“The effect of digital transformation and innovation on SMEs’ performance in times of COVID-19”

AUTHORS	Surahman Himanshu Shee Zhikry Fitrian Ari Sasmoko Adi Rizky Yudaruddin

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Surahman (Indonesia), **Himanshu Shee** (Australia), **Zhikry Fitrian** (Indonesia), **Ari Sasmoko Adi** (Indonesia), **Rizky Yudaruddin** (Indonesia)

THE EFFECT OF DIGITAL TRANSFORMATION AND INNOVATION ON SMES' PERFORMANCE IN TIMES OF COVID-19

Abstract

This study examines the impact of digital capabilities and digital orientation on the digital transformation and digital innovation of small and medium enterprises (SMEs) during the COVID-19 pandemic. In addition, this study assesses how the role of digital transformation and digital innovation mediates the relationship between digital capabilities, digital orientation, and SME performance during the COVID-19 pandemic. Using a sample of 247 SMEs managers, data were analyzed using the structural equation modeling with a partial least square approach. The findings demonstrate the significant and positive influence of digital capability and orientation on SMEs' digital transformation and innovation during the pandemic. Additionally, the study confirms that digital transformation and innovation positively affect SMEs' performance during the pandemic. Furthermore, the study reveals that digital transformation and innovation mediate the relationship between digital orientation and capability on SMEs' performance during the pandemic. However, digital innovation was not found to significantly mediate the link between digital capability and SMEs' performance.

Keywords organization, crisis, technology, firm objectives, behavior, intellectual property, product, enterprises

JEL Classification L21, L25, O32, O36, I18

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Surahman, Ph.D., Lecturer in Marketing, Innovation & Technology, Department of Business Administration, Samarinda State Polytechnic, Indonesia. (Corresponding author)

Himanshu Shee, Ph.D., Associate Professor, Department of Business, Victoria University Business School, Australia.

Zhikry Fitrian, Researcher, Research and Innovation Agency of East Kalimantan, Indonesia.

Ari Sasmoko Adi, Ph.D., Research and Innovation Agency of East Kalimantan, Indonesia.

Rizky Yudaruddin, Ph.D., Lecturer, Management Department, Faculty of Economic and Business, Mulawarman University, Indonesia.

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INTRODUCTION

The performance of small and medium enterprises (SMEs) during periods of crisis holds immense significance as it encapsulates the resilience and adaptability of these enterprises in the face of adversity. Crises, such as the COVID-19 pandemic, bring unprecedented challenges that test the very fabric of SMEs – from their operational strategies to their capacity for innovation and survival. Understanding how SMEs navigate and excel within such tumultuous scenarios is pivotal for their individual sustainability and crucial for the broader economic landscape. The ability of SMEs to maintain operations, retain their workforce, and continue contributing to the economy despite crisis-induced disruptions underscores their importance as dynamic engines of growth and job creation. Investigating the factors that drive SMEs to effectively weather crises and emerge stronger is thus of paramount importance, as it not only informs strategies for their survival but also enriches the broader understanding of business resilience and recovery in the face of unprecedented challenges.

In 2019, data from the Indonesian Ministry of Cooperatives and Small and Medium Enterprises (Kemenkopukm, 2022) demonstrated the significance of SMEs to the nation's economy. These enterprises con-

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tributed 60.51% or approximately Rp9.58 trillion to the Gross Domestic Product (GDP) and employed approximately 119.56 million people, or 96.92% of the nation's workforce. By June 2022, nearly 19.5 million small and medium-sized enterprises, or 30.4% of the total, had already integrated e-commerce platforms. Despite economic fluctuations, these numbers have remained remarkably stable, demonstrating the resilience of small and medium-sized businesses. Nonetheless, the COVID-19 pandemic has handed micro, small, and medium-sized enterprises (MSMEs) a severe blow. In 2020, the production of micro and small industries (MSIs) declined by 17.63% due to the cessation of numerous MSMEs caused by restrictions on mobility. These difficulties were exacerbated by the subsequent implementation of large-scale social restrictions (PSBB) during the pandemic. A survey of 2,944 MSMEs conducted by the Mandiri Institute (2021) revealed that 19.3% were forced to cease operations due to COVID-19 policies, while 47.0% operated under constraints during the PSBB. The restrictions on business hours had a negative impact on the revenue of MSMEs, with 72.04% reporting decreased earnings in July and August 2021.

Furthermore, in the context of crisis, the role of digital capability and orientation on digital transformation and innovation becomes pivotal in driving the performance of SMEs. As external shocks disrupt traditional business models, the ability of SMEs to harness digital tools and technologies can provide a transformative advantage. Digital capability refers to the technical competence of SMEs in utilizing digital solutions effectively. This capability empowers SMEs to swiftly transition to online platforms, maintain communication with customers, and optimize their operations despite mobility restrictions. In parallel, digital orientation plays a crucial role in aligning digital strategies with market demands and emerging trends. SMEs with a clear digital orientation can adapt their products, services, and processes to cater to evolving consumer behaviors, thereby staying relevant and responsive in dynamic markets. The synergy between digital capability and digital orientation enables SMEs to survive and thrive by exploiting the potential of digital transformation and innovation, ultimately bolstering their overall performance during times of crisis.

In essence, the symbiotic relationship between digital capability, digital orientation, digital transformation, and digital innovation catalyzes SMEs to navigate through challenges and seize opportunities amid crises. By effectively leveraging digital tools, SMEs can maintain their operations, connect with customers, and explore new revenue streams despite limitations imposed by external factors. Digital orientation then ensures that these digital strategies remain agile and adaptable, enabling SMEs to address shifting market dynamics and capitalize on emerging trends. Together, these elements empower SMEs to weather the storm of crisis and position them for sustained growth and competitive resilience in an increasingly digitized business landscape.

