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Strategic Effects of Digital Transformation: Innovation Performance as a Pathway to Competitive Advantage

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Abstract

Background: Digital transformation has become a central process in contemporary business environments, as organizations increasingly integrate advanced technologies into their operations and business models. While digital transformation is widely recognized as a driver of organizational change and innovation capacity, its direct effect on competitive advantage remains unclear, as the mechanisms through which digital investments translate into strategic outcomes are not yet fully understood.

Purpose: The aim of this research is to examine how digital transformation influences innovation and competitive advantage, and to assess whether innovation performance mediates this relationship.

Study design/methodology/approach: Data were collected through a structured survey in which 53 representatives of companies from Split, Croatia participated. The response rate was 31.2%. Empirical analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed relationships between digital transformation, innovation performance, and competitive advantage, which is particularly appropriate for small samples and exploratory research designs.

Findings/conclusions: The results indicate that digital transformation positively influences innovation performance, which in turn positively influences competitive advantage. Innovation performance fully mediates the relationship between digital transformation and competitive advantage, with the direct path becoming insignificant once the mediator is included. These findings suggest that digital transformation generates competitive advantage primarily through its capacity to enhance innovation performance, rather than through direct technological adoption.

Limitations/future research: The study is limited by a small convenience sample drawn from a single geographic area, which restricts generalizability. Future research should examine different institutional, sectoral and national contexts, incorporate objective performance measures, and apply longitudinal designs to better establish causality.

Keywords

competitive advantage, digital transformation, dynamic capabilities, innovation, innovation performance, PLS-SEM, strategy

Introduction

Digital transformation is now a central topic in contemporary business research and practice. Advances in digital technologies, including data analytics, artificial intelligence, cloud computing and process automation, has significantly changed how organizations operate, compete, and create value (Vial, 2019). Many companies invest considerable resources in digital initiatives with the expectation that these investments will improve efficiency, productivity, flexibility, and ultimately competitiveness. For this reason, digital transformation is often described as necessary for companies that wish to stay relevant in increasingly dynamic markets (Kraus et al., 2021).

However, the assumption that digital transformation automatically leads to superior performance or competitive advantage is questionable. Although digital technologies provide new opportunities, their implementation frequently requires substantial organizational change, investment in infrastructure, employee training, and adjustments in business models. Without strategic alignment and appropriate organizational capabilities, digital initiatives may fail to produce the expected benefits. Technology, therefore, should not be treated as an end in itself, but rather as a means for achieving broader strategic goals (Kraus et al., 2021).

At the same time, companies operate in environments characterized by technological disruption, shorter product life cycles, and intensified competition (Teece, Pisano & Shuen, 1997). Hence, digital transformation alone doesn't guarantee advantage; what matters is whether firms develop the organizational capabilities to convert digital investments into innovation outcomes. Under such conditions, innovation becomes increasingly important. Innovation has long been recognized as a key element of organizational growth and long-term success (Martins & Terblanche, 2003; Hidalgo & Albors, 2008). Nevertheless, while numerous studies examine the outcomes of innovation, fewer focus on its drivers and underlying organizational mechanisms (Zeb et al., 2021). Innovation is often viewed as an exogenous factor rather than the direct outcome of strategic and structural decisions within companies (Mršić Radas & Petković, 2021).

This gap becomes particularly significant in the era of digital transformation. It remains unclear how companies convert digital investments into concrete strategic outcomes. From a resource-based perspective, digital transformation can be viewed as a strategic investment whose value depends on how it is translated into valuable organizational capabilities. Competitive advantage is therefore unlikely to arise from technology adoption alone. Instead, it may emerge from how digital initiatives are integrated into processes that support learning, adaptation, and value creation.

