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DIGITAL STRATEGIC MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE: EXAMINING THE MODERATING INFLUENCE OF TECHNOLOGICAL INNOVATION AMONG MANUFACTURING FIRMS IN NIGERIA

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Abstract

Manufacturing firms in Lagos State, Nigeria, increasingly rely on digital strategic management practices (DSMP) to improve operational performance. However, the extent to which technological innovation influences the effectiveness of these digital practices remains unclear. This study examined the moderating role of technological innovation in the relationship between DSMP and operational performance among selected manufacturing firms. A quantitative survey design was employed, targeting 1,402 senior management staff across ten purposively selected listed manufacturing firms in Lagos State. A sample of 302 respondents was determined using the Krejcie and Morgan table, with 269 valid responses obtained, yielding an 89.1% return rate. Data were collected using a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to assess both direct and moderating effects of technological innovation. Findings indicated that DSMP had a significant positive effect on operational performance ($\beta = 0.277$, $T = 4.696$, $p < 0.001$). Among the dimensions of technological innovation, Innovation Capacity exerted a statistically significant negative moderating effect on the DSMP–operational performance relationship ($\beta = -0.160$, $T = 2.401$, $p = 0.016$), while Research and Development Investment showed a weak negative moderation ($\beta = -0.107$, $T = 1.861$, $p = 0.063$). Technological Absorptive Capacity and the aggregated Technological Innovation construct did not significantly moderate this relationship. Direct effects of technological innovation constructs were positive and significant, with the aggregated innovation construct showing the strongest direct effect on operational performance ($\beta = 0.331$, $T = 5.551$, $p < 0.001$). The model explained 21.4% of the variance in operational performance when technological innovation and interaction terms were included, indicating moderate explanatory power. The study concludes that while DSMP and technological innovation independently enhance operational performance, technological innovation does not universally strengthen the DSMP–performance relationship. It is recommended that firms strategically develop internal innovation capacity, aligning it with organisational goals to maximise operational gains from digital strategic initiatives.

Keywords: *Digital Strategic Management Practices, Technological Innovation, Innovation Capacity, Operational Performance, Manufacturing Firms, Moderation.*

1. Introduction

Manufacturing firms are increasingly operating in a business environment shaped by digital disruption, technological competition, rising production complexity and changing customer expectations. These pressures have made digital transformation a strategic necessity rather than a mere technological option. Across industrial sectors, firms are expected to integrate digital technologies into strategic planning, operational coordination, production systems and customer value delivery in order to remain competitive and improve performance outcomes (Canhoto et al., 2021; Rêgo et al., 2021; AlNuaimi et al., 2022). In this context, digital strategic management practices have become important because they allow organisations to align digital initiatives with corporate objectives, strengthen decision making, improve process integration and support operational responsiveness.

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For manufacturing firms, operational performance depends heavily on the capacity to improve productivity, reduce costs, maintain product quality, enhance profitability and respond quickly to market changes. Digital strategic management practices can support these outcomes through digital strategy alignment, digital leadership, IT infrastructure capabilities, technology integration and customer centred digital strategy (Peppard & Ward, 2016; Gobble, 2018; Grab et al., 2019; Maksimenko et al., 2021). However, the performance benefits of digital strategic management may not depend only on the adoption of digital practices. They may also depend on the innovative capacity of firms to generate new ideas, invest in research and development, absorb external technological knowledge and transform digital resources into operational value (Cui et al., 2025).

Technological innovation is therefore a critical issue in understanding how digital strategic management practices influence operational performance. It refers to the application of new or significantly improved technologies, processes or products to enhance organisational operations and competitiveness (Abdallah et al., 2016; Cui et al., 2025). In manufacturing firms, technological innovation may take the form of new production technologies, improved product development processes, research and development investment, knowledge absorption, automation, process redesign and the continuous improvement of technological systems. These innovation capabilities may strengthen the extent to which digital strategic management practices produce operational performance gains.

The relevance of technological innovation is particularly important in developing economies where manufacturing firms often operate under conditions of infrastructural constraint, limited technological readiness, high production cost and uneven access to advanced digital systems. In Nigeria, and particularly in Lagos State, manufacturing firms face the dual challenge of improving operational performance while adapting to rapid technological change. Lagos remains Nigeria's major industrial and commercial centre, but many manufacturing firms in the state still struggle with weak digital integration, inadequate technological capability, fragmented operational systems and limited strategic coordination between digital investments and performance objectives (Abiodun et al., 2023; Olumoh, 2023). These challenges raise a critical question about whether technological innovation strengthens or weakens the effect of digital strategic management practices on operational performance.

Existing studies have established that digital transformation and digital strategic management practices can improve firm performance, especially through improved technology integration, IT infrastructure capability, operational efficiency and customer responsiveness (Ribeiro-Navarrete et al., 2021; Manresa et al., 2021; Tian et al., 2023). However, there is limited empirical evidence on whether technological innovation changes the strength or direction of the relationship between digital strategic management practices and operational performance. The attached study notes that while technological innovation has been recognised as an important contributor to performance, limited attention has been given to its moderating role in the digital strategy and operational performance relationship among manufacturing firms, especially in Lagos State.

This gap is important because firms may adopt digital strategic management practices without achieving strong operational benefits if they lack innovation capacity, research and development capability or technological absorptive capacity. Conversely, firms with stronger technological innovation may be better positioned to convert digital strategies into improved productivity, product quality, profitability and operational responsiveness. Therefore, examining technological innovation as a moderating factor provides a deeper understanding of the conditions under which digital strategic management practices contribute to operational performance.

This study therefore assesses the moderating role of technological innovation in the relationship between digital strategic management practices and the operational performance of manufacturing firms in Lagos State, Nigeria. Specifically, it examines whether innovation capacity, research and development investment, technological absorptive capacity and the aggregated technological innovation construct strengthen or alter the relationship between digital strategic management practices and operational performance. The study is guided by the following research question: to what extent does technological innovation moderate the relationship between digital strategic management practices and operational performance among manufacturing firms in Lagos State?

The study contributes to knowledge by shifting attention from the direct effect of digital strategic management practices to the conditions that may influence the strength of that effect. It also provides evidence from a developing economy context where technological innovation may operate differently due to infrastructural limitations, resource constraints and varying levels of digital maturity. Practically, the study offers insights to manufacturing managers on how innovation capability, research investment and technological knowledge absorption can be aligned with digital strategic management practices to improve operational outcomes.

2. LITERATURE REVIEW

Conceptual Review

Digital strategic management practices refer to the deliberate integration of digital technologies into strategic planning, implementation, monitoring and control. They involve the use of digital tools, data driven systems, leadership capabilities, IT infrastructure and customer-oriented platforms to support organisational goals and improve performance outcomes (Peppard & Ward, 2016; Canhoto et al., 2021; Rêgo et al., 2021). In manufacturing firms, these practices are reflected in digital strategy alignment, digital leadership, IT infrastructure capabilities, technology integration and customer centred digital strategy. These dimensions support production

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coordination, real time decision making, process optimisation, product quality improvement and customer responsiveness.

Operational performance refers to the extent to which a firm achieves efficiency and effectiveness in its production, logistics and support functions. It covers outcomes such as profitability, operational efficiency, product quality, customer satisfaction and innovation performance (Dora et al., 2013; Wang et al., 2024). Within manufacturing firms, operational performance is central because it determines how well firms use resources, minimise waste, maintain quality standards and compete in dynamic markets. Digital strategic management practices are expected to improve these outcomes when digital systems are effectively embedded into operational routines and strategic decision making.

Technological innovation refers to the adoption, creation or application of new or significantly improved technologies, processes, products or systems that enhance organisational competitiveness (Abdallah et al., 2016; Cui et al., 2025). In this study, technological innovation is captured through innovation capacity, research and development investment and technological absorptive capacity. Innovation capacity refers to a firm's ability to generate new ideas, products and processes through technology. Research and development investment reflects the extent to which a firm commits resources to technological advancement and innovation activities. Technological absorptive capacity refers to the firm's ability to acquire, assimilate and apply external technological knowledge for operational improvement (Abdallah et al., 2016; Ahn et al., 2022; Zou et al., 2018; Ilmudeen & Bao, 2018; Faiz et al., 2024).

The moderating role of technological innovation implies that the effect of digital strategic management practices on operational performance may vary depending on a firm's level of innovation capability. Where technological innovation is strong, digital strategic management practices may translate more effectively into operational improvement because the firm possesses the capacity to experiment, adapt, absorb knowledge and improve technological systems. Where innovation capability is weak, digital strategic management practices may have limited performance effect because firms may lack the technical and organisational capacity to convert digital investments into measurable operational value.

Theoretical Framework

This study is anchored on Dynamic Capabilities Theory (Teece et al., 1997) and supported by the Resource-Based View (Wernerfelt, 1984; Barney, 1991). Dynamic Capabilities Theory explains how firms integrate, build, and reconfigure internal and external competencies in response to changing environments. It is particularly appropriate for this study, as digital transformation and technological innovation require firms to continually update technological systems, renew resources, and adapt operational routines to evolving market and technological conditions (Rêgo et al., 2021; AlNuaimi et al., 2022).