1. LITERATURE REVIEW AND HYPOTHESES

Digital capability plays a crucial role as a driving force behind digital innovation and transformation. The foundation for long-term competitive advantage lies in a firm's technological capability, encompassing knowledge, trade secrets, patents, and technology-specific intellectual property (Lee et al., 2001). Technological capability acts as the driving force behind a firm's innovation efforts (Hsieh & Tsai, 2007).

Digital technology capability has become essential in the current business landscape, defined as a company's ability to develop and formulate digital products and processes (Khin & Ho, 2020). Effective management and leveraging of digital technology significantly enhance business performance by integrating and mobilizing human resources and technology (Liu et al., 2011). Technology affordances describe digital capacity, in which businesses design and maintain processes with knowledge assets and use human capital to connect with particular digital technologies (Saputra et al., 2022). A company's capabilities play a crucial role in determining its overall business performance, and the concept of company capability is rooted in dynamic capabilities and the organization's flexibility, including its digital capability.

Khin and Ho (2020) highlight digital capability as a key driving factor for digital innovation. Additionally, Yang et al. (2012) supported the positive impact of digital orientation on digital innovation. To fully harness digital capability, IT firms are encouraged to invest in training, outsourcing, and establishing alliances or joint ventures with stronger players (Zhou et al., 2005). Digital capabilities drive digital innovation and have a consequential impact on digital transformation (Orlandi, 2016). Dynamic capabilities, allowing firms to process, create new products, and respond to market changes, are recognized as the primary source of sustainable competitive advantage (Teece et al., 1997; Teece & Pisano, 1994). Digital capacity has a direct beneficial impact on digital transformation. Developing dynamic capabilities is vital for attracting and retaining digitally capable experts, who are essential in accelerating digital transformation (Lewis et al., 2004; Rupeika-Apoga et al., 2022). Effectively managing digital transformation requires firms to develop dynamic capabilities tailored to this digital context (Ellström et al., 2022). Dynamic capabilities are vital in responding to digital disruption and achieving competitive advantage in the digital era (Karimi & Walter, 2015).

Amid this dynamic business landscape, effectively managing technology is crucial for organizations. Regardless of how well technology has been deployed, effective and efficient management is necessary to achieve desired outcomes (Lu & Ramamurthy, 2011). Digital capability refers to a talent, firm's competence, and ability to manage digital technology for new product creation in the context of digital products (Moorman & Slotegraaf, 1999). Furthermore, digital capability is fundamental for transforming customer experiences, business models, and operational processes (Westerman et al., 2012). It encompasses not only digital knowledge but also communication skills, information skills, and an understanding of legal, ethical, privacy, and security aspects related to technology.

Successful digital transformation requires tailored capabilities for specific needs (Carcary et al., 2016). Key digital capabilities include robust information management and flexible IT infrastructure (Levallet & Chan, 2018). Effective digital transformation management demands dynamic capabilities involving the ability to sense, seize, and reconfigure routines (Hilliard & Goldstein, 2019; Yeow et al., 2018; Winter, 2003; Warner & Wäger, 2019).

Digital orientation, a novel concept, is related to technology orientation. Past research has shown mixed links between technology orientation and innovation, with some studies indicating a positive connection to product innovation (Yang et al., 2012; Hortinha et al., 2011; Salavou, 2005; Spanjol et al., 2011; Zhou et al., 2005). Defining digital orientation involves integrating internal and external strategic elements, which is critical as the use of digital tech increases. Digitally oriented firms tend to produce digital innovations due to their tech commitment (Khin et al., 2012). Digital orientation shapes an organization's strategic approach to leverage digital opportunities, fostering market insights, proactive innovation, and adaptability to market changes (Quinton et al., 2018). Identifying factors that shape digital orientation helps SMEs develop competitive positions (Quinton et al., 2018). Digital transformation enhances enterprises' resilience, propelled by a combination of exploitative and explorative innovation (Zhang et al., 2021). Al-Ansari et al. (2013) showed that a solid commitment to tech is vital in adapting to changing conditions. Digitalization tightly integrates strategic elements, blurring product and service boundaries and emphasizing interfaces (Yoo et al., 2010; Nambisan et al., 2019).

Digital innovation and transformation impact firm performance, especially during the pandemic (Lestari et al., 2021; Riadi et al., 2022). Digital orientation enhances product value and long-term profitability (Zaidi & Rupeika-Apoga, 2021). Digital innovation boosts performance by creating value through innovative products (Liu et al., 2020; Chen et al., 2016). Financial viability and sales growth improve as a result of successful digital transformation (Weill & Woerner, 2015; Masoud & Basahel, 2023). It affects the business model and operations (Ziółkowska, 2021) and relies on digital capabilities for innovation and competitive advantage (Bouwman, 2019; Khin & Ho, 2020).

While some studies link digital innovation to higher profitability (Lestari et al., 2021; Achmad et al., 2023), others find no direct connection (Chae

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et al., 2014). However, implementing digital product innovation has been shown to enhance performance by generating value for customers (Liu et al., 2020). Digital innovation drives competitive advantage and financial performance (Leão & da Silva, 2021; Berawi et al., 2020), reducing costs and improving profitability (Osmundsen et al., 2018; Saksonova & Kuzmina-Merlino, 2017). Digital orientation aligns resources with strategic challenges (Kindermann et al., 2021) and supports adaptability (Ziółkowska, 2021), requiring a dedicated strategy and digital skills (Orlandi, 2016; Rupeika-Apoga et al., 2022).