One possible mechanism through which digital transformation generates strategic value is innovation performance. Digital technologies can facilitate experimentation, knowledge sharing, and process redesign, thereby enhancing a company's ability to introduce new or upgraded products and services. In this sense, innovation performance may mediate the relationship between digital transformation and competitive advantage. Understanding digital transformation is key to strategic decision-making and to navigating its impact on the innovation landscape (Kochetkov, 2023)

Accordingly, this study examines whether innovation performance mediates the link between digital transformation and competitive advantage. The study develops and empirically tests a model where digital transformation affects innovation performance, which then serves as a driver of a company's competitive advantage. By focusing on this mechanism, the paper aims to contribute to the understanding of how digital transformation translates into strategic outcomes in real business contexts.

The next chapter provides an overview of the main investigated concepts and proposed hypotheses. Following that, the methodology and research results are discussed. At the end of the paper, the discussion and conclusion are presented.

1. Theoretical framework and hypotheses

1.1. Digital transformation

Digital transformation is a key concept in modern society, with technological advances becoming an inseparable part of everyday life (Rassool & Dissanayake, 2019). However, despite this, concepts associated with digital transformation remain inconsistent or are treated too simplistically (Reis et al., 2018).

The literature commonly distinguishes between digitization, digitalization, and digital transformation (Morze & Strutynska, 2021; Verhoef et al., 2021). Digitization represents the conversion of analog data into digital formats, whereas digitalization involves applying digital technologies to improve existing processes and organizational activities (Pagani & Pardo, 2017). The implementation of digitalization strategies has enabled companies to optimize their operations, driving sustainable business performance (Li et al., 2022). Digital transformation, in contrast, represents deeper organizational change, including the modification of business models and core processes enabled by digitalization. This distinction highlights that while digitalization focuses primarily on process improvements, digital transformation reflects broader structural and strategic change.

Digital transformation is defined differently across research perspectives. While some experts

focus on a broad skills and abilities needed for effective business, others emphasize specific elements such as strategic changes (Rogers, 2016), performance and corporate culture (Catlin et al., 2015), or the formulation of digital transformation strategies (Matt, Hess & Benlian, 2015). Kaplan et al. (2004) define digital transformation as transformation related to the use of digital technology in different spheres of human society.

According to Oswald et al. (2022), digital transformation has several key characteristics. It is inevitable, irreversible, rapid and uncertain. Although digital transformation has emerged as an important driver in diverse fields such as innovation studies, management, sustainability, and information sciences, it now transcends mere digitalization by restructuring organizational processes and assignments, frequently resulting in new business models (Reis et al., 2018).

Digital transformation enables companies to be successful in the digital age, which is its greatest advantage. For companies, this means higher revenue and profit, while for non-profit institutions, it allows them to better serve their stakeholders through digital success metrics. Warner and Wäger (2019) propose that digital transformation includes continuous changes to organization and strategy to improve business models. Nadkarni and Prügl (2021) add that digital transformation is supported by the introduction of new technologies, which result in improved performance, new processes, and new business models. In addition, digital transformation makes organizations more agile and ready to adapt to market changes, while updated technological capabilities encourage innovation and experimentation while lowering risk.

1.2. Dynamic Capabilities as a Theoretical Lens

Teece, Pisano and Shuen (1997) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Hence, digital transformation can be understood as a process of building dynamic capabilities: sensing new technological opportunities, seizing them through innovation, and reconfiguring business models accordingly.

During the 1990s, ideas about the role of company resources and capabilities as the main basis for corporate strategy and the primary source of competitive advantage developed in the so-called the resource-based view of competitive advantage (RBV), a concept from which dynamic capabilities emerged. In that context, Amit and Shoemaker (1993) define resources as "a set of available factors that a company owns or controls", and capabilities as the ability of using resources, that is, "repetitive processes of product innovation, production flexibility and quick response to changing market trends". Barney (1991, 1995) developed the VRIO framework and states that valuable, rare, imperfectly imitable resources and capabilities, that are also exploited by organization will lead sustainable competitive advantage. Based on that idea, Teece Pisano and Shuen (1997) developed the concept of dynamic capabilities that tries to disintegrate how to maintain a capability-based advantage in the context of changes in the environment (Helfat & Peteraf, 2009). Teece, Pisano and Shuen (1997) call the ability to achieve new forms of competitive advantage dynamic capability, and define dynamic capabilities as the ability of a company to integrate, build and reshape internal and external competencies and thus react to changes in the environment. Eisenhardt and Martin (2000) consider dynamic capabilities to be processes that integrate, reshape, procure and release resources to adapt to change, or create market change. Thus, dynamic capabilities are organizational and strategic routines by which companies acquire new forms of resources as markets develop, diverge and disappear.