Within this study, Dynamic Capabilities Theory provides insight into how technological innovation influences the relationship between digital strategic management practices (DSMP) and operational performance. Digital strategic management practices provide a structured approach to aligning technologies with organisational goals, while technological innovation reflects a firm's ability to renew, adapt, and apply technological knowledge. Firms with stronger innovation capacity, research and development investments, and absorptive capacity are better positioned to translate digital strategic initiatives into operational gains (Mukhtar, Shad, & Lai, 2025; Ngugi et al., 2010; Ahn et al., 2022).

The Resource-Based View (RBV) also provides a complementary lens, arguing that valuable, rare, inimitable, and well-organised resources can enhance competitive advantage and performance (Barney, 1991; Wernerfelt, 1984). In this study, DSMP, IT infrastructure capabilities, technology integration, and technological innovation capabilities constitute strategic resources. The mere possession of these resources does not guarantee performance; value arises when resources are effectively deployed, integrated, and renewed through innovation capability (Emeh, 2024; Bogetoft et al., 2024).

Together, Dynamic Capabilities Theory and RBV explain the mechanisms through which digital resources enhance operational performance. While RBV highlights the importance of resource possession, Dynamic Capabilities Theory emphasises the reconfiguration of resources via innovation to respond to technological and market changes. This theoretical combination supports the expectation that technological innovation moderates the influence of DSMP on operational performance, allowing firms to improve efficiency, productivity, product quality, and customer satisfaction when digital and technological capabilities are strategically aligned and innovatively applied (Abdallah et al., 2016; Raymond et al., 2018; Mukhtar et al., 2025).

Empirical Review

Empirical studies have increasingly shown that digital strategic management practices influence operational performance by improving technological integration, strategic alignment, process coordination and decision making. Ribeiro-Navarrete et al. (2021) found that digitalisation enhances business performance by improving internal efficiency and responsiveness. Manresa et al. (2021) reported that new technologies and organisational practices contribute positively to operational performance among manufacturing firms. Similarly, Tian et al. (2023) established that digital transformation practices improve operations when they are embedded into organisational routines and operational processes. These studies suggest that digital strategic management practices can improve performance, but they do not fully explain the conditions under which such effects become stronger or weaker.

Technological innovation has also been widely associated with improved organisational and operational performance. Abdallah et al. (2016) argued that technological innovation enables firms to improve competitiveness by strengthening

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product development, process improvement and operational efficiency. Raymond et al. (2018) similarly found that integrated technological innovation systems enhance organisational performance by supporting flexibility, responsiveness and improved production outcomes. Mukhtar et al. (2025) further observed that research and development orientation strengthens organisational performance when it is integrated with broader innovation systems. These studies indicate that technological innovation is an important performance driver, especially in manufacturing firms that depend on process improvement and technological adaptation.

Innovation capacity is one dimension of technological innovation that may influence the relationship between digital strategic management practices and operational performance. Firms with stronger innovation capacity are more likely to generate new technological ideas, redesign processes, improve products and respond creatively to operational challenges. Ahn et al. (2022) linked innovation capacity to improved technological outcomes, while Abdallah et al. (2016) emphasised its role in strengthening competitiveness and organisational performance. In manufacturing firms, innovation capacity can make digital strategic management practices more effective by helping firms move beyond basic technology adoption towards continuous improvement and value creation.

Research and development investment is another important dimension of technological innovation. Firms that invest in research and development are better positioned to develop new processes, improve product quality and adapt technologies to operational needs. Zou et al. (2018) highlighted the importance of knowledge and innovation capability in strengthening performance outcomes, while Faiz et al. (2024) showed that digital technology adoption is influenced by innovation related capabilities. However, R&D investment may not always produce immediate performance gains, especially in contexts where firms face high implementation costs, weak infrastructure and limited commercialisation capacity. In such situations, R&D may initially increase cost and complexity before producing long term operational benefits.

Technological absorptive capacity also plays a significant role in innovation and performance. It reflects a firm's ability to acquire, assimilate and apply external technological knowledge. Ilmudeen and Bao (2018) and Abdallah et al. (2016) indicated that absorptive capacity enables firms to benefit from external knowledge and convert technological learning into organisational improvement. In manufacturing firms, absorptive capacity can help organisations adopt external technologies, adapt imported systems to local production realities and apply technical knowledge to improve operational outcomes. However, its moderating role may depend on the extent to which absorbed knowledge is effectively connected to digital strategic management practices and operational routines.

Although the existing literature supports the performance relevance of both digital strategic management practices and technological innovation, the moderating role of technological innovation remains underexplored. Many previous studies have examined technological innovation as a direct predictor of performance rather than as a factor that changes the strength of the relationship between digital strategy and operational outcomes. The attached document identifies this as a key empirical gap, noting that limited evidence exists on how technological innovation moderates the relationship between digital strategic management practices and operational performance among manufacturing firms in Lagos State.

This gap is important because technological innovation may not always strengthen digital strategy outcomes in the same way across different contexts. In firms with strong innovation systems, digital strategic management practices may produce stronger operational benefits because innovation capabilities help translate digital initiatives into improved processes, products and decision making. In firms with weak innovation systems, the effect may be limited because digital strategies may not be supported by sufficient experimentation, learning, research investment or technological knowledge absorption. Therefore, the relationship between digital strategic management practices and operational performance requires closer examination through the lens of technological innovation.

In line with the objective of this study, the following null hypothesis is tested:

H_{O3}: Technological innovation does not significantly moderate the relationship between digital strategic management practices and the operational performance of manufacturing firms in Lagos State.

This study adds to knowledge by examining technological innovation not only as a direct organisational capability but also as a possible moderator of the relationship between digital strategic management practices and operational performance. By focusing on manufacturing firms in Lagos State, it provides context specific evidence on whether innovation capacity, research and development investment and technological absorptive capacity strengthen the operational value of digital strategic management practices in a developing economy.

3. METHODS

This study employed a quantitative survey research design to assess the moderating role of technological innovation on the relationship between digital strategic management practices (DSMP) and operational performance in manufacturing firms in Lagos State, Nigeria. A cross-sectional approach was adopted to capture data from respondents at a single point in time, allowing for the evaluation of both the direct and moderating effects of technological innovation on operational outcomes. Lagos State was selected due to its strategic importance as Nigeria's industrial hub and its high concentration of manufacturing firms across subsectors such as food and beverages, pharmaceuticals, building materials,

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electronics, and chemical/plastic products (Olumoh, 2023; Abiodun et al., 2023).

The population consisted of 1,402 senior management staff across ten purposively selected listed manufacturing firms in Lagos State: Nestlé Nigeria Plc, Nigerian Breweries Plc, Unilever Nigeria Plc, Cadbury Nigeria Plc, Flour Mills Nigeria Plc, Dangote Cement Plc, Lafarge Africa Plc, Berger Paints Plc, Neimeth Plc, and Fidson Healthcare Plc. Senior management staff were selected because of their involvement in strategic decision-making, operational oversight, and digital strategy implementation. Managing Directors were excluded due to accessibility constraints. A sample of 302 respondents was determined using the Krejcie and Morgan (1970) table, and the sample was proportionally allocated across firms. A multi-stage sampling technique was used: purposive selection of firms, stratification of senior management categories (General Managers, Principal Managers, Senior Managers), and random selection of respondents within each stratum.

Primary data were collected using a structured questionnaire, which included sections on demographics, digital strategic management practices, operational performance, and technological innovation. DSMP was measured through five dimensions: digital strategy alignment, digital leadership, IT infrastructure capabilities, technology integration, and customer-centric digital strategy (Canhoto et al., 2021; Rêgo et al., 2021; AlNuaimi et al., 2022). Operational performance was measured via profitability and product quality. Technological innovation, the moderator, was captured through innovation capacity, research and development investment, and technological absorptive capacity (Abdallah et al., 2016; Ahn et al., 2022; Faiz et al., 2024). All items were rated on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

The model for testing the moderating effect was specified as:

$$\text{Operational Performance} = \beta_0 + \beta_1\text{DSMP} + \beta_2\text{TI} + \beta_3(\text{DSMP} \times \text{TI}) + \varepsilon$$

where Operational Performance is the dependent variable, DSMP is the independent variable, TI represents technological innovation, (DSMP × TI) is the interaction term capturing the moderation effect, β_0 is the constant, β_1–β_3 are path coefficients, and ε is the error term. The null hypothesis tested was: *Technological innovation does not significantly moderate the relationship between digital strategic management practices and operational performance among manufacturing firms in Lagos State*.

Descriptive statistics (frequencies, percentages, means, standard deviations) were used to summarise respondent characteristics. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to analyse the measurement and structural models, evaluate the moderation effect, and assess the significance of path coefficients through bootstrapping. Measurement model assessment included indicator relevance, loadings, and multicollinearity using Variance Inflation Factor (VIF). Significance was assessed at $\alpha = 0.05$. SPSS was used for descriptive analyses, and SmartPLS was used for SEM analysis.

Ethical procedures were strictly observed. Participation was voluntary, respondents were informed about the purpose of the study, and anonymity and confidentiality were maintained. Data were reported in aggregate to prevent identification of individuals or firms, and respondents could skip items if desired.