Digital capability is a critical driver of digital innovation and transformation for businesses (Lee et al., 2001). This capability encompasses a firm's technological knowledge, patents, technology-specific intellectual property, and trade secrets, acting as a driving force behind innovation efforts (Hsieh & Tsai, 2007). To thrive in the current business landscape, companies must possess the ability to develop and implement digital products and processes (Khin & Ho, 2020). Effective management and utilization of digital technology are vital in enhancing business performance by integrating human resources and technology (Liu et al., 2011). Technology affordances define digital capabilities, where companies develop and maintain procedures to exploit human capital and knowledge assets in interacting with digital technologies (Saputra et al., 2022). A firm's digital capabilities are essential determinants of its overall business performance (Khin et al., 2012).

Digital innovation, driven by digital capability, positively influences firm performance by enabling the successful creation of processes, services, and new IT-enabled products (Kohli & Melville, 2019). Studies have also shown that digital orientation, combined with environmental orientation, positively impacts process and product innovation (Ardito et al., 2021). Additionally, a dynamic business environment plays a crucial role in facilitating the influence of product innovation on a company's overall performance (Coad et al., 2016). Adopting ICT and other technologies further improves innovation and performance, developing competitive advantage (Gërguri-Rashiti et al., 2017).

On the other hand, digital transformation plays a more significant role in influencing operating performance than financial performance (Guo & Xu, 2021). Its impact on firm performance requires favorable policy and innovation environment conditions. Technology adoption in the financial sector directly contributes to firm performance, particularly in the long term, due to the complexity of technology implementation (Scott et al., 2017). Furthermore, IT capabilities, represented by social media and e-commerce, have been empirically shown to enhance a firm's performance (Braojos et al., 2019). However, a competitive environment can influence innovation's effect on firm performance, with a stronger effect on process innovation (Prajogo, 2016; Turulja & Bajgoric, 2019). Tajvidi and Karami (2021) found that innovation has a substantial mediating function in the relationship between social media usage and company performance.

Despite the positive impact of digital innovation on firm performance, challenges arise due to the high externalities of digital technology (Teece, 2018). Nonetheless, digital innovation has been found to significantly impact corporate performance (Wang et al., 2022). The mediating role of digital innovation in the relationship between digital capability and firm performance highlights the importance of leveraging digital resources for successful innovation and ultimately improved performance. Alongside digital innovation, digital transformation also mediates the effect of digital capability on firm performance, emphasizing the need for companies to adapt to the digital landscape to achieve sustainable competitive advantage and success in the digital era.

Effective technology management is essential for organizations in the dynamic business landscape (Lu & Ramamurthy, 2011). Digital capability, as a firm's skill and expertise in managing digital technologies for new product development (Moorman & Slotegraaf, 1999), is fundamental for transforming customer experiences, operational processes, and business models (Westerman et al., 2012). Successful digital transformation requires companies to develop capabilities tailored to their specific sectors and needs (Carcary et al., 2016). Developing dynamic capabilities is vital for a firm's ability to adapt to changes and achieve a

competitive advantage in the digital era (Karimi & Walter, 2015). Dynamic capabilities provide a consistent approach to studying digital transformation, considering the powerful impact of digital technologies on business performance (Warner & Wäger, 2019).

Digital orientation is crucial in driving digital innovation and transformation (Kindermann et al., 2021). It involves exploiting digital technologies for competitive advantage (Kindermann et al., 2021). Digital orientation positively affects digital innovation, which mediates the link between digital capabilities, digital orientation, and nonfinancial and financial success (Khin & Ho, 2020; Yang et al., 2012). Companies with a strong digital orientation are more likely to produce digital innovations due to their openness and commitment to digital technologies (Khin et al., 2012). Aligning technology suites with organizational processes becomes critical as the use of digital technology increases (Leonardi, 2011). Firms oriented toward digital platforms demonstrate a more expansive perspective and dedication toward utilizing emerging technology in developing new products (Khin et al., 2012).

The impact of innovation on a company's performance has been thoroughly examined and is generally found to be favorable (Datta & Roumani, 2015). Digital innovation, in particular, has been recognized as a key driver of sustainable competitive advantage (Leão & da Silva, 2021; Berawi et al., 2020; Yudaruddin, 2023a). While some studies have shown a positive association between digital innovation and financial performance (Westerman et al., 2012; Weill & Woerner, 2015), others have found mixed results (Chae et al., 2014). However, there is a consensus that digital innovation has a beneficial impact on the performance of firms. This is achieved by generating novel customer value by introducing creative digital organizational approaches, processes, and products (Liu et al., 2020). According to Zhang et al. (2021), the resilience of organizations is enhanced by successful digital transformation, which is facilitated by a combination of exploitative and explorative innovation.

The significance of digital transformation in the contemporary economy and its extensive economic ramifications have been emphasized in the scholarly literature (Orlandi, 2016; Rupeika-Apoga et al., 2022). Implementing this strategy has been found to have a good effect on various aspects of a firm's operations, including revenue growth, cost reduction, and overall financial performance. This, in turn, contributes to an enhanced overall firm performance (Osmundsen et al., 2018; Yudaruddin, 2023b; Yudaruddin et al., 2023). According to Ziółkowska (2021), digital transformation significantly changes a company's whole business model. This transformation requires the establishment of an ecosystem, the acquisition of digital skills to facilitate the process, the implementation of a dedicated digital strategy, and ultimately, the attainment of positive outcomes. Ziółkowska (2021) asserts that the complexity inherent in the company model, in conjunction with its income generation, affords the opportunity to investigate the mediating influence of digital transformation on customer satisfaction and financial sustainability. According to Bouwman et al. (2019), organizations that prioritize enhancing their innovation capabilities tend to observe enhanced business performance.