Zollo and Winter (2002) believe that in a relatively stable environment, dynamic capabilities are likely unnecessary, whereas in conditions of rapid market changes, they become necessary. If changes are not only rapid but also unpredictable, these capabilities will be constantly renewed. Winter (2003) builds on previous work and argues that dynamic capabilities are not a requied prerequisite for adapting to changes, as companies can also react to changes ad-hoc. According to Zahra et al. (2006), dynamic capabilities refer to the ability to reshape a company's resources and routines in a way that is planned and considered appropriate by main decision makers.

Wang and Ahmed (2007) identify three main common components of dynamic capabilities: adaptive, absorptive, and innovative capabilities. Adaptive capability refers to the capacity to identify and exploit emerging market opportunities. It manifests itself through strategic flexibility, that is, the flexibility inherent in the resources a company possesses and the flexibility in how it uses those resources. Absorptive capacity refers to a company's ability to recognize the value

of new, external information, then absorb and use it. Innovation capability refers to the ability to develop new products and markets. The authors consider the aforementioned capabilities to be the most important components of dynamic capabilities because they help a company to integrate, reshape, renew, and rebuild its capabilities and resources.

This theoretical framework helps explain why innovation performance mediates the relationship between digital transformation and competitive advantage. As Wang and Ahmed (2007) argue, innovative capability, i.e. the ability to develop new products and markets, is among the most important components of dynamic capabilities, as it supports a firm's capacity to integrate, reshape and renew its resources. Innovation performance, as measured in this study, represents the observable organizational outcome of this capability. Digital transformation can therefore be understood as a process through which firms build and activate dynamic capabilities, with innovative capability serving as the key mechanism through which digital investments translate into a competitive advantage. This aligns with Warner and Wäger (2019), who argue that building dynamic capabilities is an ongoing process of strategic renewal driven by digital transformation.

1.3. Innovation

Innovation refers to a new or improved product, process, or a combination of both, that differs substantially from the earlier products or processes of an organization (OECD/Eurostat, 2018). Innovation can also be viewed as a process that enables solving of a problem, or as a diverse learning process (Hidalgo & Albors, 2008). Urabe (1988), as well as Baregheh, Rowley, and Sambrook (2009) conclude that innovation is not a one-time phenomenon, but a long-term, cumulative process involving multiple organizational decisions, from generating a new idea to implementing it. Afuah and Utterback (1997) define innovation through integrating newly acquired or developed knowledge into processes, products, and services. They divide innovations based on their market, technological, and administrative-organizational features. In this regard, technological innovations relate to products, processes and services. Market innovations relate to the product, price, distribution, and promotion, while administrative innovations relate to strategy, structure, systems, and people. Innovation typologies have been widely discussed in the literature. Mensch (1979) distinguishes between three types of innovations. Basic innovations introduce entirely new products or processes. Improved innovations represent incremental progress. Superficial innovations involve only external changes that offer no substantive value to consumers. Later studies expanded on this work to stress the need for precise terms when measuring how innovative a product or process is (Garcia & Calantone, 2002). Leavy (2005) concluded that three important factors influence the stimulation of innovation: creating and maintaining an appropriate organizational climate, attracting and retaining creative and innovative employees over the long term, and achieving the right balance between innovation and efficiency. After considering innovations, it is necessary to focus on innovativeness as the trait that enables their continuous generation within the organization. Innovativeness is a company's propensity to innovate, referring to its capability to implement innovations (Nasution & Mavondo, 2008; Ruba et al. 2023). It creates a link between a company's resources and the market (Wang & Ahmed, 2007) and serves as a key factor determining its market competitiveness, its ability to survive, and its capacity to attract new customers and external collaborators. For an organization to be truly innovative and successful, it is necessary to secure the support of all stakeholders, including management, employees, and business partners. In this study, innovation performance refers to a company's perceived innovation performance compared with competitors.

