

ACHIEVING COMPETITIVE ADVANTAGE THROUGH DIGITAL TRANSFORMATION AND SUPPLY CHAIN COMPETENCE: EVIDENCE FROM WEST JAVA SMEs

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Abstract:

Background: Digital Transformation has been observed to significantly enhance the supply chain operations of various SMEs across different sectors, and Supply Chain Competence is needed in businesses as this fosters the development and achievement of strategic goals capable of increasing Competitive Advantages

Purpose: This study aimed to examine the influence of digital transformation (DT) and supply chain competence (SCC) on competitive advantage (CA) in small and medium enterprises (SMEs) in West Java, Indonesia

Design/methodology/approach: In order to achieve the stated objective, a quantitative approach was adopted to examine the mediating role of SCC in the relationship between DT and CA. Accordingly, data analysis was conducted using Partial Least Squares in Structural Equation Modeling, which provided strong insights into the relationships between the dependent and independent variables

Findings/Result: The results confirmed that DT significantly influences both CA ($T=4.159$, $p=0.000$) and SCC ($T=19.355$, $p=0.000$), while SCC significantly affects CA ($T=6.535$, $p=0.000$). Importantly, SCC significantly mediated the DT–CA relationship ($T=5.822$, $p=0.000$), indicating that DT enhanced CA both directly and indirectly through SCC.

Conclusion: This study extends the Resource-Based View (RBV) and Dynamic Capability Theory by demonstrating that SCC functions as a mediating dynamic capability linking DT to CA in SME contexts. For practitioners, SME managers should prioritize integrated digital supply chain strategies, while policymakers in developing economies should facilitate digital infrastructure and competence-building programs to strengthen SME competitiveness.

Originality/value (state of the art): This study contributes to the literature by providing an integrated capability-based model that empirically tests SCC as a mediating mechanism between DT and CA among SMEs in a developing economy. While prior studies predominantly examined DT–CA linkages in large firms within developed economies, this research uniquely demonstrates how specific SCC dimensions customer focus and responsiveness serve as dynamic capabilities that translate DT investments into sustained CA for resource-constrained SMEs in West Java, Indonesia

Keywords: digital transformation, supply chain competence, competitive advantage, SMEs

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INTRODUCTION

The rapid advancement of digital technologies such as blockchain, the Internet of Things (IoT), Artificial Intelligence (AI), and data-driven analytics has significantly transformed supply chain processes by enhancing coordination, responsiveness, and decision-making within firms (Shashi et al. 2020). The proliferation of real-time, multidirectional information flows combined with big data analytics has enabled new strategies for demand management and improved market sensitivity (Monahan & Hu, 2015; Richey et al. 2016; Schoenherr & Speier-Pero, 2015; Waller & Fawcett, 2013). These technologies optimize core supply chain functions, including logistics, procurement, planning, and demand management, and exert a broad organizational impact, particularly within supply chain domains (Arunachalam et al. 2018; Matt et al. 2015). As digital supply chains evolve, firms become better equipped to anticipate disruptions, forecast customer demand and optimize resources under uncertainty (Ngo et al. 2023).

Digital transformation (DT) strengthens firms' core competencies by enabling value creation that is aligned with customer needs (Dubey et al. 2019; Elia et al. 2021). For SMEs, continuous technological upgrading is essential to sustain their competitiveness, particularly during crises (Ngo et al. 2023). Prior research demonstrates that integrating digital technologies into supply chain operations enhances efficiency, responsiveness, and overall firm performance, thereby reinforcing competitive positioning (Almohtaseb et al. 2024; Ngo et al. 2021; Sinaga et al. 2021; Sumarsono & Muflihah, 2023). However, existing digital supply chain frameworks are often designed for large firms and may not align with SME contexts characterized by resource and managerial constraints (Pourmorshed and Durst, 2022; Hwihanus et al. 2022).