In the context of the literature review, it is evident that digital capability, digital orientation, digital innovation, and digital transformation play pivotal roles in influencing firm performance, particularly in the context of the COVID-19 pandemic and a dynamic business environment. The significance of digital technology and its orientation is increasing, while digital capability and digital transformation emerge as critical factors in achieving competitive advantage and business success. Therefore, this study examines how digital capabilities and orientation impact SMEs' digital transformation and innovation. This study also examines how digital transformation and innovation mediate digital capabilities, digital orientation, and SMEs' performance during the COVID-19 pandemic. With this foundation, the following hypotheses are proposed:

H1: There is a positive relationship between digital capability and digital transformation of SMEs.

H2: There is a positive relationship between digital capability and digital innovation of SMEs.

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H3: There is a positive relationship between digital orientation and digital transformation of SMEs.

H4: There is a positive relationship between digital orientation and digital innovation of SMEs.

H5: There is a positive relationship between digital transformation and firm performance of SMEs.

H6: There is a positive relationship between digital innovation and firm performance of SMEs.

H7: Digital transformation of SMEs mediates the influence of digital capabilities on firm performance.

H8: Digital transformation of SMEs mediates the influence of digital orientation on firm performance.

H9: Digital innovation of SMEs mediates the influence of digital capabilities on firm performance.

H10: Digital innovation of SMEs mediates the influence of digital orientation on firm performance.

2. METHOD

This study explored the interplay between digital transformation, digital capability, digital orientation, digital innovation, and company performance. The research methodology involved adapting existing measurement scales and employing a variance-based analysis method through PLS to assess the model's validity and relationships between the variables. The findings from this study contribute to a deeper understanding of the factors influencing company performance in the context of digital transformation and innovation.

This study employed various variables to investigate the relationship between digital orientation, digital capability, digital innovation, and digital transformation on company performance. Company performance was the dependent variable, while digital capability and digital orientation were the independent variables. Digital transformation and digital innovation acted as mediating variables in the study.

To measure company performance (PER), the study adapted the measures of Wang et al. (2022) and Hogan and Coote (2014). The assessment involved five items on a Likert-style five-point scale, ranging from 1 = strongly disagree to 5 = strongly agree. In terms of the mediating factors, digital transformation (DIT) and digital innovation (DII), the paper adopted the measures from Rupeika-Apoga et al. (2022), Priyono et al. (2020), and Ziółkowska (2021) for DIT, and Wang et al. (2022), Khin and Ho (2020), Byukusenge et al. (2017), and Paladino (2007) for DII. Meanwhile, the measurement of digital capability (DIC) used a seven-item scale developed by Wang et al. (2022), Heredia et al. (2022), Zhou and Wu (2010), and Khin and Ho (2020). The assessment of digital orientation (DIO) as the independent variable employed a five-item scale developed by Bendig et al. (2023), Khin and Ho (2020), Gatignon and Xuereb (1997), and Zhou et al. (2005).

A survey was designed and distributed to managers of small and medium enterprises (SMEs) in Indonesia from July to December 2021 to collect data. The participants were selected through purposive random sampling. A total of 247 responses were collected, and preliminary processing was conducted to ensure data accuracy and sufficiency. The survey was divided into two sections. The first section collected demographic information such as age, gender, number of employees, level of education, and duration of business operation; the second section contained the values of all variables.

The collected data were analyzed using a variance-based method, specifically partial least squares (PLS), known for its flexibility and fewer assumptions. The outer model assessed the reliability and validity of the variables, including measures like convergent and discriminant validity and composite reliability (Hair et al., 2016). The cutoff values for composite reliability, Cronbach's alpha, factor loading, and AVE were set at 0.70 to ensure the model's reliability. The model's convergent validity was confirmed with

Table 1. Measurement items

Variables	Item	References
Digital capability (DIC)	I feel I have sufficient skills and knowledge in operating digital technology to support my business (DIC1)	Heredia et al. (2022), Wang et al. (2022), Zhou and Wu (2010), Khin and Ho (2020)
	I actively adopt digital technologies such as websites, social media, e-commerce, and business software in my business operations (DIC2)	
	I have adequate access to digital infrastructure, such as a stable internet connection and hardware, to support the use of digital technology (DIC3)	
	I regularly participate in digital training or development programs to enhance my skills and understanding of digital technology (DIC4)	
	I quickly adapt to technological changes and emerging market trends (DIC5)	
	I am involved in e-commerce and have an online platform to sell products and services (DIC6)	
	My customers interact and engage actively through digital channels such as social media or websites (DIG7)	
Digital orientation (DIO)	I am aware that adopting digital technology can enhance the efficiency and competitiveness of my business (DIO1)	Bendig et al. (2023), Khin and Ho (2020), Zhou et al. (2005), Gatignon and Xuereb (1997)
	I actively search for opportunities to utilize digital technology in various aspects of my business (DIO2)	
	I proactively integrate digital technology innovations into my products, services, or business processes (DIO3)	
	I have adequate plans and resources to address challenges in the process of business digitalization (DIO4)	
	I am prepared to adapt to the changes brought about by the adoption of digital technology in our business (DIO5)	
Digital transformation (DIT)	I actively utilize digital technology such as websites, social media, or business applications in my business operations (DIT1)	Rupeika-Apoga et al. (2022), Priyono et al. (2020), Ziółkowska, (2021)
	I have an online store or participate in e-commerce platforms to sell my products or services (DIT2)	
	I engage with customers and promote products or services through social media (DIT3)	
	My employees possess relevant digital skills and contribute to the business's digital transformation (DIT4)	
	I maintain a responsive online presence and continuously adapt to evolving technological developments (DIT5)	
Digital innovation (DII)	I creatively and innovatively utilize limited digital resources to support my business activities (DII1)	Wang et al. (2022), Byukusenge et al. (2017), Paladino (2007), Khin and Ho (2020)
	I adopt relevant and efficient digital technologies to support my business processes without burdening the budget (DII2)	
	I collaborate with others or form partnerships to access digital resources at affordable costs (DII3)	
	I use open-source solutions or free software to gain benefits from digital technologies without significant expenses (DII4)	
	I align my business strategies with digital trends without incurring significant expenses (DII5)	
Company performance (PER)	After adopting digital technology, I have experienced a significant increase in sales (PER1)	Wang et al. (2022), Hogan and Coote (2014)
	I feel that my business operates more efficiently since implementing digital technology (PER2)	
	I have observed an improvement in profitability and profit margins after adopting digital technology (PER3)	
	My customers provide positive feedback and are satisfied with the services after digital technology adoption (PER4)	
	Digital technology adoption has enabled me to create new products or services or enhance the existing ones (PER5)	