4. RESULTS AND DISCUSSION

4.1 Response Rate of Questionnaire

A total of 302 questionnaires were administered to respondents selected from manufacturing firms in Lagos State, Nigeria. As presented in Table 4.1, 269 questionnaires were properly completed, returned, and found suitable for analysis, accounting for 89.1% of the total number distributed. The remaining questionnaires were either not retrieved or were improperly completed and were therefore excluded from the analysis.

The response rate of 89.1% is regarded as exceptionally high within the context of behavioural and management research. According to Moser and Kalton (2017), a response rate ranging from 30% to 40% is generally considered adequate for conducting reliable statistical analyses and making valid generalisations. Consequently, the response rate achieved in this study is considered sufficiently robust to support the attainment of the study objectives and the testing of the formulated hypotheses. In addition, the high retrieval rate reflects a strong level of participation among respondents and indicates that the subject of digital strategic management practices was of considerable relevance and interest to manufacturing firms operating in the evolving digital business landscape of Lagos State.

4.1 Response Rate of Questionnaire

Table 4.1: Response Rate of Questionnaire

Item	Frequency	Percentage (%)
Distributed Questionnaires	302	100
Returned Questionnaires and Used	269	89.1
Unreturned/Invalid Questionnaires	33	10.9
Total	**302**	**100**

Source: Researcher's Field Report (2026)

4.2 Demographic Characteristics of Respondents

Table 4.2 presents the demographic characteristics of the respondents involved in the study. The age distribution shows that the majority of respondents (61.0%) were between 40 and 50 years of age, while 27.9% fell within the 30 to 40 years category. Respondents aged between 50 and 60 years constituted 6.3% of the sample, whereas those below 30 years represented 4.5%. Only 0.4% of the respondents were aged above 60 years. This age profile indicates that most participants were mature professionals with considerable

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industry and managerial experience. As a result, the information provided by the respondents is likely to be reliable and reflective of practical realities regarding digital strategic management practices and operational performance in manufacturing firms.

The gender distribution revealed that 84.0% of the respondents were male, while females accounted for 16.0%. This finding suggests a strong male dominance in managerial and operational positions within the manufacturing sector in Lagos State. It further implies that key organisational decisions relating to strategy formulation, operational management, and digital transformation are predominantly influenced by male professionals within the sector.

Regarding educational qualifications, 43.1% of the respondents possessed BSc, BEng, or BTech degrees, while 27.1% held Higher National Diploma qualifications. Respondents with Master's degrees constituted 24.5% of the sample, whereas 3.7% possessed doctoral degrees. Only 1.5% had ND or NCE qualifications. The findings demonstrate that the respondents were largely well educated, suggesting that they possessed the intellectual capacity and professional competence required to provide informed responses on issues relating to digital strategic management and organisational performance. The high proportion of respondents with tertiary and postgraduate qualifications also reflects the importance placed on skilled human capital within manufacturing organisations.

The results relating to years of work experience indicate that 65.1% of the respondents had between 11 and 15 years of professional experience. Those with 16 to 20 years of experience accounted for 19.0%, while 12.3% had worked between 5 and 10 years. Respondents with less than 5 years of experience and those with more than 20 years of experience each represented 1.9% of the sample. This distribution suggests that the majority of participants had acquired substantial professional experience and practical exposure to organisational operations, strategic decision making, and digital transformation activities. Consequently, their responses are expected to provide credible insights into the issues investigated in the study.

Analysis of organisational size showed that 83.6% of the respondents were drawn from large manufacturing firms employing 200 workers and above. Small scale organisations accounted for 12.6%, while medium sized firms represented only 3.7% of the sample. This finding indicates that large manufacturing organisations dominated the study. Such organisations are generally more likely to possess the financial resources, technological infrastructure, and managerial capabilities required for the implementation of sophisticated digital strategies. The result therefore suggests that the adoption of digital strategic management practices may be more pronounced among larger manufacturing firms.

The distribution of respondents across manufacturing subsectors revealed that food and beverage firms constituted the largest category, accounting for 58.7% of the sample. This was followed by building materials firms with 20.1% and pharmaceutical firms with 12.3%. Chemical and plastic firms represented 4.5%, while electrical and electronics firms accounted for 3.7%. Textile and garment firms constituted the smallest proportion at 0.7%. These findings indicate that the food and beverage subsector remains the most dominant segment of manufacturing activity within Lagos State and may be among the leading adopters of digital strategic management practices within the sector.

With respect to ownership structure, 58.7% of the organisations were indigenous or Nigerian owned, while foreign owned firms accounted for 37.9%. Joint venture organisations represented 3.3% of the sample. This pattern suggests that local ownership continues to dominate manufacturing activities in Lagos State. However, the substantial proportion of foreign owned firms indicates the presence of significant international participation within the sector, which may facilitate the transfer of advanced managerial practices, technological expertise, and digital innovations.

The findings also revealed that 88.1% of the respondents indicated that their organisations currently implement digital strategies in their operations, while only 11.9% reported otherwise. This result points to a high level of digital strategy adoption among manufacturing firms in the study area. It further suggests that digital transformation has become an important component of organisational operations and strategic management practices within the manufacturing sector.

Furthermore, the analysis of respondents' organisational positions showed that Sales and Marketing Managers constituted the largest group, representing 44.2% of the respondents. Human Resource Managers accounted for 24.9%, while Research and Development Managers and Production Managers represented 14.1% and 13.8%, respectively. Accounting Managers constituted 1.9%, whereas Managing Directors accounted for 1.1% of the sample. This distribution indicates that the study captured the perspectives of individuals occupying key managerial and decision-making positions within their organisations. Consequently, the responses obtained are considered both relevant and dependable for evaluating the influence of digital strategic management practices on operational performance among manufacturing firms in Lagos State.

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Table 4.2: Demographic Characteristics of Respondents (n = 269)

Variable	Category	Frequency (n)	Percent (%)
Age Group	Less than 30 years	12	4.5
	30 to 40 years	75	27.9
	40 to 50 years	164	61.0
	50 to 60 years	17	6.3
	60 years and above	1	0.4
Total		269	100
Gender	Male	226	84.0
	Female	43	16.0
Total		269	100
Educational Level	ND/NCE	4	1.5
	HND	73	27.1
	BSc/BEng/BTech	116	43.1
	Master's Degree	66	24.5
	PhD	10	3.7
Total		269	100
Years of Experience	Less than 5 years	5	1.9
	5 to 10 years	33	12.3
	11 to 15 years	175	65.1
	16 to 20 years	51	19.0
	More than 20 years	5	1.9
Total		269	100
Size of Organisation	Small, less than 50 employees	34	12.6
	Medium, 50 to 199 employees	10	3.7
	Large, 200 employees and above	225	83.6
Total		269	100
Sector/Sub sector of Manufacturing	Food and Beverages	158	58.7
	Textile and Garments	2	0.7
	Pharmaceuticals	33	12.3
	Building Materials	54	20.1
	Electrical/Electronics	10	3.7
	Chemical/Plastic	12	4.5
Total		269	100
Ownership Structure	Indigenous/Nigerian Owned	158	58.7
	Foreign Owned	102	37.9
	Joint Venture	9	3.3

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Total		269	100
Digital Strategy Implementation	Yes	237	88.1
	No	32	11.9
Total		269	100
Current Position in the Firm	Managing Director	3	1.1
	Production Manager	37	13.8
	Accounting Manager	5	1.9
	Human Resource Manager	67	24.9
	Sales and Marketing Manager	119	44.2
	Research and Development Manager	38	14.1
Total		269	100

Source: Researcher's Field Report (2026)

4.3 Moderating role of technological innovation in the relationship between digital strategic management practices and the operational performance of manufacturing firms

4.3.1 Measurement model for moderating role of technological innovation in the relationship between digital strategic management practices and the operational performance of manufacturing firms

In order to ascertain the quality and suitability of the data for examining the moderating role of technological innovation in the relationship between digital strategic management practices and the operational performance of manufacturing firms, the study conducted a formative measurement model assessment using the PLS-SEM algorithm. The formative measurement model focused on evaluating the relevance and significance of the indicators, as well as examining the Variance Inflation Factor (VIF) values for all indicators, in line with the recommendations of Hair et al. (2017; 2019; 2021). The constructs assessed in this objective comprised IT Infrastructure Capabilities (bITIC), Technology Integration (bTI), Profitability (dP), Product Quality (dPQ), Innovation Capacity (eIC), Research and Development Investment (eRDI), and Technological Absorptive Capacity (eTAC). These constructs were measured using formative indicators as presented in Table 4.3 and Figure 4.1.

Following the established procedure for formatively measured constructs, the study first examined the significance of the weights associated with each indicator. Indicators with statistically significant weights were regarded as Relatively Important (RI) because they contributed meaningfully to explaining their respective constructs. However, where the indicator weights were not statistically significant, the study considered the indicator loadings. Indicators with loadings above the acceptable threshold of 0.50 were regarded as Absolutely Important (AI), indicating that despite the non-significant weights, they still contributed substantially to the construct. Indicators that satisfied either of these conditions were retained for further structural path analysis. The study further assessed multicollinearity among the formative indicators using the Variance Inflation Factor (VIF). According to Hair et al. (2017), VIF values below 5.0 indicate the absence of problematic multicollinearity. As shown in Table 4.3, all indicators recorded acceptable VIF values ranging from 1.043 to 1.262, thereby confirming that multicollinearity was not a concern within the formative measurement model.