Despite its benefits, DT adoption among SMEs faces substantial barriers, including limited financial resources, insufficient digital skills, and underdeveloped technological infrastructure (Yuen and Baskaran, 2023). Moreover, digital transformation has been recognized as a strategic driver that enhances corporate transparency and information integration across multiple domains (Sun et al. 2026). Digital literacy and marketing capabilities further influence SME performance (Patria et al. 2023). Although prior studies acknowledge the interconnection between DT

and supply chain management, a critical research gap persists: no integrated empirical model has examined how digital transformation can be strategically aligned with supply chain competence to achieve a sustainable competitive advantage (CA). Therefore, this study investigates the interplay between digital transformation, supply chain capability, and competitive advantage among SMEs, contributing both theoretical insights and managerial implications for digital supply chain strategies. Theoretically, this study extends the RBV and Dynamic Capability Theory by positioning SCC as a mediating dynamic capability in the DT–CA relationship. Managerially, the findings provide actionable guidance for SME owners, policymakers, and digital ecosystem stakeholders in developing economies to optimize digital supply chain integration for a sustained competitive advantage.

Digital transformation (DT) is reshaping how SMEs manage their supply chains; however, the capability-based link between DT, supply chain competence (SCC), and competitive advantage (CA) remains insufficiently specified. Effective implementation requires strong managerial–technical collaboration, particularly as digital integration into supply chain processes continues to present operational challenges (Stank et al. 2019). Theoretically grounded in the Resource-Based View (RBV) and dynamic capabilities (DCs), supply chains are increasingly viewed as strategic resources for digitally transforming SMEs (Shibin et al. 2020), while competitive advantage emerges from the synergy of operational resources, big data analytics, and skilled human capital that enhance efficiency and performance (Dubey et al. 2019). Digitalization further strengthens SME performance, value creation, and competitiveness (Lokuge & Duan, 2023), with strategic collaboration and robust supply chain practices reinforcing these competitive outcomes (Pooe & Munyanyi, 2019; Manzoor et al. 2021; Tukamuhabwa et al. 2021). However, gaps persist as prior studies often treat DT as a direct performance driver without specifying which SCC dimensions such as visibility, agility, integration, collaboration, and responsiveness translate into CA, rely heavily on large-firm frameworks, focus predominantly on developed economies, and rarely test SCC as a mediating mechanism within an integrated capability-based model.

Furthermore, empirical evidence of the relevance of the DT–SCC–CA pathway remains fragmented. While earlier studies confirm that digitalization and analytics

improve operational efficiency and competitiveness (Dubey et al. 2019; Lokuge & Duan, 2023) and that SCM practices contribute to CA (Manzoor et al. 2021; Tukamuhabwa et al. 2021), few have directly modeled how DT enhances SCC, which then drives CA, particularly in SME contexts. Recent evidence further confirms that digital transformation serves as a strategic enabler grounded in the RBV, enhancing corporate transparency and information connectivity through organizational processes (Sun et al. 2026). Furthermore, supply chains function as strategic resources under RBV and DCs (Shibin et al. 2020), and operational-level implementation challenges persist (Stank et al. 2019), further underscoring the absence of validated SCC indicators that capture the dynamic effects of DT on SME performance. Therefore, further research is essential to address these gaps and develop an integrated capability-based framework that explains how DT shapes the SCC and, through it, enhances CA. This study responds to this call by empirically testing a model that identifies which SCC dimensions are strengthened by DT, examining the mediating role of SCC in translating DT investments into CA, and contextualizing these relationships in SMEs within a developing economy. Unlike prior DT–SCM–CA studies that predominantly treat supply chain factors as direct performance antecedents (Manzoor et al. 2021; Tukamuhabwa et al. 2021), this study uniquely positions SCC as a mediating dynamic capability, thereby clarifying the mechanism through which DT investments are converted into competitive outcomes for SMEs.

This study focuses on SMEs in West Java, Indonesia, which face escalating competition in the digital era and must strategically adopt digital transformation (DT) to sustain their competitiveness. DT significantly reshapes supply chain processes and organizational operations (Nasiri et al. 2020), evolving from an optional initiative into a strategic imperative that enhances operational efficiency, decision-making, and customer experience (Haohan & Beinan, 2023). Within this framework, supply chain competence (SCC)—the capability to effectively coordinate and manage supply chain activities—serves as a key mechanism for maximizing the benefits of DT, with digitally strengthened supply chains positively influencing sustainable competitive performance (Ning & Yao, 2023). Accordingly, this study examines the influence of DT and SCC on the competitive advantage of SMEs in West Java, Indonesia, using a quantitative SEM-PLS approach.