factor loadings above 0.70 and average variance extracted (AVE) above 0.50 for each construct. The inner model examined the relationship between the study concepts, significance values, and R-square, shedding light on the mediating influence of digital transformation and innovation on digital orientation, capability, and organizational performance.

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3. RESULTS

Table 2 offers a comprehensive overview of the sample demographics for the study conducted between July and December 2021, involving managers of small and medium enterprises (SMEs) in Indonesia. The sample consisted of 247 respondents, selected through purposive random sampling to ensure representative data. The gender distribution showed that 51.2% of the participants were male, while 48.8% were female. Regarding age groups, the majority fell between 25 and below 50 years old, accounting for 51.4%, followed by 35.2% in the 18 to below 25 age range, and 13.4% were above 50 years old. Regarding educational backgrounds, 60.3% of the participants had completed university or college education, 35.2% had senior high school qualifications, and a smaller proportion of 4.5% had attended junior high school. When examining the length of business operation, 43.7% of respondents had been operating their businesses for 5 to 10 years, 33.2% had been in operation for 3 to below 5 years, and 23.1% had more than 10 years of business experience. As for the size of the businesses represented, the majority (61.9%) had less than 10 employees, followed by 24.7% with 10 to less than 25 employees, 9.7% with 25 to less than 50 employees, and only 3.6% with over 50 employees. These demographic insights provide crucial context for this study and contribute to a more comprehensive understanding of the characteristics of participants.

Table 2. Sample demographics

Characteristics	Group	Frequency	Percentage
Gender	Male	129	51.2
	Female	118	48.8
Age	18 < 25	87	35.2
	25 < 50	127	51.4
	> 50	33	13.4
Education	University/ College	149	60.3
	Senior high school	87	35.2
	Junior high school	11	4.5
Length of business operation	3-5 years	82	33.2
	5-10 years	108	43.7
	> 10 years	57	23.1
Number of employees	< 10	153	61.9
	10-25	61	24.7
	25-50	24	9.7
	> 50	9	3.6

Note: n = 247.

Table 3 provides an in-depth exploration of the variables' validity and reliability. Digital capability (DIC) displayed robust relationships with its items, featuring loadings ranging from 0.916 to 0.955. Its internal consistency was high, as evidenced by Cronbach's alpha coefficient of 0.977. The composite reliability achieved an excellent level at 0.981, while the average variance extracted (AVE) was 0.881, confirming the construct's convergent validity. Similarly, digital orientation (DIO) exhibited strong results. Item loadings ranged from 0.851 to 0.937, indicating substantial relationships between the latent construct and its indicators. The construct's internal consistency was sound, with a Cronbach's alpha coefficient of 0.954. The composite reliability value of 0.964 surpassed the recommended threshold, and the AVE of 0.845 confirmed its convergent validity.

Furthermore, digital transformation (DIT) demonstrated notable outcomes. Item loadings ranged from 0.931 to 0.967, reflecting significant connections between the latent construct and its items. Internal consistency was high, as indicated by a Cronbach's Alpha coefficient of 0.971. The composite reliability value of 0.978 and the AVE of 0.897 indicated robust convergent validity. Digital innovation (DII) exhibited consistent outcomes. Item loadings ranged from 0.861 to 0.970, indicating substantial relationships between the latent construct and its items. Internal consistency was high, as indicated by a Cronbach's Alpha coefficient of 0.968. The composite reliability exceeded the recommended threshold at 0.975, while the AVE was 0.887, indicating satisfactory convergent validity. Lastly, company performance (PER) displayed notable results. The item loadings ranged from 0.769 to 0.943, demonstrating strong connections between the latent construct and its indicators. Internal consistency was high, as indicated by a Cronbach's Alpha coefficient of 0.925, which was sound. The composite reliability reached 0.943, surpassing the recommended threshold, and the AVE was 0.771, confirming the construct's reliability and convergent validity.

The extensive analysis of the variables' validity and reliability, as presented in Table 3, provides a comprehensive understanding of the measurement model's robustness. The achieved values for item loadings, Cronbach's Alpha, composite relia-

Table 3. Validity and reliability result

Variables	Item Loadings		Cronbach's Alpha	CR (Composite Reliability)	AVE
Digital capability (DIC)	DIC1	0.921	0.977	0.981	0.881
	DIC2	0.942			
	DIC3	0.942			
	DIC4	0.948			
	DIC5	0.946			
	DIC6	0.955			
	DIC7	0.916			
Digital orientation (DIO)	DIO1	0.937	0.954	0.964	0.845
	DIO2	0.937			
	DIO3	0.934			
	DIO4	0.933			
	DIO5	0.851			
Digital transformation (DIT)	DIT1	0.967	0.971	0.978	0.897
	DIT2	0.950			
	DIT3	0.953			
	DIT4	0.934			
	DIT5	0.931			
Digital innovation (DII)	DII1	0.961	0.968	0.975	0.887
	DII2	0.970			
	DII3	0.969			
	DII4	0.942			
	DII5	0.861			
Company performance (PER)	PER1	0.921	0.925	0.943	0.771
	PER2	0.943			
	PER3	0.942			
	PER4	0.769			
	PER5	0.798			

bility, and AVE collectively support the credibility and consistency of the measurement model, setting the stage for further hypothesis testing and advanced statistical analysis.

