 32(3):391–417. doi: 10.1108/TLO-04-2023-0060
6. Egala SB, Amoah J, Bashiru Jibril A, Opoku R, Bruce E. Digital transformation in an emerging economy: exploring organizational drivers. *Cogent Soc Sci.* (2024) 10(1):2302217. doi: 10.1080/23311886.2024.2302217
7. Yu J, Moon T. Impact of digital strategic orientation on organizational performance through digital competence. *Sustainability.* (2021) 13(17):9766. doi: 10.3390/su13179766
8. Al Naqbi H, Bahroun Z, Ahmed V. Enhancing work productivity through generative artificial intelligence: a comprehensive literature review. *Sustainability.* (2024) 16(3):1166.
9. Spilotro C, Secundo G, Del Vecchio P. Discovering the impact of emerging technologies on SMEs' digital marketing strategies: a conceptual framework. *Int Market Rev.* (2025):doi: 10.1108/IMR-11-2023-0301
10. Yoshikuni AC, Dwivedi R, Dultra-de-Lima RG, Parisi C, Oyadomari JCT. Role of emerging technologies in accounting information systems for achieving strategic flexibility through decision-making performance: an exploratory study based on North American and South American firms. *Global J Flex Syst Manag.* (2023) 24(2):199–218. doi: 10.1007/s40171-022-00334-9
11. Tang X, Ding S, Gao X, Zhao T. Can digital finance help increase the value of strategic emerging enterprises? *Sustain Cities Soc.* (2022) 81:103829. doi: 10.1016/j.scs.2022.103829
12. Menz M, Kunisch S, Birkinshaw J, Collis DJ, Foss NJ, Hoskisson RE, et al. Corporate strategy and the theory of the firm in the digital age. *J Manag Stud.* (2021) 58(7):1695–720. doi: 10.1111/joms.12760
13. Kurzhals C, Graf-Vlachy L, König A. Strategic leadership and technological innovation: a comprehensive review and research agenda. *Corp Gov Int Rev.* (2020) 28(6):437–64. doi: 10.1111/corg.12351
14. Chakravarty A, Grewal R, Sambamurthy V. Information technology competencies, organizational agility, and firm performance: enabling and facilitating roles. *Inform Syst Res.* (2013) 24(4):976–97. doi: 10.1287/isre.2013.0500
15. Ravichandran T. Exploring the relationships between IT competence, innovation capacity and organizational agility. *J Strateg Inf Syst.* (2018) 27(1):22–42. doi: 10.1016/j.jsis.2017.07.002
16. Lu Y, (Ram) Ramamurthy K. Understanding the link between information technology capability and organizational agility: an empirical examination. *MIS Quart.* (2011) 35(4):931. doi: 10.2307/41409967
17. Trąpczyński P, Kawa A. Firm capabilities, use of Internet technologies and export performance: an empirical study of Polish exporters. *J Organ Change Manag.* (2023) 36(5):681–702. doi: 10.1108/JOCM-11-2022-0322
18. Zahoor N, Lew YK. Enhancing international marketing capability and export performance of emerging market SMEs in crises: strategic flexibility and digital technologies. *Int Market Rev.* (2023) 40(5):1158–87. doi: 10.1108/IMR-12-2021-0350
19. Li X, Wu T, Zhang H, Yang D. Digital Technology adoption and sustainable development performance of strategic emerging industries: the mediating role of digital technology capability and the moderating role of digital strategy. *J Organ End User Comput.* (2022) 34(8):1–18. doi: 10.4018/JOEUC.315645
20. Zhang B, Zhang J, Chen C. Digital technology innovation and corporate resilience. *Glob Fin J.* (2024) 63:101042. doi: 10.1016/j.gfj.2024.101042