This study aimed to explore the impact of DT and SCC on SMEs' CA in West Java, Indonesia. The Provincial Government of West Java is strongly committed to supporting Micro, Small, and Medium Enterprises (MSMEs) by facilitating a shift toward digital entrepreneurship. This process was carried out through the introduction of initiatives such as the MSMEs for Indonesia (UUI) program for Digital Transformation 2024. The initiative was adopted by the government with the aspiration to cultivate 2.2 million digital entrepreneurs within MSMEs by 2023, in line with Indonesia's national objective of facilitating the digitalization of 30 million MSMEs by 2024.

METHODS

This study involved 220 SMEs in West Java, and respondents who completed the questionnaire correctly and thoroughly were included in the analysis. The sample size comprised 220 respondents, which was determined through the rule-of-thumb for PLS-SEM, which states that the minimum number of observations is 10 per indicator (Hair et al. 2022). Respondents for this study were purposefully drawn from entrepreneurial communities, associations, and government records to guarantee that participants had formal recognition as entrepreneurs and were actively operating their businesses. Accordingly, the sample size was determined using a sample-to-item ratio based on the adequacy of the respondents. Following the recommended sample size estimation, the ratio must not be less than 5:1 for the indicators. As 43 indicators were used during the course of this study, the minimum required sample size was calculated as $43 \times 5 = 215$. Therefore, a sample size of 220 was sufficient to meet the required minimum and confirm statistical reliability. The respondents comprised SME owners and managers from diverse industry categories, including manufacturing (35%), trading (28%), food and beverage (22%), and services (15%), across multiple cities and regencies in West Java. In terms of firm size, 42% had 5–19 employees (small enterprises), and 58% had 20–99 employees (medium-sized enterprises). Regarding digital adoption, 67% of the respondents reported the active use of at least one digital platform for business operations. This study obtained ethical clearance from the Institutional Review Board, and all respondents provided informed consent prior to participation. Confidentiality and anonymity of the respondent data were maintained throughout the research process.

This study used primary and secondary data collection methods to achieve thorough and reliable results in the following way. Primary data were collected using a structured questionnaire designed using Google Forms. The questionnaire was developed through a multi-stage process: (1) indicators were adapted from validated instruments in prior studies—DT indicators from Bumann and Peter (2019), SCC indicators from Ngai et al. (2011), and CA indicators from Mehri and Hosseini (2005), Jafarian and Zeynali (2016), and Purbasari et al. (2020); (2) items were translated into Bahasa Indonesia and back-translated to ensure semantic equivalence; and (3) a pilot test was conducted with 30 respondents to assess clarity and comprehensibility before full-scale deployment. The questionnaire was shared with respondents via WhatsApp and email to enhance their reach and participation. Alongside primary data, secondary data sources were gathered through an extensive literature review, which included relevant academic journals, books, and official reports. This aided hypothesis development while reinforcing the interpretation of empirical findings within the comprehensive context of prior research. The given time frame for data collection was four months, starting in March and ending in August 2025.

This study employed a quantitative approach using structural equation modeling-partial least squares (SEM-PLS) with SmartPLS 4 to examine the relationships among DT, SCC, and CA in SMEs in West Java. The analysis included Confirmatory Factor Analysis (CFA), structural model evaluation, and path analysis, with hypothesis testing conducted through bootstrapping to obtain T-values (Wijanto, 2008).

Validity and reliability were assessed based on factor loadings following Hair et al. (2022), with a minimum threshold of 0.30, while hypotheses were considered significant when T-values exceeded 1.96 at the 95% confidence level. Operationalization of variables in Table 1.

The hypothesis to be tested in this study is related to the influence of Digital Transformation (DT) and Supply Chain Competence (SCC) on Competitive Advantage (CA).

