



Adapting to Thrive: Operation Management Capabilities and Flexibility Effects on Procurement Performance among Manufacturing Firms in Ghana

Joseph Kwasi AGBEKA¹, Bismark Stephen KUMAH², Mawuli SENANU³, Sampson AFRIFA JNR⁴

¹ Department of Marketing and Supply Chain, Evangelical Presbyterian University College, HP 678, Ho, GH;  joseph.agbeka@epuc.edu.gh

² Department of Finance, Ghana Grid Company Limited, Off Aflao Road, Tema, Accra, GH;  markstev05@gmail.com

³ Department of Supply Chain, Ho Teaching Hospital, Ho - Denu Road, Ho GH;  gilmakings@gmail.com

⁴ Department of Research, Ikern Institute for Tax Policy and Research, 10 Lilongwe Avenue East Legon, MD1132 Madina, Accra, GH;  profafrika21@gmail.com (corresponding author)

Abstract: This study examined the direct and moderating relationships between operational management capabilities, specifically process efficiency capability, process integration capability, operational flexibility and procurement performance among manufacturing firms in Ghana. The study adopted a quantitative cross-sectional survey design. A total of three hundred and fifty (350) procurement officials from fifty (50) manufacturing firms were selected for the study. Stratified and purposive sampling techniques were used in the selection of manufacturing firms and procurement officials, respectively. Questionnaires were used in the data collection, and data were analyzed using Partial Least Squares (PLS) Structural Equation Modelling (SEM). For direct effects, the study showed that a non-significant positive relationship exists between process integration capability and procurement performance. However, a significant positive relationship was found to exist between process efficiency capability and procurement performance. The study also found that operational flexibility does not moderate the relationship between process integration capability and procurement performance. Meanwhile, operational flexibility negatively moderates the relationship between process efficiency capability and procurement performance among manufacturing firms in Ghana. The results of the study highlight the importance of developing robust process efficiency capabilities for improved procurement outcomes, while also suggesting a careful balance in operational flexibility initiatives to avoid inefficiencies among manufacturing firms. The study contributes to the dynamic capabilities theory and provides practical implications for manufacturing firms seeking to optimize their procurement strategies.

Keywords: strategic capability; process efficiency capability; process integration capability; strategic flexibility; procurement performance; manufacturing firms.

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Introduction

In Ghana, the manufacturing sector remains key in the economic development as it provides employment, brings in foreign exchange and is a contribution towards industrialisation (Appiah et al., 2023). With increasing competition in markets worldwide, many firms in Ghana are concerned with effective procurement strategies to improve their operational performance (Afum et al., 2021). According to Lysons and Farrington (2020), procurement, which includes the activities of sourcing and purchasing of products and services, is a key component which has direct consequences on the performance of manufacturing enterprises (Zimmermann et al., 2020). In this regard, firms' operational management capabilities, which refer to a firm's ability to effectively manage, coordinate,

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and continuously improve its core operational activities to deliver products or services efficiently, reliably, and at the desired quality level are of great significance in improving the performance of procurement (Zimmerman et al., 2020). There are two distinct, but related, measures of operational management capabilities, namely process efficiency capability (Swink & Schoenherr, 2015) and process integration capability (Rajaguru & Matanda, 2019). According to Sousa, Rodrigues, and Nunes (2018), process efficiency capability comprises the ability of firms to rationalize their procurement processes, cut costs, and enhance operational efficiency through better usage of resources. However, process integration capability emphasises the smooth linkage of different functions in the supply chain, such as sourcing and logistics, and inventory, which foster cooperation and sharing of information among participants (Ahmadi & Letter, 2021). Researchers have argued that process efficiency and process integration capabilities are critical for enabling manufacturing firms to adopt best practices which are aimed at enhancing procurement performance by improving available workflows, lead times as well as supplier contact relations (Bag et al., 2020; Butt, 2020). Inasmuch as existing literature has established a link between operations management capabilities and procurement performance (Agbeka, Quagraine, & Kabalan, 2024; Bag et al., 2020; Hallikas, Immonen, & Brax, 2021; Ivanov et al., 2021), the specific dynamics of this relationship in the context of procurement performance among manufacturing firms in Ghana have not been thoroughly explored (Zhu & Sweeney, 2019). Moreover, there is limited empirical evidence regarding the moderating role of operational flexibility on the relationship between operational management capabilities and procurement performance among firms (Amoako-Gyampah, Boakye, Adaku, & Famiyeh, 2019).