For the construct IT Infrastructure Capabilities (bITIC), two indicators were retained in the model. The indicator bITIC2 recorded a weight of 0.406 with a T-statistic of 1.700 and a p-value of 0.089, indicating that the weight was not statistically significant at the 95% confidence level. However, its loading of 0.576 was statistically significant, with a T-statistic of 2.689 and a p-value of 0.007, which exceeded the acceptable threshold of 0.50.

Table 4.3: Relevance and Significance of Digital Strategic Management Practices, Technological Innovation and the Operational Performance

Path	Weights	T stat	P values	Loadings	T stat	P values	VIF	Decision
bITIC2 -> bITIC	0.406	1.700	0.089	0.576	2.689	0.007	1.043	AI
bITIC4 -> bITIC	0.835	5.210	0.000	0.918	7.772	0.000	1.043	RI
bTI1_rev -> bTI	0.596	2.238	0.025	0.321	1.198	0.231	1.232	RI
bTI2 -> bTI	0.763	2.701	0.007	0.605	2.299	0.022	1.262	RI

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bTI4 -> bTI	0.509	1.854	0.064	0.681	2.870	0.004	1.056	AI
dP2 -> dP	0.732	2.640	0.008	0.884	4.131	0.000	1.106	RI
dP4 -> dP	0.492	1.560	0.119	0.718	2.776	0.006	1.106	AI
dPQ2 -> dPQ	0.821	7.822	0.000	0.933	15.195	0.000	1.097	RI
dPQ4 -> dPQ	0.376	2.408	0.016	0.621	4.565	0.000	1.097	RI
eIC1 -> eIC	0.714	3.750	0.000	0.703	3.885	0.000	1.057	RI
eIC2 -> eIC	0.416	2.215	0.027	0.602	3.465	0.001	1.067	RI
eIC3_r -> eIC	0.467	2.360	0.018	0.335	1.617	0.106	1.162	RI
eIC4 -> eIC	0.395	2.060	0.039	0.231	1.220	0.223	1.102	RI
eRDI2 -> eRDI	0.832	4.141	0.000	0.921	5.995	0.000	1.053	RI
eRDI4 -> eRDI	0.399	1.377	0.168	0.586	2.267	0.023	1.053	AI
eTAC2 -> eTAC	0.595	4.281	0.000	0.738	6.710	0.000	1.044	RI
eTAC4 -> eTAC	0.690	5.297	0.000	0.813	7.579	0.000	1.044	RI

Source: Researcher's Field report (2026)

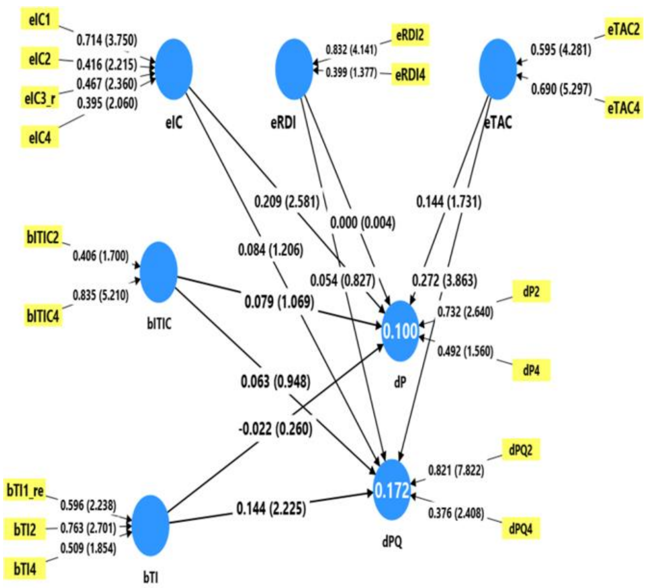

Figure 4.1: Measurement Model for Digital Strategic Management Practices, Technological Innovation and the Operational Performance

Consequently, the indicator was adjudged as Absolutely Important (AI) and retained in the model. On the other hand, bITIC4 demonstrated a highly significant weight of 0.835, with a T-statistic of 5.210 and a p-value of 0.000, alongside a strong loading of 0.918. The indicator was therefore classified as Relatively Important (RI). The VIF values for both indicators were 1.043, confirming the absence of multicollinearity problems within the construct.

The construct Technology Integration (bTI) also exhibited satisfactory formative measurement properties. The indicator bTI1_rev showed a significant weight of 0.596, with a T-statistic of 2.238 and a p-value of 0.025, thereby qualifying as Relatively Important (RI), despite its relatively low loading of 0.321. Similarly, bTI2 recorded a significant weight of 0.763, with a T-statistic of 2.701 and a p-value of 0.007, while its loading of 0.605 was also statistically significant. Consequently, the indicator was classified as Relatively Important (RI). The indicator bTI4, however, recorded a weight of 0.509 with a T-statistic of 1.854 and a p-value of 0.064, indicating non-significance at the 95% confidence level. Nevertheless, its loading of 0.681 exceeded the threshold of 0.50 and was statistically significant, with a T-statistic of 2.870 and a p-value of 0.004. As a result, the indicator was retained as Absolutely Important (AI). The VIF values for the Technology Integration indicators ranged between 1.056 and 1.262, indicating that multicollinearity was not an issue.

With respect to the operational performance construct measured through Profitability (dP), the indicator dP2 recorded a statistically significant weight of 0.732, with a T-statistic of 2.640 and a p-value of 0.008. Its loading was also high at 0.884, confirming its strong contribution to the construct. Consequently, the indicator was adjudged as Relatively Important (RI). The second indicator, dP4, had a non-significant weight of 0.492 with a T-statistic of 1.560 and a p-value of 0.119. However, its loading of 0.718 was statistically significant with a T-statistic of 2.776 and a p-value of 0.006, thereby exceeding the required threshold. It was therefore retained as Absolutely Important (AI). The VIF values for both indicators were 1.106, indicating satisfactory collinearity statistics.

For the Product Quality (dPQ) construct, both indicators demonstrated strong formative relevance. The indicator dPQ2 exhibited a highly significant weight of 0.821, with a T-statistic of 7.822 and a p-value of 0.000, while its loading was also very high at 0.933. Consequently, the indicator was classified as Relatively Important (RI). Similarly, dPQ4 recorded a significant weight of 0.376, with a T-statistic of 2.408 and a p-value of 0.016, alongside a loading of 0.621. The indicator was therefore retained as Relatively Important

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(RI). The VIF values for both indicators were 1.097, indicating that the construct was free from multicollinearity concerns.

The technological innovation dimensions also exhibited acceptable formative measurement properties. For Innovation Capacity (eIC), all four indicators demonstrated statistically significant weights and were therefore adjudged as Relatively Important (RI). Specifically, eIC1 recorded a weight of 0.714, with a T-statistic of 3.750 and a p-value of 0.000, while its loading was 0.703. The indicator eIC2 recorded a weight of 0.416, with a T-statistic of 2.215 and a p-value of 0.027, alongside a loading of 0.602. Similarly, eIC3_r showed a significant weight of 0.467, with a T-statistic of 2.360 and a p-value of 0.018, although its loading was relatively low at 0.335. In the same manner, eIC4 recorded a significant weight of 0.395, with a T-statistic of 2.060 and a p-value of 0.039, despite its loading of 0.231. Since the weights of these indicators were statistically significant, all were retained as Relatively Important (RI), in accordance with formative measurement principles. The VIF values for the Innovation Capacity indicators ranged from 1.057 to 1.162, thereby confirming the absence of multicollinearity issues.

For the Research and Development Investment (eRDI) construct, the indicator eRDI2 recorded a highly significant weight of 0.832, with a T-statistic of 4.141 and a p-value of 0.000, alongside a loading of 0.921. The indicator was therefore classified as Relatively Important (RI). Conversely, eRDI4 recorded a non-significant weight of 0.399, with a T-statistic of 1.377 and a p-value of 0.168. However, its loading of 0.586 was statistically significant, with a T-statistic of 2.267 and a p-value of 0.023. Consequently, the indicator was retained as Absolutely Important (AI). Both indicators recorded VIF values of 1.053, indicating no multicollinearity concern.

The construct Technological Absorptive Capacity (eTAC) also demonstrated strong formative properties. The indicator eTAC2 exhibited a significant weight of 0.595, with a T-statistic of 4.281 and a p-value of 0.000, while its loading was 0.738. Similarly, eTAC4 recorded a significant weight of 0.690, with a T-statistic of 5.297 and a p-value of 0.000, alongside a loading of 0.813. Both indicators were therefore adjudged as Relatively Important (RI). Their VIF values of 1.044 further confirmed that multicollinearity was not problematic.

Overall, the formative measurement model presented in Table 4.3 and Figure 4.1 demonstrates satisfactory indicator relevance, significance, and collinearity statistics. Out of the seventeen indicators retained across the seven constructs, the majority recorded statistically significant weights and were classified as Relatively Important (RI), while the remaining indicators demonstrated sufficiently high loadings and were therefore retained as Absolutely Important (AI). Importantly, all VIF values were substantially below the threshold of 5.0 recommended by Hair et al. (2017), confirming that multicollinearity was not a concern within the formative measurement model. Other constructs such as Digital strategy alignment, digital leadership, customer-centric digital strategy, operational efficiency and customer satisfaction were removed from the model as a result of insignificant weight and poor outer loading.