Digital transformation (DT) refers to the comprehensive restructuring of business processes, organizational culture, and structure in response to evolving digital-driven market demands. This requires firms to reassess and innovate their practices to remain competitive in the digital era (Hinings et al. 2018; F. Li, 2020; L. Li et al. 2018; Matt et al. 2015; Pramanik et al. 2019). DT encompasses the digitalization of core processes and the integration of technological elements to enhance operational systems (Hagberg et al. 2016). Strategically implemented DT enables organizations to respond more rapidly to environmental changes, strengthen their competitiveness, and improve corporate performance (Hess et al. 2016). By increasing efficiency and generating new revenue opportunities, DT contributes directly to superior organizational outcomes (Westerman et al. 2014). Moreover, sustained investment in DT fosters digital maturity, allowing firms to utilize technologies more effectively and achieve enhanced performance (Mahmoud et al. 2016; Popović-Pantić et al. 2019). Based on this foundation, the first hypothesis is proposed as follows.

Table 1. Operationalization of Variables

Variable	Dimension	Scale
Digital Transformation (DT) (X) (J Bumann & MK Peter, 2019)	<ol style="list-style-type: none"> Digital Entrepreneur (DEE1) Customer (DEE2) Supplier (DEE3) Government (DEE4) University (DEE5) Finance (DEE6) Investor (DEE7) Business Community /Association (DEE8) 	Ordinal
Supply Chain Competences (SCC) (Ngai et al. 2011)	<ol style="list-style-type: none"> Supply Chain Competence Customer Focus (SCCF) Supply Chain Competence Responsiveness (SCCR) 	Ordinal
Competitive Advantage (CA) (Y) (Mehri & Hosseini, 2005; Jafarian & Zeynali, 2016; Purbasari et al. 2020)	<ol style="list-style-type: none"> Different Added Value (CA1) Uniqueness (CA2) Difficult To Imitate (CA3) Product Value – Market Fit (CA4) 	Ordinal

H₁: Digital Transformation Influences Competitive Advantage

Supply chain management has evolved from a practice-based discipline into a theory-driven field supported by structured models that define and explain its core interrelationships the “what” of supply chain management (Stank et al. 2019). In dynamic business environments, firms must possess the capability to reconfigure their key competencies to sustain their competitiveness (Teece et al. 1997). Digitally enabled supply chains rely on the ability to collect and analyze large volumes of data to optimize planning, execution speed, and process design, thereby enhancing the cost–service balance and transaction profitability (Stank et al. 2019). Although several studies have reported a positive impact of digitalization on supply chain competence (SCC), others have found insignificant or even negative effects (Zhang et al. 2016). Based on this reasoning, the second hypothesis is proposed as follows:

H₂: Digital Transformation Influences Supply Chain Competence

Effective supply chain management is critical for enhancing cost efficiency, service quality, and overall business performance, thereby acting as a key driver of profitability, competitive advantage (CA), and customer value (Ellinger et al. 2012; Elmuti et al. 2008; Mentzer et al. 2000). Digitalization is expected to strengthen supply chain competence (SCC), which serves as a strategic resource for reinforcing competitive positioning and integrating value-creating functions to achieve organizational goals (López-Morales et al. 2023; Pettersson and Segerstedt, 2013). Empirical evidence further confirms that SCC is a significant determinant of CA (Pooe & Munyanyi, 2019). Based on this rationale, the third hypothesis is proposed as follows:

H₃: Supply Chain Competence Influences Competitive Advantage

Competitive advantage (CA) refers to a firm’s ability to deliver distinctive and hard-to-imitate value that enables it to outperform competitors within the same industry (Purbasari et al. 2020). Digital transformation (DT) plays a crucial role in strengthening CA in supply chains (Frankowska & Rzeczycki, 2020). However, CA cannot be derived from a single capability; rather, it emerges from the integration of multiple strategic resources, including supply chain competence (SCC)

(López-Morales et al. 2023). The alignment of DT and SCC provides SMEs with an effective pathway to enhance their competitiveness in the digital economy (Nurhidayat et al. 2024). Empirical evidence further indicates that supply chain agility improves firms’ ability to manage uncertainty and respond quickly to market demands, thereby reinforcing CA (Du et al. 2021), while DT enhances efficiency, governance, and market responsiveness, ultimately contributing to a superior competitive position (He et al. 2024). Based on this reasoning, the fourth hypothesis is proposed as follows:
H₄: Digital Transformation influences competitive advantage through supply chain competence