Companies undergoing digital transformation invest more heavily in innovation (Ferreira et al., 2019). As Yang et al. (2024) demonstrate, the influence of digital transformation on innovation varies across companies, with digital infrastructure serving as a vital catalyst for this positive relationship. This impact is particularly pronounced in high-tech industries and fiercely competitive environments (Niu et al., 2023). Based on this reasoning, we propose:

H1: Digital transformation has a positive effect on innovation performance.

1.4. Competitive advantage

Over the past decade, competitive advantage and distinctive capabilities have become far more important to a company's success. This is driven by the belief that a sustainable competitive advantage is the foundation for strong, long-term performance. However, having an advantage

drives innovation, which eventually makes that advantages disappear as competitors catch up (Srivastava et al., 2001).

Porter (1980) states that competitive advantage is at the core of a company's success in competitive markets. By achieving this advantage, a company secures a better market position through its ability to deliver superior value for customers whether by differentiating its products, lowering costs, responding faster to customer needs, or using a combination of these factors. Competitive advantage refers to a company's ability to strategically leverage its distinct combination of resources and particular competencies in areas such as quality, innovation, efficiency, and customer responsiveness to financially outperform its rivals (Hill & Jones, 2004). It enables companies to operate more productively and efficiently compared to their competitors (Wang, Tian & Yuan, 2019). Peteraf and Barney (2003) propose a definition to resolve past inconsistencies regarding competitive advantage. They argue that it arises when a company creates more economic value than its main competitor. In doing so, they define this economic value as the difference between the value created for the customer and the cost of production. Barney (1991) believes that valuable and rare resources can create a competitive advantage. If these resources and capabilities are also hard to copy, substitute, or transfer, this advantage can last a long time. A company wins a competitive advantage when it gains or builds specific resources or combination of resources that enable it to outperform its competitors (Porter, 1985).

Although empirical results show that the relationship between innovation and company performance is complex, context-dependent, and not always clear-cut (Miočević, Talaja & Alfirević, 2021), a significant body of literature demonstrates its positive effect on organizational results (e.g. Lee & Hsieh, 2010). Every successful innovation secures temporary market dominance (Schumpeter, 1934), while an effective innovation strategy (Agazu & Kero, 2024) and innovative behavior (Fatoki, 2021) actively foster competitive advantage. Therefore, innovation itself (Jiménez-Jiménez & Sanz-Valle, 2011; Dos-Santos, 2021) can be considered the most important element of competitive advantage. In their research, Ngo and O'Cass (2013) state that companies should implement innovations to achieve and maintain competitive advantage, and McGrath (2013) points out that in today's dynamic business environment, constant adaptation and innovation are key to maintaining competitive advantage. Hence, we propose:

H2: Companies with higher innovation performance will achieve higher levels of competitive advantage.

As digital transformation increasingly reshapes how organizations create value, the question of how companies achieve and sustain competitive advantage becomes particularly relevant. From a strategic perspective, competitive advantage refers to a company's ability to create superior value through unique resources, capabilities, and organizational processes. In this context, digital transformation does not drive this competitive advantage directly. Instead, it works through organizational mechanisms that help companies adapt to changing market conditions and innovate more effectively. Hence, competitive advantage comes less from adopting technology itself and more from turning digital efforts into actual innovation.