21. Zeng J, Glaister KW. Value creation from big data: looking inside the black box. *Strat Organ.* (2018) 16(2):105–40. doi: 10.1177/1476127017697510
22. Schneider S, Kokshagina O. Digital transformation: what we have learned (thus far) and what is next. *Creat Innov Manag.* (2021) 30(2):384–411. doi: 10.1111/caim.12414
23. Goi V. The impact of digital technologies on the companies' strategic management. *Econ Aff.* (2023) 68(2):doi: 10.46852/0424-2513.2.2023.33
24. Felicetti AM, Corvello V, Ammirato S. Digital innovation in entrepreneurial firms: a systematic literature review. *Rev Manag Sci.* (2024) 18(2):315–62. doi: 10.1007/s11846-023-00638-9
25. Bai H. Role of digital technology in transforming organizational competencies influencing green economy: moderating role of product knowledge hiding. *Front Psychol.* (2021) 12:792550. doi: 10.3389/fpsyg.2021.792550
26. Nautwima JP, Obrenovic B, Asa AR, Johannes HN, Abueva N. Determinants of technology adoption in small and medium-sized enterprises. *Sustain Futures.* (2025) 10:100919. doi: 10.1016/j.sftr.2025.100919
27. Dana L-P, Salamzadeh A, Mortazavi S, Hadizadeh M. Investigating the impact of international markets and new digital technologies on business innovation in emerging markets. *Sustainability.* (2022) 14(2):983. doi: 10.3390/su14020983
28. Tsou H-T, Chen J-S. How does digital technology usage benefit firm performance? Digital transformation strategy and organisational innovation as mediators. *Technol Anal Strat Manag.* (2023) 35(9):1114–27. doi: 10.1080/09537325.2021.1991575
29. Carter CR, Rogers DS. A framework of sustainable supply chain management: moving towards new theory. *Int J Phys Distrib Logist Manag.* (2008) 38(5):360–87. doi: 10.1108/09600030810882816
30. Zhou Q, Yu H, Adams K, Attah-Boakye R, Johansson J. Uncovering the impact of digital technologies on strategising: evidence from a systematic literature review. *Int J Manag Rev.* (2025) 27(3):375–97. doi: 10.1111/ijmr.12387
31. Li F. Leading digital transformation: three emerging approaches for managing the transition. *Int J Oper Prod Manag.* (2020) 40(6):809–17. doi: 10.1108/IJOPM-04-2020-0202
32. Serirungsun P, Badir YF, Frank B. Achieving digital transformation: the effect of open innovation strategies at different stages of SME development in an emerging market. *IEEE Trans Eng Manag.* (2024) 71:15555–68. doi: 10.1109/TEM.2024.3487297
33. Li G, Shao Y. How do top management team characteristics affect digital orientation? Exploring the internal driving forces of firm digitalization. *Technol Soc.* (2023) 74:102293. doi: 10.1016/j.techsoc.2023.102293
34. Nautwima JP, Asa AR. Exploring the challenges and factors impeding effective public service delivery at a municipality in Namibia. *Int J Innov Econ Dev.* (2002) 8:15–24. doi: 10.18775/ijied.1849-7551-7020.2015.85.2002
35. Secundo G, Spilotro C, Gast J, Corvello V. The transformative power of artificial intelligence within innovation ecosystems: a review and a conceptual framework. *Rev Manag Sci.* (2024) 19(9):2697–728. doi: 10.1007/s11846-024-00828-z
36. Kroon N, Alves MDC, Martins I. The impacts of emerging technologies on accountants' role and skills: connecting to open innovation—a systematic literature review. *J Open Innov Technol Market Complex.* (2021) 7(3):163. doi: 10.3390/joitmc7030163
37. Chatterjee S, Chaudhuri R, Vrontis D, Basile G. Digital transformation and entrepreneurship process in SMEs of India: a moderating role of adoption of AI-CRM capability and strategic planning. *J Strat Manag.* (2022) 15(3):416–33. doi: 10.1108/JSMA-02-2021-0049
38. Asa RA, Nautwima JP, Khom-Oabes J. The role of strategic change management in enhancing academic institutions' sustainability. *Int J Manag Sci Bus Admin.* (2023) 9(3):41–53. doi: 10.18775/ijmsba.1849-5664-5419.2014.93.1004
39. Jiang M, Yang S, Tao S. Exploring the patterns and influencing factors of emerging technology impact: a case study of digital medical technology. *Inform Res Int Elect J.* (2025) 30(iConf):699–711. doi: 10.47989/ir30iConf47221
40. Jiang X, Li J, Chen C-H. Enhancing critical thinking skills with chatGPT-powered activities in Chinese language classrooms. *Int J Chin Lang Teach.* (2024) 5(1):47–73.
41. Kang M, Robb C, Kim S, Stephens A. Digital technology adoption for building supply chain resilience amid the COVID-19 pandemic: evidence from South Korean manufacturers. *Oper Supply Chain Manag.* (2024) 17(1):65–76.
42. Asa AR, Tsanga D, Januarie C, Kamati M. Technological innovation as a strategy for competitive advantage within the Namibian banking industry. *Int J Manag Sci Bus Admin.* (2021) 8(1):68–72. doi: 10.18775/ijmsba.1849-5664-5419.2014.81.1006
43. Chen CL, Lin YC, Chen WH, Chao CF, Pandia H. Role of government to enhance digital transformation in small service business. *Sustainability.* (2021) 13(3):1462. doi: 10.3390/su13031462
44. Wang X, Wang Y, Chen D. How does digitalization influence innovation performance of manufacturing enterprisesin emerging countries? The perspective of dualinnovation synergy. *Pol J Environ Stud.* (2024) 33(3):2393–405. doi: 10.15244/pjoes/174838
45. Alvarez-Aros EL, Bernal-Torres CA. Technological competitiveness and emerging technologies in industry 4.0 and industry 5.0. *An Acad Bras Cienc.* (2021) 93(1):e20191290. doi: 10.1590/0001-3765202120191290
46. Yadav A, Bhatnagar A. Sustainable digital manufacturing processes in industry 4.0. In: Shah S, Nautiyal H, Gugliani G, Kumar A, Namboodri T, Singla YK editors. *Sustainability in Smart Manufacturing: Trends, Scope, and Challenges*. Boca Raton (FL): CRC Press (2024). doi: 10.1201/9781003467496-2
47. Asa AR, Nautwima JP, Villet H. An integrated approach to sustainable competitive advantage. *Int J Bus Soc.* (2024) 25(1):201–22. doi: 10.33736/ijbs.6907.2024
48. Asa AR, Prasad NS. Analysis on the factors that determine sustainable growth of small firms in Namibia. *Int J Manag Sci Bus Admin.* (2014) 1(1):5–11. doi: 10.18775/ijmsba.1849-5664-5419.2014.11.1001
49. Qiao P, Chang M, Zeng Y. The influence of digitalization on SMEs' OFDI in emerging countries. *J Bus Res.* (2024) 177:114633. doi: 10.1016/j.jbusres.2024.114633
50. Kabango CM, Asa AR. Factors influencing e-commerce development: implications for the developing countries. *Int J Innov Econ Dev.* (2015) 1(1):64–72. doi: 10.18775/ijied.1849-7551-7020.2015.11.2006
51. Singh S. How the digital environment moderates disruptive technology and digital entrepreneurship relationship in emerging markets. *Eur J Innov Manag.* (2024). doi: 10.1108/EJIM-04-2024-0426
52. Kaplinsky R, Kraemer-Mbula E. Innovation and uneven development: the challenge for low- and middle-income economies. *Res Policy.* (2022) 51(2):104394. doi: 10.1016/j.respol.2021.104394
53. Puriwat W, Tripopsakul S. From ESG to DESG: the impact of DESG (Digital Environmental, Social, and Governance) on customer attitudes and brand equity. *Sustainability.* (2022) 14(17):10480. doi: 10.3390/su141710480
54. Mathews SW, Maruyama M, Sakurai Y, Bebenroth R, Luck E, Chen H-L, et al. Internet resources and capabilities: Japanese SME risk-taking, industry and performance. *Asia Pac Bus Rev.* (2018) 24(5):675–92. doi: 10.1080/13602381.2018.1492690
55. Prause M. Challenges of industry 4.0 technology adoption for SMEs: the case of Japan. *Sustainability.* (2019) 11(20):5807. doi: 10.3390/su11205807
56. Li Z, Yang C, Yang Z, Zhao Y. The impact of middle managers' digital leadership on employee work engagement. *Front Psychol.* (2024) 15:1368442. doi: 10.3389/fpsyg.2024.1368442