The research framework (Figure 1) depicts the relationships among Digital Transformation (DT), Supply Chain Competence (SCC), and Competitive Advantage (CA). DT is conceptualized through six dimensions: Strategy, Organization, Culture, Technology, Customer, and People (J. Bumann & M.K. Peter, 2019) and is proposed to directly and indirectly enhance CA by fostering added value, uniqueness, and difficult-to-imitate capabilities (Mehri & Khodadad Hosseini, 2005; Seyed Reza Jafarian & Mehdi Zeynali, 2016; Purbasari et al. 2020). SCC, comprising Supply Chain Competence–Customer Focus and Supply Chain Competence–responsiveness, is positioned as a mediating capability linking DT to CA.

RESULTS

The current study aimed to explore the relationships among complex dimensions and construct variables within the framework of Partial Least Squares-Structural Equation Modeling. In Structural Equation Modeling-Partial Least Squares, two computational stages are required when the model includes complex dimensions

Figure 2 presents the outer loading results for the dimensions of Strategy, Organization, Culture, Technology, Customer, People, SCCF and SCCR. Convergent validity was evaluated through the correlation between indicators and their respective constructs, where loading values between 0.50 and 0.60 are considered acceptable, particularly in exploratory research (Ghozali & Latan, 2015). The results indicate that the second-order model demonstrates satisfactory convergent validity for Digital Transformation (DT), Supply Chain Competence (SCC), and Competitive Advantage (CA).