According to Sui et al. (2024), the degree of digital transformation improves a company's competitiveness, while Xue et al. (2022) explicitly argue that digital transformation positively affects a company's sustainable competitive advantage. Furthermore, Masoud and Basahel (2023) confirm that digital transformation, especially when combined with innovation, positively affects the overall performance of a company, while Wolpert and Roth (2020) suggest that digital transformation enables better use of resources which in turn leads to competitive advantage. So, we propose:

H3: Digital transformation has indirect effect on competitive advantage through innovation performance.

2. Methodology

The study was conducted on a sample of 53 company representatives based in Split, Croatia. The questionnaire was distributed in early August 2024 to 170 companies, yielding a 31.2% response rate. Companies were contacted through available business networks and professional contacts in the Split area, representing a convenience sample of firms operating across various sectors. While this sampling approach limits generalizability, it remains consistent with exploratory research designs aimed at initial model testing rather than population-level inference (Hair et al., 2010).

The questionnaire contained closed-ended questions. Questions related to digital transformation were adopted from Vendrell-

Herrero et al. (2024), while innovation performance relative to competitors was measured according to Roberts and Candi (2024). Competitive advantage of companies was assessed based on Alshawawreh et al. (2024). All items were evaluated using a five-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). The items used in a questionnaire are shown in Table 1.

PLS-SEM was selected as the analytical method because it handles smaller sample sizes well, does not require multivariate normality, and suits exploratory research with reflective measurement models. The analysis was conducted using bootstrapping with 5,000 resamples to assess the significance of path coefficients and the indirect mediation effect.

3. Results

The proposed model positions innovation performance as a mediator between digital transformation and competitive advantage. Prior to testing the structural model, the measurement model was evaluated to confirm reliability and validity of all constructs. The structural model was then estimated using PLS-SEM with bootstrapping to assess the significance of both direct and indirect paths.

To test for collinearity, variance inflation factors (VIF) were analyzed. The resulting VIF values range from a low 1.617 (D2), to a high of 5.797 (I3), with the latter being only value to exceed acceptable thresholds. Since all other values fall within the 0.2 to 5 range recommended by Hair et al. (2010), this slight deviation suggests that multicollinearity is not a significant concern for the model.

The measurement model was analyzed by examining individual reliability, composite reliability, convergent validity, and discriminant validity. All factor loadings were statistically significant ($p<0.01$) and exceeded 0.650 (Table 1). The reliability and convergent validity of the constructs are analyzed below (Table 1).

Table 1 Items, factor loadings, reliability and validity

	Items	Factor loadings	Cronbach's α	rho_a	rho_c	AVE
	Digital Transformation					
D1	You have successfully identified the value that can be created through the process of digitization.	0.779	0.905	0.925	0.925	0.640
D2	Customers fully recognize and understand the value offered by your digital solutions.	0.679				
D3	You have conducted thorough research to uncover the hidden needs and motivations driving customers' desire to use digital media.	0.911				
D4	Your company has a clear understanding of the conditions under which the business model driven by digital technology makes financial sense.	0.881				
D5	You have the flexibility and capability to reconfigure your business model to effectively manage risks associated with digital transformation.	0.843				
D6	The implementation of the new digital model does not negatively impact the existing traditional model.	0.665				
D7	Critical financial parameters that have the potential to impact the profitability of the business have been thoroughly analyzed.	0.809				
	Innovation performance					
I1	We introduce more new products/services on the market than our competitors.	0.925	0.931	0.939	0.951	0.830
I2	We adopt more technological innovations than our competitors.	0.921				
I3	We are more innovative than our competitors.	0.950				
I4	The new products/services we launch are more innovative than our competitors'.	0.845				
	Competitive advantage					
CA1	The firm has fine and excellent reputation in the market.	0.871	0.836	0.886	0.898	0.745
CA2	The firm is interested in building long-term strategic relationships with its partners.	0.819				
CA3	The firm responds to changes in supply and demand.	0.898				

Source: the authors

Cronbach alpha, as well as the composite reliability indicators rho_a and rho_c are above 0.8, indicating high reliability of the analyzed constructs. The values of the average variance extracted (AVE) are above 0.7, indicating that convergent validity has been established. The Fornell-Larker criterion and the heterotrait-monotrait correlation ratio (HTMT) were used to test discriminant validity. Table 2 shows the results of the discriminant validity analysis using the Fornell-Larker criterion.