Table 4. R-square

Dependent Variable	*R*-square
Digital innovation (DII)	0.273
Digital transformation (DIT)	0.184
Company performance (PER)	0.180

The examination of R-square outcomes, as depicted in Table 4, delves into the interconnectedness between the significant values and the constructs, unraveling their underlying relationships. These estimations offer insights into the degree to which the constructs contribute to explaining the variations in their respective dependent variables. The R-square values unveil the portion of variability accounted for by the constructs within the structural models. Within this context, the analysis reveals that digital innovation (DII), digital transformation (DIT), and company performance (PER) possess R-square values of 0.273 or 27.3%, 0.184 or 18.4%, and 0.180 or 18%, respectively. The residual variances of 72.7%, 81.6%, and 82% within the respective constructs are attributable to external factors beyond the scope of the study model. It is noteworthy that company performance (PER) appears to be influenced by digital transformation (DIT) and digital innovation (DII). Simultaneously, digital transformation (DIT) and digital orientation (DIO) are inclined to be influenced by digital capability (DIC) and digital orientation (DIO). This complicated interaction between variables emphasizes their complexity. The Q-square test size and structural path coefficients are synchronized with R-square values as the inner model is evaluated. Within partial least squares (PLS) analysis, the Q-square measurement gauges the structural component's predictive capacity within the model. Computed as 1 - (1 - 0.273) (1 - 0.184) (1 - 0.180) = 0.513, the Q-square value indicates that the model adeptly elucidates around 51.3% of the variability in DII, DIT, and PER. The remaining 48.7% of the variance is subject to influences from

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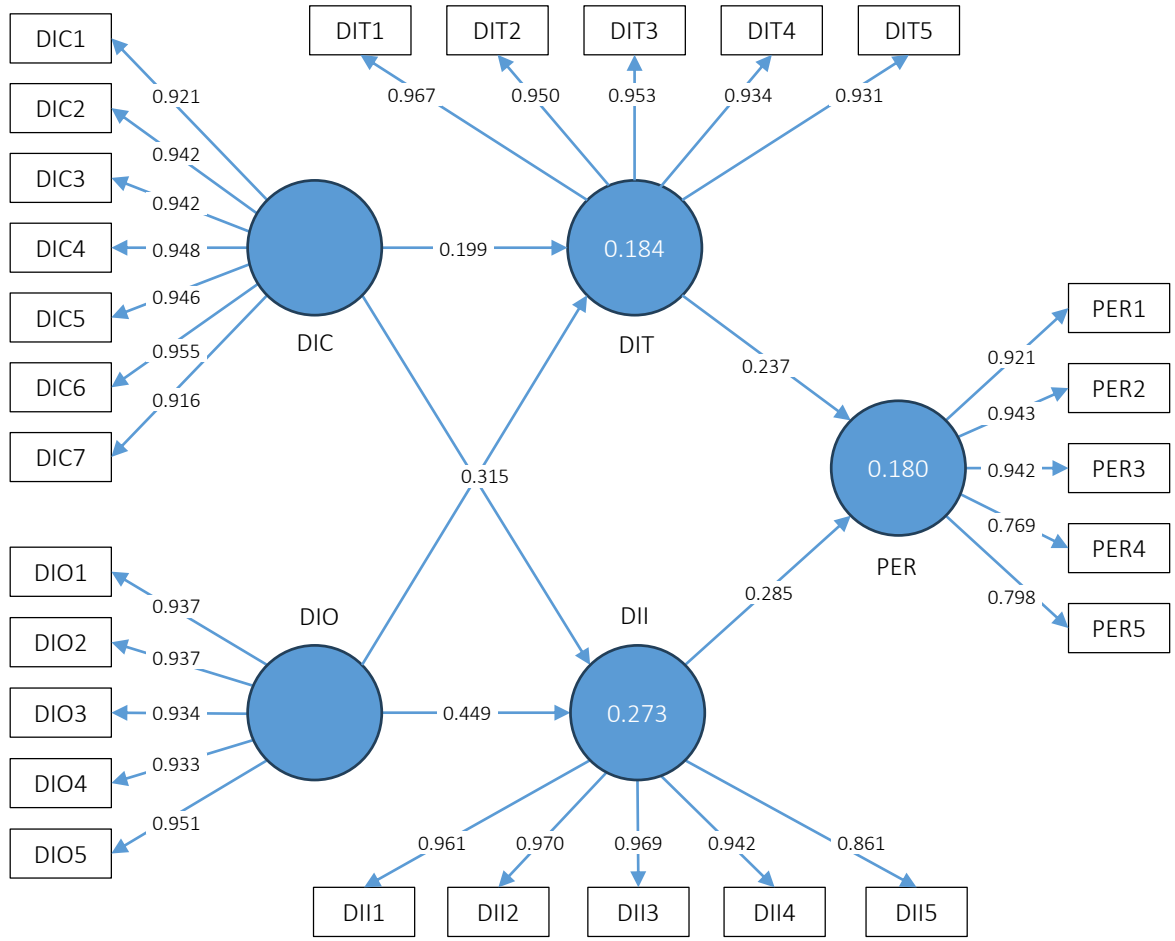

Note: DII = digital innovation; DIT = digital transformation; DIC = digital capability; DIO = digital orientation; PER = company performance.

Figure 1. Structural equation model

external factors not encompassed within the model's constructs. The integration of the Q-Square metric augments the understanding of the model's predictive efficacy and its implications for the intricate relationships interlinking the constructs.