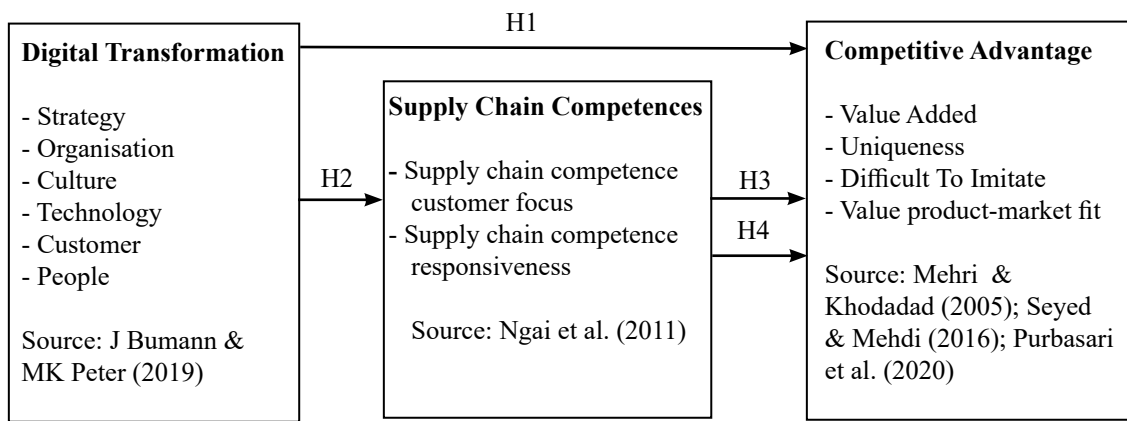


Figure 1. Research framework

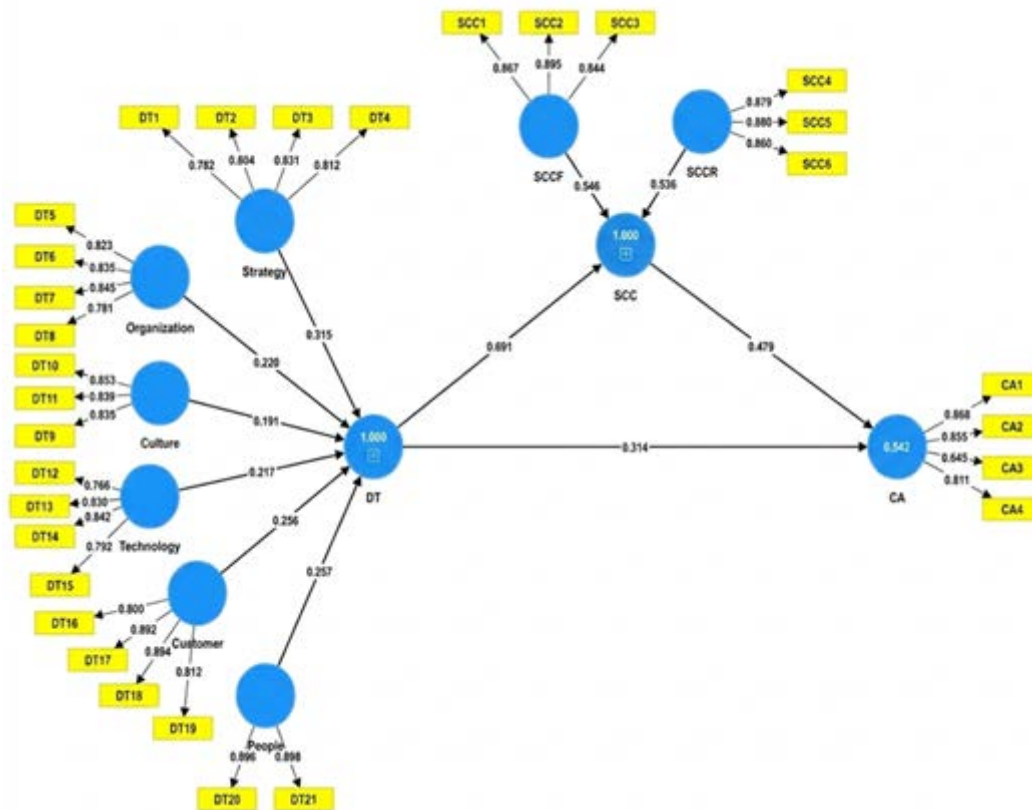


Figure 2. Results of first-order outer loading measurement

Table 2 reports the validity and reliability results for Competitive Advantage (CA), Digital Transformation (DT), and Supply Chain Competence (SCC). All variables exhibited Cronbach’s alpha values above 0.70, indicating strong internal consistency, with DT showing the highest reliability (0.905). The AVE values confirmed good convergent validity (above 0.50), with SCC demonstrating the strongest explanatory power (AVE = 0.851).

Table 3 presents the results of the Discriminant Validity measurement, which was carried out using the Fornell-Larcker criterion for the three main variables: Competitive Advantage (CA), Digital Transformation (DT), and Supply Chain Competence (SCC). The diagonal values (e.g., CA 0.799, DT 0.824, and SCC 0.923) represent the square root of the AVE, which must be greater than the inter-variable correlations (off-diagonal values) to indicate good discriminant validity.

Table 4 presents the R-Square and Adjusted R-Square measurement results for two variables, Competitive Advantage (CA) and Supply Chain Competence (SCC). The R-squared value indicates the extent to which the independent variables can explain the variability of the dependent variable. For CA, the obtained R-squared value of 0.540 signified that the independent variables in the model could explain 54% of the variability, suggesting a moderate to strong influence of the independent variables. Meanwhile, the adjusted R-squared value of 0.535 accounted for potential bias due to the number of independent variables used. This confirms that the explanatory power of the model is significant and reliable.

For the SCC variable, an R-squared value of 0,504 shows that 50.4% of the variability in supply chain competence was explained by the independent variables in the model. This indicates a strong and significant

relationship between the independent variables and SCC. Accordingly, the Adjusted R-Squared value of 0.501 reflects minimal correction from the R-squared value, suggesting that the number of independent variables did not significantly affect the model. For both CA and SCC, the R-squared and adjusted R-squared values essentially showed that the model had good predictive ability in explaining the measured constructs.

Table 5 presents the statistical test results for the DT construct's mediation effect on CA through SCC. According to the rule of thumb, a T-statistic greater than 1.96 shows significance at a 95% confidence level, while a P-value below 0.05 confirms a significant relationship. The mediation effect was highly statistically significant. These results confirmed that the SCC construct plays a highly effective mediating role in the relationship between DT and CA.