Consequently, the study was satisfied that all retained indicators possessed adequate formative relevance and significance, thereby justifying their retention for subsequent structural path analysis relating to the moderating role of technological innovation in the relationship between digital strategic management practices and operational performance of manufacturing firms in Lagos State.

4.3.2Structural Path Analysis for moderating role of technological innovation

The moderation models examining the role of technological innovation in the relationship between digital strategic management practices (DSMPs) and operational performance were estimated after the formative measurement model was found satisfactory. The structural results are presented in Tables 4.4–4.7 and graphically illustrated in Figures 4.2–4.9. The interpretation follows conventional PLS-SEM thresholds recommended by Hair et al. (2017; 2019; 2021) and Adepoju et al. (2023; 2025) where T-statistics greater than 1.96 and p-values less than or equal to 0.05 indicate statistical significance at the 95% confidence level, while T-statistics above 1.65 with p-values below 0.10 indicate moderate or marginal significance at the 90% confidence level. The explanatory power of the moderation models is interpreted using Cohen's (1992) benchmarks for R^2 values, where 0.26 indicates substantial explanatory power, 0.13 indicates moderate explanatory power, and 0.02 indicates weak explanatory power. Similarly, the effect sizes (f^2) are interpreted using Cohen's thresholds of 0.02, 0.15, and 0.35 for small, medium, and large effects respectively.

Beginning with collinearity diagnostics, the Variance Inflation Factor (VIF) values reported across Tables 4.4–4.7 range between 1.032 and 1.182. These values are substantially below the conservative thresholds of 3.0 or 5.0 recommended in the PLS-SEM literature, thereby indicating that multicollinearity is not a concern in any of the moderation models. Consequently, the path coefficients and interaction effects can be interpreted reliably without fear of coefficient inflation or instability.

Table 4.4 and Figures 4.2–4.3 present the moderation analysis involving Innovation Capacity (eIC). The results show that digital strategic management practices exert a positive and highly significant direct effect on operational performance ($\beta = 0.277$, T = 4.696, $p < 0.001$).

This indicates that higher levels of digital strategic management practices are associated with improved operational performance among manufacturing firms in Lagos State. The effect size associated with this relationship ($f^2 = 0.088$) falls within the small-to-moderate range, suggesting that DSMPs make a meaningful contribution to explaining operational performance.

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Innovation Capacity also demonstrates a positive and statistically significant direct effect on operational performance (β = 0.175, T = 2.890, p = 0.004). This implies that firms possessing stronger innovation capabilities independently experience better operational outcomes. However, the most notable finding in this model is the interaction effect between Innovation Capacity and DSMPs. The interaction term (eIC × b_DSMPs -> dOP_OPER_PERF) is negative and statistically significant (β = -0.160, T = 2.401, p = 0.016). This indicates that Innovation Capacity negatively moderates the relationship between DSMPs and operational performance.

Table 4.4: Moderation Analysis with Innovation Capacity

Path	Beta	STD	T stat	P values	f-square	VIF
b_DSMPs -> dOP_OPER_PERF	0.277	0.059	4.696	0.000	0.088	1.067
eIC -> dOP_OPER_PERF	0.175	0.061	2.890	0.004	0.033	1.134
eIC x b_DSMPs -> dOP_OPER_PERF	-0.160	0.067	2.401	0.016	0.040	1.066
R-Square with Mod IC	0.187					
R-Square without Mod IC	0.109					

Source: Researcher's Field Report (2026)

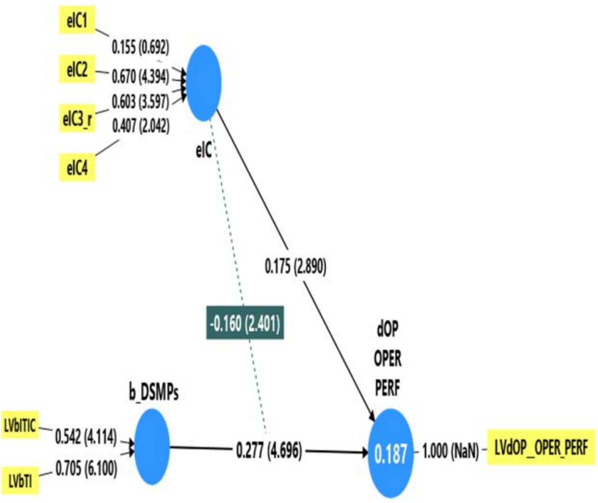

Figure 4.2: Moderation Analysis with Innovation Capacity

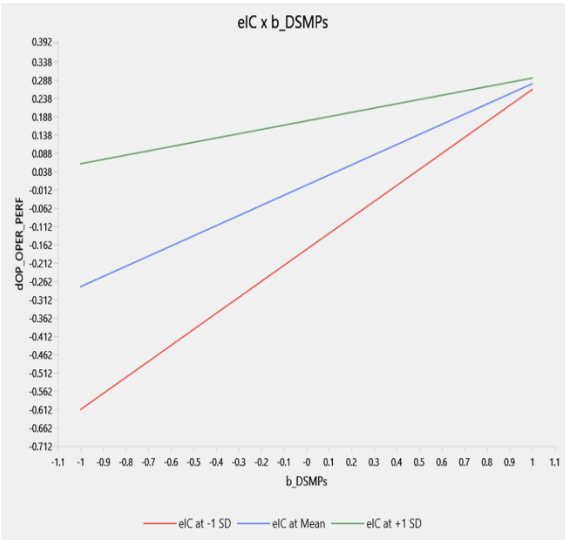

Figure 4.3: Slope Analysis with Innovation Capacity

In practical terms, although both DSMPs and Innovation Capacity independently improve operational performance, higher levels of Innovation Capacity reduce the strength of the positive relationship between DSMPs and operational performance. The effect size of the interaction term (f^2 = 0.040) indicates a small but meaningful moderation effect.

The explanatory power of the model also improves with the inclusion of the moderator. Specifically, the R^2 value increases from 0.109 without moderation to 0.187 with Innovation Capacity included in the model. This means that the model explains approximately 18.7% of the variance in operational performance when Innovation Capacity and the interaction term are considered. Using Cohen's (1992) benchmark, this represents a moderate level of explanatory power. The increase in R^2 further confirms that Innovation Capacity contributes additional explanatory value to the relationship between DSMPs and operational performance.

The slope analysis presented in Figure 4.3 further buttresses the moderation result. The slope lines indicate that operational performance improves with increasing levels of DSMPs at all levels of Innovation Capacity. However, the slope becomes flatter at higher levels of Innovation Capacity, confirming the negative moderation effect. This suggests that firms with very high innovation capacity may derive comparatively smaller incremental operational gains from additional digital strategic management practices than firms with lower innovation capacity. The graphical pattern aligns with the negative interaction coefficient reported in Table 4.4.

Table 4.5 and Figures 4.4–4.5 present the moderation analysis involving Research and Development Investment (eRDI). Similar to the previous model, DSMPs maintain a positive and highly significant direct effect on operational performance (β = 0.287, T = 4.991, p < 0.001), with a small-to-moderate effect size (f^2 = 0.097). This confirms the robustness of the positive

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Table 4.5: Moderation Analysis with R&D Investment

Path	Beta	STD	T stat	P values	f-square	VIF
b_DSMPs -> dOP_OPER_PERF	0.287	0.058	4.991	0.000	0.097	1.033
eRDI -> dOP_OPER_PERF	0.208	0.053	3.900	0.000	0.049	1.068
eRDI x b_DSMPs -> dOP_OPER_PERF	-0.107	0.057	1.861	0.063	0.014	1.038
R-Square with Mod RDI	0.172					
R-Square without Mod RDI	0.109					

Source: Researcher's Field Report (2026)

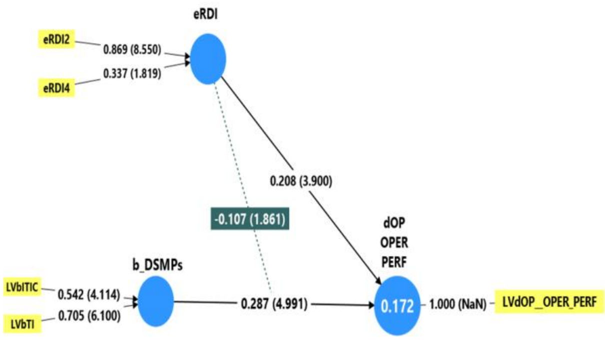

Figure 4.4: Moderation Analysis with R&D Investment

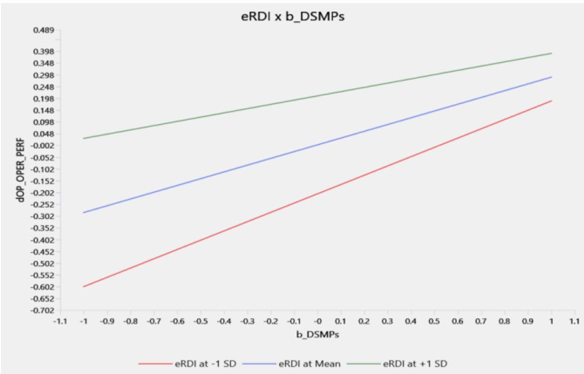

Figure 4.5: Slope Analysis with R&D Investment contribution of digital strategic management practices to operational performance across the moderation specifications.