Table 5. Description of path coefficients

Hypothesis	Path coefficient	T Statistic	P-Value	Result
H1: DIC → DIT	0.199	2.788	0.006	Supported
H2: DIC → DII	0.150	2.528	0.012	Supported
H3: DIO → DIT	0.315	4.939	0.000	Supported
H4: DIO → DII	0.449	7.465	0.000	Supported
H5: DIT → PER	0.237	4.528	0.000	Supported
H6: DII → PER	0.285	4.822	0.000	Supported

Note: DII = digital innovation; DIT = digital transformation; DIC = digital capability; DIO = digital orientation; PER = company performance.

Table 5 provides a comprehensive overview of the summary of path coefficient values, elucidating the relationships between different constructs. This systematic presentation allows for a structured understanding of the outcomes, enabling robust interpretations of the hypotheses. Commencing with H1, which postulates the influence of digital capability on digital transformation, the results indicate a positive effect with a path coefficient of 0.199. This is substantiated by a significant t-statistic of 2.788, surpassing the threshold of 1.96 and a low P-value of 0.006. As such, H1 is accepted, signifying that digital capability indeed affects digital transformation. Moving on to H2, which explores the relationship between digital capability and digital innovation, the analysis reveals a path coefficient of 0.150. This is accompanied by a substantial t-statistic of 2.528, exceeding the critical value, and a P-value of 0.012. Consequently, H2 is supported, highlighting the positive influence of digital capability on digital innovation. Concerning H3, which proposes the impact of

digital orientation on digital transformation, the outcomes demonstrate a significant and positive relationship. The path coefficient is 0.315, the associated t-statistic stands at an impressive 4.939, and the P-value is below 0.000. Thus, H3 is accepted, indicating that digital orientation indeed influences digital transformation.

Similarly, H4 explores the connection between digital orientation and digital innovation. The analysis presents a substantial path coefficient of 0.449, supported by a remarkable t-statistic of 7.465 and a negligible P-value. Therefore, H4 is accepted, indicating a positive and significant influence of digital orientation on digital innovation. Shifting focus to H5, which examines the relationship between digital transformation and company performance, the results demonstrate a positive impact. The path coefficient is 0.237, accompanied by a t-statistic of 4.528 and a P-value below 0.000. Consequently, H5 is supported, indicating that digital transformation positively affects company performance. Lastly, H6 explores the influence of digital innovation on company performance. The analysis showcases a path coefficient of 0.280, supported by a t-statistic of 4.822 and a P-value below 0.000. Thus, H6 is accepted, emphasizing the positive influence of digital innovation on company performance.

Table 6 provides a structured summary of the mediation effects, shedding light on the intricate relationships between the variables and their potential mediating roles. This systematic presentation enhances the clarity and interpretability of the study's outcomes, enabling meaningful insights into the hypotheses. Beginning with H7, which postulates the mediation of digital transformation in the relationship between digital capability and company performance, the analysis reveals a path coefficient of 0.047. This is complemented by a substantial t-statistic of 2.189, surpassing the threshold of 1.96, and a P-value of 0.029. As a result, H7 is supported, indicating that digital transformation mediates the influence of digital capability on company performance. Moving on to H8, which explores the mediating function of digital orientation on the relationship between digital transformation and company performance, the results demonstrate a significant and positive mediating role. The path coefficient is 0.075, and the associated t-statistic stands at a noteworthy 3.259, accompanied by an impressively low P-value of 0.001. Consequently, H8 is accepted, signifying that digital orientation indeed mediates the effect of digital transformation on company performance. However, the outcomes do not provide sufficient support for H9, which examines the mediating influence of digital innovation in the relationship between digital capability and company performance. The path coefficient is 0.043, the t-statistic is 1.931, and the P-value is 0.054. Thus, H9 is rejected, indicating that digital innovation does not mediate the effect of digital capability on company performance. Conversely, the analysis demonstrates a positive and significant mediating effect for H10, which suggests the mediating role of digital innovation in the relationship between digital orientation and company performance. The path coefficient is 0.128, supported by a t-statistic of 3.750 and a P-value below 0.000. Therefore, H10 is accepted, highlighting that digital innovation indeed mediates the influence of digital orientation on company performance.

4. DISCUSSION

This study analyzes how digital capacity and direction affect SMEs' digital transformation and innovation during the COVID-19 pandemic. The study also examines how digital transformation and innovation mediate the effects of digital orientation and competence on SME

Table 6. Summary of mediation effects

Hypothesis	Path coefficient	T Statistic	P-Value	Result
H7: DIC → DIT→PER	0.047	2.189	0.029	Supported
H8: DIO → DIT→PER	0.075	3.259	0.001	Supported
H9: DIC → DII→PER	0.043	1.931	0.054	Rejected
H10: DIO → DII→PER	0.128	3.750	0.000	Supported

Note: DII = digital innovation; DIT = digital transformation; DIC = digital capability; DIO = digital orientation; PER = company performance.

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performance during the COVID-19 pandemic. Digital capacity and attitude positively and significantly affect SMEs' digital transformation and innovation during the COVID-19 epidemic. These observations support hypotheses 1-4. The results show that digital capacity and orientation positively and significantly affect SMEs' digital transformation and innovation during COVID-19. This suggests that SMEs with strong digital capabilities and a clear digital orientation are more likely to successfully undergo digital transformation and innovate digitally in the challenging context of the pandemic.

The study supports the idea that digital capability serves as a driving force for digital innovation and transformation within businesses. It aligns with the understanding that a firm's technological knowledge, trade secrets, patents, and technology-specific intellectual property are crucial in driving innovation efforts. The positive impact of digital capability on digital innovation and transformation, especially during the COVID-19 pandemic, is consistent with the insights from Lee et al. (2001), Hsieh and Tsai (2007), Khin and Ho (2020), Liu et al. (2011), and Saputra et al. (2022).