In the competitive and dynamic manufacturing sector of Ghana, companies face a myriad of issues such as volatile raw material prices, supply chain reliability, and government regulation changes (Ndone, 2023). Our study argues that due to the dynamics of Ghana's manufacturing sector (Ndone, 2023), it is imperative for manufacturing companies that seek to survive in the competitive environment of Ghana's economy to understand how operational flexibility interacts with operation management capabilities specifically, process efficiency and process integration capabilities to influence procurement performance. Despite the impact of operation management capabilities on procurement performance by manufacturing firms (Brandon-Jones & Knoppen, 2018; Calderón et al., 2018; Cappelletti et al., 2023; Loijas et al., 2024), a key gap that is of concern to this study is to examine the interplay between these operation management capabilities, operational flexibility and procurement performance among manufacturing firms in Ghana.

This gap is particularly relevant given the distinct difficulties that manufacturing firms in Ghana encounter. This is because the Ghanaian manufacturing sector is beset by considerable uncertainty due to the volatility of the economy and the unpredictability of the supply chain disruptions (Hamidu, Boachie-Mensah, & Issau, 2023). Our study argues that the difficulties encountered by manufacturing firms gives the implication that manufacturing firms that possess high operation management capabilities, particularly in process efficiency and process integration, but low on operational flexibility, might not perform optimally in their procurement performance (Chaudhuri, Boer, & Taran, 2018). Meanwhile, manufacturing firms with low levels of operational capability but high levels of operational flexibility may also perform well in their procurement processes (Wagner, Grosse-Ruyken, & Erhun, 2018). This complexity further exacerbates the existing gap identified in understanding how process efficiency and process integration capability, and operational flexibility affect the procurement performance. Our study, therefore, seeks to achieve the following objectives:

1. To examine the effect of process efficiency capability on procurement performance among manufacturing firms in Ghana.
2. To examine the effect of process integration capability on procurement performance among manufacturing firms in Ghana.
3. To examine the moderating role of operational flexibility on the relationship between operational management capabilities (process efficiency, process integration) on procurement performance among manufacturing firms in Ghana.

The structure of this paper is as follows: after the introductory section, the second part reviews existing literature, focusing on theoretical and empirical studies that bridge the gap between theory and practice. The third part presents the research context and outlines the methodology used in this study. Following that, the fourth part delves into the analysis and findings. The discussion and implications are explored in the fifth section. Finally, the conclusion highlights key insights, recommendations, future research directions, and the limitations of the study

Literature review

The underlying theories: Dynamic Capabilities Theory

Dynamic Capabilities Theory (DCT) was prominently developed by David Teece, Gary Pisano, and Amy Shuen in the late 1990s (Teece, Pisano, & Shuen, 1997). Teece introduced the dynamic capabilities theory, emphasizing how organizations must integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Jorde & Teece, 1990). Subsequent work by Pisano and Shuen expanded the theory, highlighting the importance of learning, innovation, and organizational processes in adapting to change (Pisano, 1994; Shuen & Sieber, 2009). The foundational idea of the DCT is that firms need to develop capabilities that enable them to respond to and shape market dynamics effectively (Bleady, Ali, & Ibrahim, 2018). The core tenets of the DCT revolve around the organization's ability to sense opportunities and threats, seize opportunities, and reconfigure resources to achieve competitive advantage (Teece, 2018). The theory posits that organizations must first sense emerging opportunities and threats in the market environment, requiring keen market intelligence and proactive analysis (Pisano, 2015). Once opportunities are identified, firms must seize them through innovation and strategic actions, often requiring the reallocation of resources (Gremme & Wohlgemuth, 2017). Finally, organizations need to continuously reconfigure their resources and capabilities to adapt to changing circumstances, ensuring long-term sustainability and competitiveness (Pisano, 2015; Teece, 2018).

While DCT has gained significant traction, it has faced criticism. Critics argue that the dynamic capabilities theory lacks empirical support and often relies on anecdotal evidence rather than systematic analysis (Wang, Senaratne, & Rafiq, 2015). Additionally, the concepts of dynamic capabilities can be seen as vague and difficult to operationalize, making it challenging for researchers to measure and test the theory effectively (Wilden, Devinney, & Dowling, 2016). Moreover, some scholars contend that DCT may overlook the role of existing capabilities and routines in achieving competitive advantage, suggesting a need for a more balanced view that includes both dynamic and operational capabilities (Liu, Guo, Han, Gavurova, Bresciani, & Wang, 2024).