Table 2 Fornell-Larker criterion

	CA	D	I
CA	0.863		
D	0.640	0.800	
I	0.482	0.635	0.911

Source: the authors

Table 2 shows that the square root of the AVE is greater than the correlations between the different constructs, confirming that discriminant validity is established. The same conclusion can be drawn from the heterotrait-monotrait (HTMT) correlation ratio results (Table 3). Specifically, because the HTMT ratio is less than 0.7, it further demonstrates that discriminant validity has been achieved.

Table 3 HTMT

	CA	D
CA		
D	0.697	
I	0.508	0.674

Source: the authors

A model in which innovation performance (I) mediates the impact of digital transformation (D) on competitive advantage (CA) was estimated using PLS-SEM using bootstrapping (Figure 1).

All analyzed relationships are statistically significant (p=0.000) and follow the expected direction. The impact of digital transformation (D) on innovation performance (I) is 0.635, while the impact of innovation performance (I) on the company's competitive advantage (CA) is 0.482. The direct impact of digital transformation (D) on the company's competitive advantage (CA) became insignificant after including innovation performance (I) as a mediator, indicating full mediation. The indirect impact of digital transformation (D) on the company's competitive advantage (CA) through innovation performance (I) is 0.306.

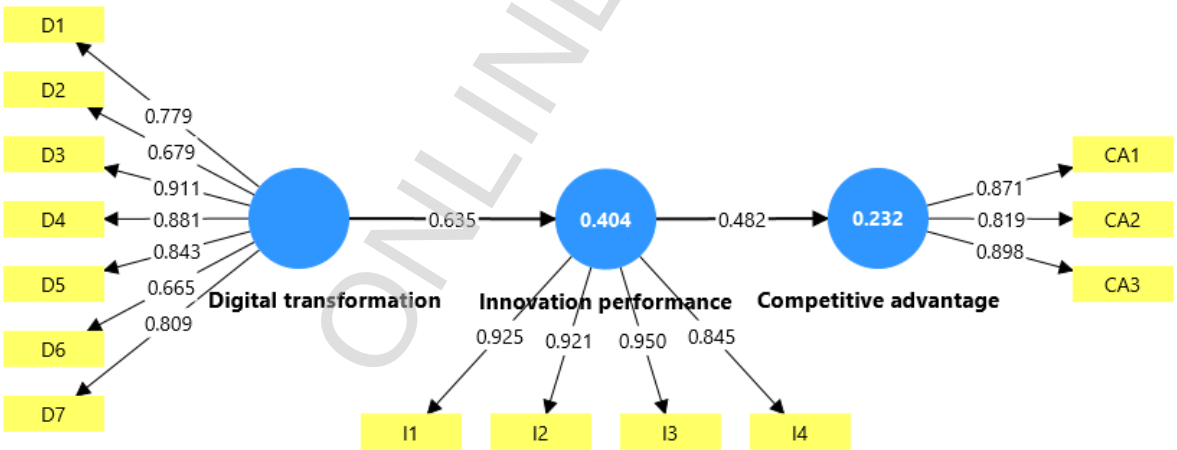

Figure 1 Structural model
Source: the authors

4. Discussion

The findings suggest that digital transformation alone does not automatically generate a competitive advantage. Instead, it becomes strategically valuable when it drives higher innovation performance. This indicates that digital transformation is not a direct source of advantage, but rather that innovation performance serves as the mechanism converting digital tools into strategic outcomes.