Moreover, the results showed that digital transformation and innovation positively affect SME performance during the COVID-19 pandemic. This outcome is in line with hypotheses 5 and 6. The adoption and successful implementation of digital transformation and digital innovation strategies are important factors that enhance the overall performance of SMEs in Indonesia during the challenging circumstances of the COVID-19 pandemic. In other words, the study's findings suggest that SMEs that have effectively embraced digital transformation and implemented innovative digital strategies have managed to navigate the difficulties brought about by the pandemic more successfully. These businesses have likely been able to adapt their services, operations, and products to the changing market conditions and customer demands, leading to improved performance despite the ongoing challenges posed by the pandemic.

These findings align with previous research highlighting the importance of digital orientation in driving digital innovation and transformation. The significance of digital orientation on digital transformation and innovation aligns with studies that emphasize the strategic role of digital orientation in exploiting digital technologies for competitive advantage. Moreover, the positive influence of digital innovation and transformation on firm performance, particularly in terms of cost reduction, revenue growth, and overall business performance, supports the conclusions drawn from various articles (Kindermann et al., 2021; Khin & Ho, 2020; Kohli & Melville, 2019; Liu et al., 2020; Guo & Xu, 2021; Ziółkowska, 2021).

Furthermore, the results of the study indicate that digital transformation and digital innovation play a significant role in mediating the influence of digital capability and digital orientation on SME performance during the COVID-19 pandemic. This suggests that when SMEs possess strong digital capability and a clear digital orientation, their performance is positively impacted through the mechanisms of digital transformation and digital innovation. These findings support hypotheses 7, 8, and 10, which proposed the mediating effects of digital transformation and digital innovation. However, the study did not find a significant mediating role for digital innovation in the relationship between digital capability and SME performance during the COVID-19 pandemic. This means that digital innovation did not mediate in translating digital capability into improved SME performance in the context of the pandemic. As a result, hypothesis 9, which suggested the mediating effect of digital innovation, was rejected.

The study's findings provide empirical support for the mediating roles proposed in the hypotheses. The mediating effect of digital innovation and digital transformation on the relationship between digital capability or digital orientation and firm performance aligns with the conceptual understanding that these factors work together to create sustainable competitive advantages and drive positive business outcomes (Khin et al., 2012; Ziółkowska, 2021; Kindermann et al., 2021; Liu et al., 2020; Rupeika-Apoga et al., 2022; Yudaruddin, 2023b; Yudaruddin et al., 2023; Zhang et al., 2021).

CONCLUSION

This study aimed to investigate the impact of digital capability and orientation on SMEs' digital transformation and digital innovation during the COVID-19 pandemic in Indonesia. The research methodology involved a sample of 247 managers of SMEs who were selected through purposive random sampling between July and December 2021. Data collection utilized a survey comprising two parts: the first capturing profile information and the second containing variable values. The collected data underwent variance-based analysis using PLS.

The outcomes of this investigation were found to be statistically significant. The study revealed that the presence of both digital capacity and digital orientation significantly and positively impacted SMEs' digital transformation and digital innovation during the COVID-19 pandemic. Moreover, the study supported the notion that digital transformation and digital innovation positively impact SME performance during the pandemic. This suggests that adept implementation of digital transformation and innovative strategies contributes to SMEs' improved performance, enabling them to adapt and thrive amid pandemic-induced challenges.

Furthermore, the study indicated that digital transformation and digital innovation play pivotal roles in mediating the relationship between digital orientation and capability on SME performance during the COVID-19 pandemic. While digital transformation and digital innovation successfully mediate the influence of digital capability and digital orientation, digital innovation was not found to significantly mediate the relationship between digital capability and SME performance during the pandemic.

The empirical findings support the conceptual understanding of these interrelated factors' roles in generating sustainable competitive advantages and fostering positive business outcomes. They align with previous research that underscores the strategic significance of digital capability and orientation in driving innovation and transformation, especially in the face of dynamic challenges like the COVID-19 pandemic. These results bear implications for policymakers and SMEs, emphasizing the importance of embracing digital transformation and cultivating digital innovation to enhance SME performance in evolving business landscapes.

For future research, exploring potential moderating factors that could impact the relationships identified in this study would be valuable. Investigating how contextual factors, industry characteristics, or organizational attributes interact with digital orientation, capability, transformation, innovation, and SME performance could enhance the understanding of the underlying mechanisms. Furthermore, conducting longitudinal studies to monitor the evolution of these relationships over an extended timeframe and across diverse conditions could yield more profound insights into the lasting effects of digital strategies on SME performance within dynamic environments.

AUTHOR CONTRIBUTIONS

Conceptualization: Surahman, Rizky Yudaruddin.
Data curation: Rizky Yudaruddin.
Formal analysis: Zhikry Fitrian, Ari Sasmoko Adi.
Funding acquisition: Surahman, Rizky Yudaruddin.
Investigation: Himanshu Shee, Zhikry Fitrian, Ari Sasmoko Adi, Rizky Yudaruddin.
Methodology: Surahman, Himanshu Shee, Rizky Yudaruddin.
Project administration: Zhikry Fitrian, Ari Sasmoko Adi.
Resources: Rizky Yudaruddin.
Software: Surahman, Himanshu Shee, Rizky Yudaruddin.

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Supervision: Himanshu Shee, Zhikry Fitrian, Ari Sasmoko Adi.
Validation: Surahman, Himanshu Shee.
Visualization: Zhikry Fitrian, Ari Sasmoko Adi.
Writing – original draft: Zhikry Fitrian, Ari Sasmoko Adi.
Writing – review & editing: Surahman, Himanshu Shee, Rizky Yudaruddin.

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