57. Kuznetsov O, Sernani P, Romeo L, Frontoni E, Mancini A. On the integration of artificial intelligence and blockchain technology: a perspective about security. *IEEE* Access. (2024) 12:3881–97. doi: 10.1109/ACCESS.2023.3349019

58. Verma A, Bhattacharya P, Madhani N, Trivedi C, Bhushan B, Tanwar S, et al. Blockchain for Industry 5.0: vision, opportunities, key enablers, and future directions. *IEEE Access.* (2022) 10:69160–99. doi: 10.1109/ACCESS.2022.3186892

59. Verhoef PC, Broekhuizen T, Bart Y, Bhattacharya A, Qi Dong J, Fabian N, et al. Digital transformation: a multidisciplinary reflection and research agenda. *J Bus Res.* (2021) 122:889–901. doi: 10.1016/j.jbusres.2019.09.022

60. Weil AR. Diffusion of innovation. *Health Aff.* (2018) 37(2):175–175. doi: 10.1377/hlthaff.2018.0059

61. Rogers EM. Diffusion of new media: new directions. *Mass Commun Rev.* (1997) 24:75–81.

62. Alzoubi H, Alshurideh M, Kurdi B, Akthis I, Aziz R. Does BLE technology contribute towards improving marketing strategies, customers' satisfaction and loyalty? The role of open innovation. *Int J Data Net Sci.* (2022) 6(2):449–60. doi: 10.5267/j.ijdns.2022.2.014