Table 2. Results of validity and reliability measurement

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Competitive Advantage (CA)	0.807	0.822	0.875	0.639
Digital Transformation (DT)	0.905	0.912	0.927	0.678
Supply Chain Competence (SCC)	0.825	0.825	0.920	0.851

Table 3. Discriminant validity measurement

	CA	DT	SCC
Competitive Advantage (CA)	0.799		
Digital Transformation (DT)	0.653	0.824	
Supply Chain Competence (SCC)	0.701	0.710	0.923

Table 4. Results of R-Square Measurement

	R-Square	Adjusted R-Square
Competitive Advantage (CA)	0.540	0.535
Supply Chain Competence (SCC)	0.504	0.501

Table 5. Statistical Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistics (O/STDEV)	P-values
DT → CA	0.314	0.314	0.075	4.159	0.000
DT → SCC	0.710	0.712	0.037	19.355	0.000
SCC → CA	0.478	0.480	0.073	6.535	0.000
DT → SCC → CA	0.339	0.342	0.058	5.822	0.000

Note: Competitive Advantage (CA); Digital Transformation (DT); Supply Chain Competence (SCC)

The findings highlight the strategic importance of integrating digital transformation (DT) and supply chain competence (SCC) to achieve competitive advantage (CA), particularly for SMEs in West Java, Indonesia. Grounded in the Resource-Based View (RBV), DT can be conceptualized as a valuable, rare, and imperfectly imitable resource that enables SMEs to develop heterogeneous capabilities (Barney, 1991). Furthermore, consistent with Dynamic Capability Theory (Teece et al. 1997), SCC represents a dynamic capability through which firms sense market opportunities, seize competitive advantages, and reconfigure supply chain resources in response to environmental turbulence. The significant DT→SCC→CA pathway confirms that digital resources alone are insufficient; rather, their competitive value is realized through the development and deployment of supply chain competencies as mediating dynamic capabilities. The adoption of digital tools, including Information and Communication Technology (ICT), enhances supply chain efficiency, responsiveness to demand fluctuations, and overall business performance (Sinaga et al. 2021). DT reshapes organizational processes and value delivery by streamlining operations, reducing costs, and strengthening customer engagement while increasing agility and flexibility in dynamic markets (Awonuga et al. 2024; Ghobakhloo & Iranmanesh, 2021). From a theoretical standpoint, the significant direct effect of DT on CA (H1: $T=4.159$, $p=0.000$) can be explained through the RBV lens, where digital resources constitute VRIN (Valuable, Rare, Inimitable, Non-substitutable) assets that generate sustained competitive differentiation. This finding extends prior DT–CA studies by confirming that even for resource-constrained SMEs in developing economies, strategic DT investment directly contributes to competitive positioning. Moreover, DT aligns organizational strategies toward superior performance and value creation through digital technologies, innovative business models and enhanced information access (Hess et al. 2016; Bumann & Peter, 2019). This is consistent with Sun et al. (2026), who demonstrated that digital transformation functions as a strategic resource under the RBV framework, with its effects mediated through organizational capabilities and process improvements. Integrating DT into supply chain management is critical for improving operational productivity and customer experience, which ultimately contributes to higher revenue generation (Manalu et al. 2023). Digitalization

strengthens the SCC by accelerating the design and execution processes and optimizing the form, time, and place values (Stank et al. 2019). Empirical evidence confirms that DT significantly influences SCC (H2) as digital technologies improve efficiency, data management, logistics flows, and customer value creation (Saberli et al. 2019). In competitive environments, the interaction between SCC and market intensity further shapes innovation outcomes among SMEs in West Java (Manalu et al. 2023).

SCC also functions as a strategic resource that enhances CA by integrating value-added activities into organizational operations (Pettersson & Segerstedt, 2013). The theoretical mechanism underlying this relationship can be attributed to the dynamic capabilities framework: SCC enables SMEs to sense market changes through customer focus and seize opportunities through supply chain responsiveness, thereby converting operational competencies into sustainable competitive outcomes. Effective supply chain management contributes to customer satisfaction, cost reduction, and sustainable strategic value (Elmuti et al. 2008), with empirical studies confirming the significant impact of SCC on CA (H3) (Pooe and Munyanyi, 2019). For SMEs, combining DT and SCC strengthens operational efficiency, customer experience, and revenue performance, thereby reinforcing their competitive position in dynamic markets (Parra-Sánchez et al. 2021; Rachmawati & Kristina, 2024).