The first hypothesis, which focuses on the impact of digital transformation on company innovation, was confirmed. The results showed that companies having undergone digital transformation show a greater propensity for innovation compared to traditional companies. Digital transformation stimulates not only technological innovation, but also broader

organizational changes in business processes, management practices, and organizational culture, all of which shape the conditions under which innovation performance emerges (Tidd, 2001). Such companies are more likely to invest in developing new products and services and introducing new ways of doing business, which differentiates them from their competitors and enables them to adapt to a dynamic market environment. The positive relationship between digital transformation and innovation performance is consistent with prior research suggesting that digital technologies stimulate experimentation, support knowledge sharing, and facilitate new organizational processes (Ferreira et al., 2019; Yang et al., 2024). This finding also supports Nambisan et al. (2017), who argue that digital technologies fundamentally reshape how firms manage and generate innovation, as well as Niu et al. (2023), who demonstrate that digital transformation breaks down organizational barriers to innovation particularly in competitive environments. Ultimately, companies that successfully implement digital technologies appear more capable of generating innovation outcomes, which then influence their market positioning.

The second hypothesis indicates the impact of innovation performance on competitive advantage. The findings suggest that innovation is an important factor in achieving competitive advantage, indicating that companies which successfully implement innovative strategies may be better positioned to adapt to changing market conditions. The findings support theoretical views that suggest that innovation contributes to strengthening the position of companies in relation to competitors. The results further indicate that innovation performance mediates the impact of digital transformation on competitive advantage, suggesting that digital transformation may serve as an important enabler of innovation and competitive positioning in dynamic business environments. Although digital transformation brings challenges, such as substantial investment requirements and organizational change, the findings indicate that its benefits for innovation performance and competitive positioning are significant, at least within the context of this study. The results suggest that companies which successfully integrate digital technologies and foster innovation performance may achieve stronger competitive positions, though the extent and generalizability of these effects warrants further investigation across different contexts. The relationship between innovation performance and competitive advantage supports prior literature emphasizing innovation as a central driver of long-term competitiveness (Dos-Santos, 2021; Agazu & Kero, 2024; Rosenbusch, Brinckmann & Bausch, 2011). Specifically, Rosenbusch et al. (2011) meta-analytic evidence confirms that innovation positively affects firm performance across contexts, while Dos-Santos (2021) demonstrates this link in networked organizational settings. The finding that innovation performance fully mediates the DT–competitive advantage relationship further extends the work of Sui et al. (2024) and Xue et al. (2022), who identify digital transformation as a driver of competitiveness but do not explicitly model the innovation mechanism through which this effect operates. Innovation enables companies to differentiate themselves, respond more effectively to market change, and sustain stronger competitive positions.

The fact that the direct path from digital transformation to competitive advantage becomes insignificant when innovation is included confirms that digital technologies themselves are not the source of advantage. Instead, value is created by a firm's capability to translate digital initiatives into innovation. This aligns with Teece et al. (1997) and Warner and Wäger (2019), suggesting that digital transformation drives value only when it translates into innovation-related outcomes. Rather than viewing digital transformation as an immediate source of competitive advantage, these results indicate that its impact operates through organizational processes that improve innovation performance. This contributes to the growing discussion on how digital transformation creates strategic value, highlighting the importance of examining underlying mechanisms instead of focusing solely on direct effects.

From a managerial perspective, the findings imply that investing in digital technologies should go hand in hand with building internal innovation capabilities. Managers should focus not just on adopting technology, but also on fostering organizational learning, experimentation, and innovation-oriented practices that turn digital initiatives into real strategic benefits.

Conclusion

This study examined the relationship between digital transformation, innovation performance, and competitive advantage, focusing specifically on how digital transformation drives strategic outcomes. The basic theoretical premises set out in

the introductory part of the paper highlighted that digital transformation is a broad phenomenon encompasseing not only technological changes, but also organizational, cultural and strategic adjustments within the company. Digital transformation, defined as a comprehensive change in the functioning of an organization achieved through the use of digital tools and innovative business strategies, is highlighted as a key factor in modern business. The empirical analysis confirms that digital transformation positively influences innovation performance, which then creates competitive advantage. Most importantly, the results show that digital transformation no longer has a direct link to competitive advantage once innovation performance is included in the model, indicating a full mediation effect. This suggests that digital transformation contributes to competitive advantage primarily by improving innovation performance.