Research and Development Investment also exerts a positive and statistically significant direct effect on operational performance ($\beta = 0.208$, T = 3.900, $p < 0.001$), indicating that firms investing more heavily in R&D activities tend to achieve superior operational outcomes. The effect size of eRDI ($f^2 = 0.049$) is small but practically meaningful.

The interaction term involving R&D Investment and DSMPs (eRDI × b_DSMPs -> dOP_OPER_PERF) is negative and marginally significant ($\beta = -0.107$, T = 1.861, p = 0.063). Following Hair et al. (2017), this interaction does not achieve significance at the strict 95% confidence level but may be interpreted as moderately significant at the 90% confidence level. The result therefore suggests weak evidence of a negative moderating role of R&D Investment in the relationship between DSMPs and operational performance. The effect size associated with the interaction term ($f^2 = 0.014$) is very small, indicating that the practical influence of the moderation effect is limited.

The explanatory power of the model improves from $R^2 = 0.109$ without moderation to $R^2 = 0.172$ with moderation included. This means that approximately 17.2% of the variance in operational performance is explained when R&D Investment and the interaction term are incorporated into the model. By Cohen's standards, this constitutes a moderate explanatory level, although still below the threshold for substantial explanatory power.

The slope analysis in Figure 4.5 visually supports the statistical findings. The slopes remain positively inclined, confirming that DSMPs enhance operational performance regardless of the level of R&D Investment. However, the lines become slightly less steep at higher levels of R&D Investment, indicating that the positive effect of DSMPs on operational performance weakens marginally as R&D Investment increases. Nevertheless, the interaction effect is weak, and the lines remain relatively close to one another, which visually reflects the small effect size observed in Table 4.5.

Table 4.6 and Figures 4.6–4.7 present the moderation analysis involving Technological Absorptive Capacity (eTAC). The direct effect of DSMPs on operational performance remains positive and highly significant ($\beta = 0.246$, T = 3.957, $p < 0.001$), with a small effect size ($f^2 = 0.068$). Likewise, Technological Absorptive Capacity demonstrates a positive and highly significant direct effect on operational performance ($\beta = 0.288$, T = 4.824, $p < 0.001$), with a small-to-moderate effect size ($f^2 = 0.092$). This indicates that firms possessing stronger abilities to identify, assimilate, and apply technological knowledge tend to achieve higher operational performance.

However, unlike the previous moderation models, the interaction term between Technological Absorptive Capacity and DSMPs is statistically non-significant ($\beta = -0.003$, T = 0.045, p = 0.964). The coefficient is extremely close to zero, and the associated effect size ($f^2 = 0.000$) indicates virtually no moderation effect. This finding suggests that Technological Absorptive Capacity does not alter the strength

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or direction of the relationship between DSMPs and operational performance. Rather, eTAC contributes independently to operational performance without significantly interacting with DSMPs.

The R^2 value increases from 0.109 without moderation to 0.185 with moderation included, indicating that the model explains 18.5% of the variance in operational performance.

Table 4.6: Moderation Analysis with Technological ACAP

Path	Beta	STD	T stat	P values	f-square	VIF
b_DSMPs -> dOP_OPER_PERF	0.246	0.062	3.957	0.000	0.068	1.101
eTAC -> dOP_OPER_PERF	0.288	0.060	4.824	0.000	0.092	1.108
eTAC x b_DSMPs -> dOP_OPER_PERF	-0.003	0.069	0.045	0.964	0.000	1.032
R-Square with Mod TAC	0.185					
R-Square without Mod TAC	0.109					

Source: Researcher's Field Report (2026)

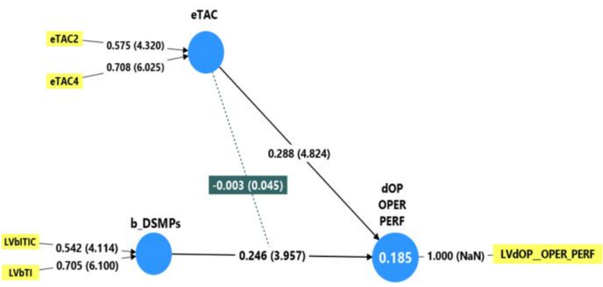

Figure 4.6: Moderation Analysis with Technological ACAP

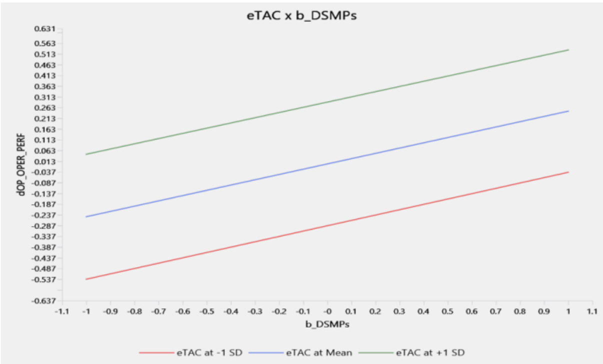

Figure 4.7: Slope Analysis with TAC

Although this reflects a moderate explanatory level, the improvement in explanatory power appears to stem primarily from the direct contribution of Technological Absorptive Capacity rather than from any meaningful interaction effect.

The slope analysis in Figure 4.7 further confirms the absence of moderation. The slope lines are almost perfectly parallel, indicating that the relationship between DSMPs and operational performance remains largely unchanged regardless of the level of Technological Absorptive Capacity. This graphical evidence is entirely consistent with the near-zero interaction coefficient and non-significant moderation effect reported in Table 4.6.

Table 4.7 and Figures 4.8–4.9 present the aggregated moderation analysis involving the higher-order Technological Innovation construct (eTECH_INNOV). The results indicate that DSMPs continue to exert a positive and statistically significant direct effect on operational performance (β = 0.216, T = 3.442, p = 0.001), with a small effect size (f^2 = 0.052). More importantly, Technological Innovation demonstrates the strongest direct effect among all the innovation constructs examined (β = 0.331, T = 5.551, $p < 0.001$), with an effect size of $f^2 = 0.118$, which approaches the medium-effect threshold. This indicates that overall technological innovation capability is a particularly important determinant of operational performance in manufacturing firms.

Nevertheless, the interaction term between Technological Innovation and DSMPs (eTECH_INNOV × b_DSMPs -> dOP_OPER_PERF) is statistically non-significant (β = -0.037, T = 0.588, p = 0.556). The associated effect size (f^2 = 0.002) is negligible, indicating that the aggregated Technological Innovation construct does not significantly moderate the relationship between DSMPs and operational performance.

Table 4.7: Moderation Analysis with Technological Innovation

Path	Beta	STD	T stat	P values	f-square	VIF
b_DSMPs -> dOP_OPER_PERF	0.216	0.063	3.442	0.001	0.052	1.126
eTECH_INNOV -> dOP_OPER_PERF	0.331	0.060	5.551	0.000	0.118	1.182
eTECH_INNOV x b_DSMPs -> dOP_OPER_PERF	-0.037	0.063	0.588	0.556	0.002	1.067
R-Square with Mod Tech Innov	0.214					
R-Square without Mod Tech Innov	0.109					

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Source: Researcher's Field Report (2026)

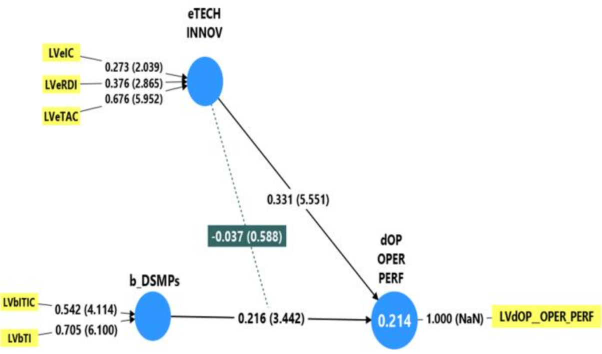

Figure 4.8: Moderation Analysis with Technological Innovation

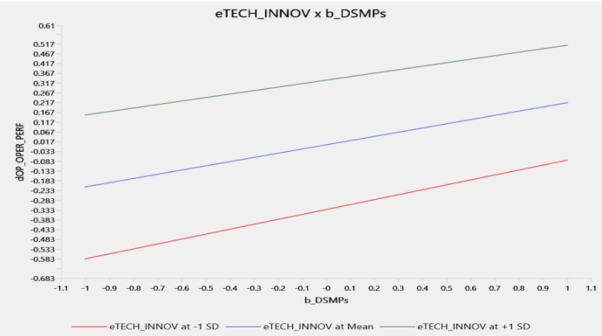

Figure 4.9: Slope Analysis with Technological Innovation

The R^2 value increases from 0.109 without moderation to 0.214 with moderation included, indicating that the model explains approximately 21.4% of the variance in operational performance. According to Cohen's (1992) benchmarks, this represents a moderate level of explanatory power and is the highest explanatory value among the four moderation models. However, the increase in R^2 is attributable primarily to the strong direct contribution of Technological Innovation rather than to the interaction effect itself.