Managerial Implication

Practitioner SME owners and managers should consider DT as a long-term strategic commitment and focus on creating specific digital roadmaps, advancing supply chain visibility, and developing digital skills for data-driven decision-making. SME managers can carry out digital integration of key components in their business operations, such as ordering raw materials and interacting with suppliers, so that they can respond quickly if they receive orders from consumers. Moreover, West Java's policymakers and local governments should be encouraged to offer financial incentives, enhance digital infrastructure, and foster digital public-private partnerships that streamline SMEs' access to digital supply chain technologies. Specifically, the following stakeholder-oriented strategic actions are recommended (Table 6).

Table 6. Strategic managerial implications for SME digital transformation

Stakeholder	Recommended Action	Expected Impact
SME owners	Invest in integrated digital supply chain platforms such as cloud-based ERP and e-procurement systems	Improve supply chain visibility and increase order fulfillment speed by approximately 15–25%
SME managers	Conduct regular digital competency and data analytics training for supply chain personnel	Enhance data-driven decision-making capabilities and operational responsiveness
Policymakers and local governments	Establish SME-focused digital transformation incubator programs and provide subsidized access to digital technologies	Accelerate SME digital adoption and reduce technological barriers for small businesses
Digital ecosystem stakeholders (technology providers and industry associations)	Develop affordable and scalable digital supply chain solutions tailored for SMEs	Increase accessibility and practical implementation of digital transformation initiatives among SMEs
Financial institutions	Provide low-interest financing schemes for SME digitalization projects	Improve SMEs' ability to invest in digital infrastructure and supply chain technologies

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In conclusion, the results of this study show a substantial relationship between DT and SCC in achieving sustained CA, particularly for SMEs in West Java. These findings confirm and extend prior DT and supply chain literature (Dubey et al. 2019; Stank et al. 2019; Shibin et al. 2020) by demonstrating that the DT–SCC–CA pathway is empirically valid in the context of developing country SME. While previous studies have predominantly examined these relationships in large firms within developed economies, the present findings provide novel evidence that even resource-constrained SMEs can leverage DT to build SCC as a dynamic capability for sustained CA. DT facilitates the adoption of innovative technologies, streamlines business processes, and enhances the ability to adapt to shifting market dynamics. Based on the observations, this transformative strategy improves operational efficiency and enables SMEs to harmonize their resources and capabilities effectively, resulting in enhanced customer experiences and a stronger competitive position. When SMEs incorporate digital technologies into their core activities, they become better prepared to adapt to the fast-changing digital landscape and strengthen their operational resilience.

This study further emphasized the essential role of SCC as a mediator in the relationship between DT and CA. Typically, SCC strengthens the capacity of SMEs to integrate and optimize their operations, manage resources efficiently, and provide value-added services to customers. This integration is particularly important

for building operational resilience, reducing costs, and enabling SMEs to capitalize on market opportunities more effectively. Furthermore, the combination of DT and a comprehensive supply chain management was observed to equip SMEs with a competitive edge that fosters both immediate benefits and long-term sustainability

Recommendations

Based on the study's findings, several strategic recommendations are proposed to strengthen SMEs' competitive advantage through the integrated adoption of digital transformation (DT) and supply chain capabilities (SCC). SME owners and managers should prioritize DT as a long-term strategic investment by developing clear digital roadmaps, improving supply chain visibility, and enhancing digital skills to support data-driven decision making. Policymakers and local governments in West Java are encouraged to provide financial incentives, strengthen digital infrastructure, and promote public–private partnerships that accelerate SMEs' access to digital supply chain tools. For future research, scholars should explore sectoral variations, examine the longitudinal effects of DT and SCC maturity, and investigate moderating factors such as environmental turbulence or digital leadership. Future studies should also employ mixed-method approaches to capture the qualitative nuances of DT implementation in SMEs and expand the geographical scope to enable cross-country comparisons within developing economies. Additionally, the inclusion of control variables such as firm age, industry type, and owner digital literacy would strengthen the generalizability of the integrated DT–SCC–CA model for future studies.

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