The study therefore supports the idea that technology itself does not guarantee a competitive advantage. Instead, competitive benefits arise when companies successfully translate digital initiatives into innovation outcomes.

This paper contributes to a deeper understanding of the relationship between digital transformation, innovation, and competitive advantage of enterprises.

Past studies have looked at how digital transformation directly affects competitive advantage (Sui et al., 2024; Xue et al., 2022) or its relationship with innovation (Ferreira et al., 2019; Yang et al., 2024). However, few studies test innovation performance as the mediating mechanism connecting these outcomes. This study contributes by empirically demonstrating full mediation, suggesting that digital transformation creates competitive value not directly but through its capacity to enhance innovation performance. This finding show that innovative capability, following Wang and Ahmed (2007), is the critical link between digital investment and strategic outcomes (Hanelt et al., 2021).

Theoretical implications

The findings contribute to the theoretical understanding of how firms leverage dynamic capabilities, and innovative capability in particular (Wang & Ahmed, 2007), to translate digital investments into competitive outcomes. By empirically demonstrating full mediation, this study supports the view that technology itself is not the source of competitive advantage, but rather the organizational capability to deploy it innovatively (Teece et al., 1997; Warner & Wäger, 2019). These findings enrich the literature by providing empirical evidence for the mechanism connecting digital transformation and competitive advantage, offering a foundation for future theoretical development.

Managerial implications

The findings suggest that investments in digital technologies should be accompanied by deliberate efforts to strengthen innovation capabilities within the organization. Managers should focus not only on technology adoption but also on fostering organizational learning, experimentation, and innovation-oriented practices that allow digital initiatives to generate tangible strategic benefits. By identifying innovation performance as the key conversion mechanism between digital transformation and competitive advantage, the study helps managers prioritize their digital transformation efforts more effectively.

Limitations and future research

While this research provides valuable insights into how digital transformation impacts innovation and the competitive advantage of businesses, several limitations should be notes. First, the geographic limitation of the sample may affect the generalizability of the results. While the findings are useful to the local context, they may not be fully applicable at a wider national or international level, where different patterns of digital transformation and innovation may emerge due to specific regional economic, cultural and regulatory factors. Additionally, because the study relied on surveys, the data depends entirely on the respondents' self-assessments. This can lead to subjective bias or inaccuracies due to different interpretations of questions and the tendency of respondents to give socially desirable answers. Furthermore, survey methodologies limit the ability to gain an in-depth understanding of specific organizational practices and experiences related to digital transformation. Because this research was cross-sectional, data was collected at a single point in time, limiting the ability to study the long-term effects of digital transformation and innovation. Future longitudinal studies tracking changes over time could provide deeper insights into the dynamics of these processes and help identify causality. Although the research includes companies of different sizes and sectors, it does not analyze the impact of digital

transformation on specific industries in detail. As Hobday (2005) demonstrates, innovation models and their outcomes differ substantially across industries and development contexts, suggesting that future research should explore sector-specific patterns. The measures of innovation and competitive advantage used are based on subjective assessments from managers and other key stakeholders in companies. Although these estimates provide valuable insights, more objective data (e.g. financial results, market share) could provide a more accurate representation of the actual state of innovation and competitiveness of a company. Additionally, the research does not fully account for external factors that may influence the results, such as macroeconomic conditions, regulatory frameworks, or market dynamics. Future work should consider how these external factors might moderate or mediate the relationship between digital transformation, innovation, and competitive advantage.

Declarations

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Use of Artificial Intelligence (AI) Tools

AI was used solely for language editing and grammar checking. All intellectual content, arguments, findings, and conclusions are the sole work or the authors.

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