The slope analysis presented in Figure 4.9 visually corroborates these findings. The slopes remain positively inclined across all levels of technological innovation, demonstrating that DSMPs consistently improve operational performance irrespective of innovation intensity. The lines are nearly parallel, indicating minimal moderation. Thus, technological innovation appears to enhance operational performance directly rather than altering the strength of the DSMPs–performance relationship.

In sum, the moderation analyses reported in Tables 4.4–4.7 and Figures 4.2–4.9 reveal a consistent pattern. Digital strategic management practices and technological innovation constructs independently exert positive and statistically significant effects on operational performance across all models. Innovation Capacity demonstrates a statistically significant but negative moderation effect, while R&D Investment shows a weak negative moderation effect that is only marginally significant. By contrast, Technological Absorptive Capacity and the aggregated Technological Innovation construct do not significantly moderate the DSMPs–operational performance relationship. Overall, the findings suggest that technological innovation contributes more strongly as a direct driver of operational performance than as a moderator of the relationship between digital strategic management practices and operational performance in manufacturing firms in Lagos State.

Discussion of Findings

The findings from the moderation analyses generally reinforce the growing body of literature which argues that digital strategic management practices and technological innovation are critical drivers of operational performance in manufacturing organisations. Across the four moderation models, digital strategic management practices consistently demonstrated positive effects on operational performance, thereby supporting earlier empirical studies that established the importance of digital systems, process integration, and strategic technology alignment in improving productivity, efficiency, responsiveness, and quality outcomes within manufacturing firms.

The positive contribution of digital strategic management practices to operational performance is strongly consistent with the study of Abdallah et al. (2016), who found that technological innovation and integrated digital systems improved operational responsiveness and customer satisfaction in manufacturing firms. The present findings similarly indicate that firms adopting stronger digital strategic management practices tend to achieve better operational outcomes. This also aligns with Ilmudeen and Bao (2018), who argued that effective management of digital and technological resources contributes significantly to organisational performance. The current study extends these earlier studies by demonstrating that the relationship remains robust even when various dimensions of technological innovation are introduced into the model.

The findings further reveal that technological innovation dimensions independently contribute positively to operational performance. This outcome supports the argument of Ahn et al. (2022), who emphasised that technological capabilities and R&D infrastructure are essential drivers of innovation outcomes and organisational competitiveness. Similarly, Mukhtar et al. (2025) concluded that innovation capabilities, technological investments, and absorptive capacity improve operational and sustainability performance in manufacturing organisations. The current study corroborates these assertions by showing that innovation-related capabilities remain highly valuable operational assets within the context of manufacturing firms in Lagos State.

More specifically, the positive role of Innovation Capacity in enhancing operational performance supports the work of Ngugi et al. (2010), who argued that firms with stronger innovation-oriented capabilities are better positioned to generate value and improve organisational outcomes. Although their study focused more on relational capabilities and co-creation, the present findings similarly suggest that firms capable of developing and implementing innovative solutions are more likely to achieve improved operational

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performance. The result also aligns with Raymond et al. (2018), who demonstrated that combinations of IT capabilities and strategic alignment significantly influence innovation and organisational outcomes.

However, while Innovation Capacity independently enhances operational performance, the present study found that it weakens the relationship between digital strategic management practices and operational performance. This finding introduces an important nuance into the technological innovation literature. Whereas previous studies generally viewed innovation capability as a performance enhancer, the current result suggests that very high levels of innovation activity may create implementation complexities, experimentation costs, or strategic disruptions that reduce the incremental operational benefits derived from digital strategic management practices. This finding partly diverges from Mukhtar et al. (2025), who conceptualised innovation capabilities primarily as performance multipliers. The present study therefore contributes a contextual insight that innovation intensity may not always strengthen digital strategy outcomes automatically, particularly within developing manufacturing environments characterised by infrastructural limitations and resource constraints.

This outcome may also be explained by the realities of emerging economies where innovation initiatives frequently require substantial organisational adjustments, retraining, and resource commitments. Under such circumstances, innovation activities may initially compete with operational stability and efficiency objectives. In this regard, the findings indirectly support the position of Capozza and Divella (2019), who argued that innovation success in emerging economies depends heavily on workforce capability, managerial readiness, and contextual alignment rather than technological investment alone.

The findings relating to R&D Investment also provide important insights. The positive direct contribution of R&D investment to operational performance supports the argument of Ahn et al. (2022) that investment in technological infrastructure and research capability enhances firm competitiveness and innovative outcomes. The result further aligns with Mukhtar, Shad, and Lai (2025), who found that R&D orientation strengthens organisational performance when integrated effectively with broader innovation systems. The implication from the current study is that manufacturing firms that invest in research and development activities are more likely to improve operational processes, adaptability, and productivity.

Nevertheless, the weak negative moderation effect associated with R&D Investment suggests that increased R&D expenditure does not necessarily strengthen the positive influence of digital strategic management practices on operational performance. This finding slightly differs from earlier studies conducted in technologically advanced contexts where R&D investment was often associated with stronger innovation-performance relationships. The divergence may reflect the operational realities of manufacturing firms in Lagos State, where R&D investments may not yet be sufficiently mature, strategically coordinated, or commercially integrated to produce immediate complementary gains alongside digital strategic management practices. Instead, R&D initiatives may initially increase operational costs, experimentation demands, and organisational complexity before long-term benefits materialise.

The findings concerning Technological Absorptive Capacity are also noteworthy. The positive direct effect of absorptive capacity on operational performance strongly supports the meta-analytical conclusions of Zou et al. (2018), who established absorptive capacity as a critical determinant of innovation and performance outcomes. The present study similarly demonstrates that firms with stronger abilities to acquire, assimilate, and apply external technological knowledge achieve superior operational performance. This further reinforces the Resource-Based View, which regards knowledge acquisition and utilisation capabilities as valuable strategic resources capable of generating competitive advantage.

However, the study found that Technological Absorptive Capacity does not significantly moderate the relationship between digital strategic management practices and operational performance. This suggests that absorptive capacity contributes independently to operational performance rather than strengthening or weakening the DSMPs and operational performance relationship itself. In this regard, the findings refine existing literature by indicating that absorptive capacity may function more effectively as a direct organisational capability than as an interaction mechanism within digital strategic contexts.

Similarly, the aggregated Technological Innovation construct exerted a strong direct effect on operational performance, thereby supporting prior studies that emphasised the strategic importance of technological innovation in manufacturing competitiveness. This outcome is highly consistent with Abdallah et al. (2016), Mukhtar et al. (2025), and Raymond et al. (2018), all of whom argued that integrated technological innovation systems improve organisational performance. The present study further demonstrates that technological innovation has substantial operational relevance even within manufacturing firms operating in resource-constrained environments such as Lagos State.

Nonetheless, the absence of a significant moderation effect from the aggregated Technological Innovation construct suggests that technological innovation primarily functions as an independent driver of operational performance rather than as a mechanism that substantially alters the strength of the relationship between digital strategic management practices and operational performance. This finding differs slightly from studies which framed innovation capabilities as amplifiers of strategic performance relationships. The current study therefore contributes to the literature by suggesting that technological innovation may yield greater value through its direct operational contributions rather than through interaction effects.

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The slope analyses presented in Figures 4.3, 4.5, 4.7, and 4.9 visually reinforce these conclusions. Across the moderation models, operational performance consistently improves as digital strategic management practices increase, regardless of the level of technological innovation. However, the slope patterns indicate that technological innovation dimensions alter the relationship only minimally. In particular, the nearly parallel slopes observed for Technological Absorptive Capacity and aggregated Technological Innovation visually confirm that these constructs function more as independent performance drivers than as strong moderators.

Overall, the findings suggest that technological innovation contributes more significantly through its direct enhancement of operational systems, processes, and capabilities than through modifying the effectiveness of digital strategic management practices. This enriches the technological innovation literature by demonstrating that innovation capabilities do not automatically strengthen digital strategy-performance relationships in all contexts. Rather, the effectiveness of technological innovation depends heavily on contextual readiness, strategic coordination, managerial integration, and the broader operational environment within which innovation activities are implemented.

Implication of Findings

The implication of these findings is that manufacturing firms in Lagos State should not assume that increased innovation activities alone will necessarily amplify the operational benefits of digital strategic management practices. Instead, firms should prioritise the strategic alignment and coordinated implementation of innovation initiatives with existing operational systems and organisational capabilities. The findings suggest that technological innovation is most valuable when embedded practically into operational routines and supported by effective managerial coordination rather than pursued as an isolated strategic activity.

The indicator-level evidence presented in Figure 4.1 further reinforces this implication. Indicators relating to R&D investment intensity, effective application of acquired technological knowledge, and cross-departmental technological integration emerged as particularly influential within the innovation constructs. This suggests that firms derive stronger operational benefits when innovation activities are integrated into organisational workflows, employee competencies, and decision-making systems. In practical terms, managers should focus on building innovation systems that complement operational efficiency objectives rather than introducing innovation initiatives that create excessive experimentation costs or implementation disruptions.

Overall, the findings imply that technological innovation remains an important determinant of operational performance, but its primary value lies in strengthening firms' internal capabilities directly rather than substantially modifying the influence of digital strategic management practices on operational outcomes.

Hypothesis Three Testing

H_{O3}: Technological innovation does not significantly moderate the relationship between digital strategic management practices and the operational performance of manufacturing firms in Lagos State.

The moderation analysis showed that Innovation Capacity significantly moderated the relationship between digital strategic management practices and operational performance ($\beta = -0.160$, $p = 0.016$), while other dimensions of technological innovation showed weak or insignificant moderating effects. Since a significant moderation effect was established, the null hypothesis was rejected. Therefore, the study concludes that technological innovation significantly moderates the relationship between digital strategic management practices and operational performance among manufacturing firms in Lagos State, Nigeria.

Conclusion and Recommendations

The findings from this study show that technological innovation exerts a conditional moderating influence on the relationship between digital strategic management practices and operational performance. Although the moderation effect varied across dimensions, Innovation Capacity demonstrated a statistically significant moderating effect, while Research and Development Investment showed only a weak influence and Technological Absorptive Capacity was not significant. This suggests that technological innovation alone may not automatically strengthen the benefits of digital strategic management practices unless firms possess the capability to effectively generate, integrate, and utilise innovation for operational purposes. Consequently, the effectiveness of digital strategic management practices may be enhanced when innovation capacity is strategically developed and aligned with organisational goals.

Based on the findings and conclusions of this study, the study recommends that manufacturing firms should strengthen organisational innovation capacity to maximise the performance benefits of digital strategic management practices. Since Innovation Capacity was the only dimension of technological innovation that significantly moderated the relationship between digital strategic management practices and operational performance, firms should establish structures that promote creativity, experimentation, and the generation of innovative ideas. Management should support internal innovation initiatives, encourage knowledge sharing, and provide adequate resources for innovation driven projects capable of enhancing operational effectiveness.

This study was limited to selected listed manufacturing firms in Lagos State and relied on cross-sectional survey data obtained from senior management staff. As a result, the findings reflect the digital strategic management, technological innovation and operational performance conditions of the sampled firms at a particular point in time and may not fully capture long-term changes in innovation capability or digital transformation maturity. Further studies should adopt longitudinal designs to examine how technological innovation influences the digital strategy-

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performance relationship over time. Future research may also extend the scope to non-listed manufacturing firms, small and medium-scale enterprises, and other industrial clusters in Nigeria to provide broader comparative evidence on how innovation capacity, research and development investment, and technological absorptive capacity shape operational performance outcomes.

References

1. Abdallah, A. B., Phan, A. C., & Matsui, Y. (2016). Investigating the effects of managerial and technological innovations on operational performance and customer satisfaction of manufacturing companies. *International Journal of Business Innovation and Research, 10*(2–3), 153–183.
2. Abiodun, T., Rampersad, G., & Brinkworth, R. (2023). Driving industrial digital transformation. *Journal of Computer Information Systems, 63*(6), 1345–1361.
3. Adepoju, A., Ekundayo, K., & Oladiipo, A. (2023). Household energy conservation behaviour: A socio-economic perspective. *Journal of Digital Food, Energy & Water Systems, 4*(1).
4. Adepoju, A. O., Ekundayo, K. J., Aladejebi, O. A., Abasilim, A. N., Jesuleye, O. A., & Oyetunji, S. A. (2025). Energy conservation behaviour and sufficiency among university hostel students: An exploratory study. *Global Journal of Energy and Sustainable Systems, 2*(2), 37–58.
5. Ahn, S., Kim, K. S., & Lee, K. H. (2022). Technological capabilities, entrepreneurship and innovation of technology-based start-ups: The resource-based view. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(3), 156.
6. AlNuaimi, B. K., Singh, S. K., Ren, S., Budhwar, P., & Vorobyev, D. (2022). Mastering digital transformation: The nexus between leadership, agility, and digital strategy. *Journal of Business Research, 145*, 636–648.
7. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.
8. Bogetoft, P., Kroman, L., Smilgins, A., & Sørensen, A. (2024). Innovation strategies and firm performance. *Journal of Productivity Analysis, 62*(2), 175–196.
9. Canhoto, A. I., Quinton, S., Pera, R., Molinillo, S., & Simkin, L. (2021). Digital strategy aligning in SMEs: A dynamic capabilities perspective. *The Journal of Strategic Information Systems, 30*(3), 101682.
10. Capozza, C., & Divella, M. (2019). Human capital and firms' innovation: Evidence from emerging economies. *Economics of Innovation and New Technology, 28*(7), 741–757.
11. Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.
12. Cui, J., Wan, Q., & Shin, S. (2025). Human-AI integration and sound-vibration technology-driven enterprise digital transformation: The mediating role of technological innovation. *Sound & Vibration, 59*(1).
13. Dora, M., Kumar, M., Van Goubergen, D., Molnar, A., & Gellynck, X. (2013). Operational performance and critical success factors of lean manufacturing in European food processing SMEs. *Trends in Food Science & Technology, 31*(2), 156–164.
14. Emeh, N. C. (2024). Effect of digital operations management on organizational sustainability in South East Nigeria. *European Journal of Marketing and Management Sciences, 7*(2), 31–46.
15. Faiz, F., Le, V., & Masli, E. K. (2024). Determinants of digital technology adoption in innovative SMEs. *Journal of Innovation & Knowledge, 9*(4), 100610.
16. Gobble, M. M. (2018). Digital strategy and digital transformation. *Research-Technology Management, 61*(5), 66–71.
17. Grab, B., Olaru, M., & Gavril, R. M. (2019). The impact of digital transformation on strategic business management. *Ecoforum Journal, 8*(1).
18. Hair, J. F., Jr., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107–123.
19. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24.
20. Hair, J. F., Astrachan, C. B., Moisescu, O. I., Radomir, L., Sarstedt, M., Vaithilingam, S., & Ringle, C. M. (2021). Executing and interpreting applications of PLS-SEM: Updates for family business researchers. *Journal of Family Business Strategy, 12*(3), 100392.
21. Ilmudeen, A., & Bao, Y. (2018). Mediating role of managing information technology and its impact on firm performance: Insight from China. *Industrial Management & Data Systems, 118*(4), 912–929.
22. Krejcie, R. V., & Morgan, D. W. (1970). Sample size determination table. *Educational and Psychological Measurement, 30*(3), 607–610.
23. Maksimenko, I., Vashko, T., & Zdrestova-Zakharenkova, S. (2021). Digital transformation and its challenges to the strategic management system. In *SHS Web of Conferences* (Vol. 106, Article 01035). EDP Sciences.
24. Manresa, A., Bikfalvi, A., & Simon, A. (2021). Investigating the impact of new technologies and organizational practices on operational performance: Evidence from Spanish manufacturing companies. *Central European Journal of Operations Research, 29*(4), 1317–1327.

*Corresponding Author: **Aribisala, O. A.**

25. Moser, C. A., & Kalton, G. (2017). *Survey methods in social investigation*. Routledge.
26. Mukhtar, B., Shad, M. K., & Lai, F. W. (2025). Fostering sustainability performance in the Malaysian manufacturing companies: The role of green technology innovation and innovation capabilities. *Benchmarking: An International Journal, 32*(3), 992–1016.
27. Ngugi, I. K., Johnsen, R. E., & Erdélyi, P. (2010). Relational capabilities for value co-creation and innovation in SMEs. *Journal of Small Business and Enterprise Development, 17*(2), 260–278.
28. Olumoh, Y. A. (2023). Strategic management accounting, digitalization of accounting practices, and performance among consumer goods firms in Lagos State. *Malete Journal of Accounting and Finance, 5*(1), 45–60.
29. Peppard, J., & Ward, J. (2016). *The strategic management of information systems: Building a digital strategy*. John Wiley & Sons.
30. Raymond, L., Uwizeyemungu, S., Fabi, B., & St-Pierre, J. (2018). IT capabilities for product innovation in SMEs: A configurational approach. *Information Technology and Management, 19*(1), 75–87.
31. Rêgo, B. S., Jayantilal, S., Ferreira, J. J., & Carayannis, E. G. (2021). Digital transformation and strategic management: A systematic review of the literature. *Journal of the Knowledge Economy*, 1–28.
32. Ribeiro-Navarrete, S., Botella-Carrubi, D., Palacios-Marqués, D., & Orero-Blat, M. (2021). The effect of digitalization on business performance: An applied study of KIBS. *Journal of Business Research, 126*, 319–326.
33. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7%3C509::AID MJ882%3E3.0.CO;2-Z
34. Tian, M., Chen, Y., Tian, G., Huang, W., & Hu, C. (2023). The role of digital transformation practices in the operations improvement in manufacturing firms: A practice-based view. *International Journal of Production Economics, 262*, 108929.
35. Wang, C. N., Yang, F. C., Vo, N., Duong, C. T., & Nguyen, V. T. T. (2024). Enhancing operational efficiency in industrial systems: A DEA-grey integration. *IEEE Access, 12*, 58532–58550.
36. Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180.
37. Zou, T., Ertug, G., & George, G. (2018). The capacity to innovate: A meta-analysis of absorptive capacity. *Innovation, 20*(2), 87–121.

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