Despite the criticisms levelled against the DCT, it provides a strong framework to understand the direct relationship between operation management capabilities, specifically process integration capability and process efficiency capability and procurement performance among manufacturing firms in Ghana. This is because process integration capability allows firms to seamlessly coordinate and align their procurement activities with their overall operational strategies. This aligns with the DCT, which asserts that the ability to integrate processes effectively can help organizations sense market changes and adjust their procurement strategies accordingly, leading to improved procurement performance. Similarly, process efficiency capability emphasizes optimizing procurement processes to minimize costs and maximize output quality. In this regard, by leveraging dynamic capabilities, firms can enhance their efficiency in procurement, allowing them to respond quickly to supplier changes and market demands. Operational flexibility acts as a crucial moderator in this relationship as it refers to a firm's ability to adapt its operations in response to changing environments. In a dynamic market, manufacturing firms that possess strong operational flexibility can better utilize their

process integration and efficiency capabilities to enhance procurement performance. This operational flexibility allows organizations to adjust their procurement strategies, relationships with suppliers, and inventory management processes based on real-time data and changing market conditions.

Operation management capabilities

Operational management capabilities refer to a firm's ability to effectively design, control, and improve its internal processes to produce goods or services efficiently and at the desired quality (Domenek, Moori, & Bitorino Filho, 2022). These capabilities encompass areas such as resource allocation, process optimisation, quality control, supply chain coordination, and technological integration (Saragih, Tarigan, Pratama, Wardati, & Silalahi, 2020). In the context of manufacturing firms in Ghana, operational management capabilities are crucial for enhancing competitiveness in a dynamic and often resource-constrained environment (Sarfo, Manesh, & Caputo, 2024). According to Jaboob, Awain, Ali and Mohammed (2024), firms that develop strong capabilities in managing operations can reduce production costs, improve product quality, and respond more flexibly to market demands. For Ghanaian manufacturers, this includes the ability to streamline production processes, manage supplier relationships, and adopt lean practices to optimise output (Benah & Ali, 2020). As global supply chains become more integrated and customer expectations rise, the ability of Ghanaian firms to build and sustain operational management capabilities becomes a key determinant of their success, resilience, and long-term growth in both local and international markets (Asamoah, Agyei-Owusu, Andoh-Baidoo, & Ayaburi, 2021). In this study, operations management capabilities are categorised into process efficiency capability and process integration capability.

Process efficiency capability is an institutional ability to improve an organization's operational processes, reduce waste management and lower costs while increasing productivity (Najafi-Tavani et al., 2018). This capability encompasses the shortening of process timelines, the improvement of process design, and the use of technology for maximized outputs with very low inputs (Wei, 2014). In manufacturing firms, process efficiency capability is key to competing in the global marketplace (Anderson, 2020). This is because fast production cycles, low costs and high quality achieve customer satisfaction while all three are the outcomes of efficient processes (Anderson, 2020). With continuous optimization of their processes, manufacturing businesses can be more efficient in meeting the needs of the customers, keeping pace with innovations, and being responsive in production (Fisher, Watson, Porcu, Bacon, Rigley, & Gomes, 2018). As a result, resource-efficient processes capability makes it possible for manufacturing organizations to experience competitive advantages in growth and returns on investment (Fisher et al., 2018). For Ghanaian manufacturing firms, process efficiency capability is essential for reducing production costs, improving quality, and increasing responsiveness in a competitive market (Amoako-Gyampah, Boakyeh, Famiyeh, & Adaku, 2020). In this regard, by streamlining operations and adopting technology, these firms can enhance productivity, meet customer demands faster, and adapt to innovations (Amoako-Gyampah et al., 2020).

Process integration capability denotes an organization's potential to complete and coordinate its internal processes and systems, including those of external partners, suppliers, and customers (Rai, Arikian, Pye, & Tiwana, 2015). According to Rajaguru and Matanda (2019), process integration capability entails the movement of relevant information and materials across different functions for collaboration and better performance. In the case of manufacturing firms, process integration capability is very important in ensuring efficient supply chain management processes. Such integration enables a process at various levels within an organization, for example, procurement, production, or distribution, to make sure that available resources are well utilized and that products reach their customers on time (Ahmadi & Letter, 2021). Srimarut and Mekhum (2020) posit that process integration capability leads to better interaction with suppliers and customers and enables manufacturers to adjust their output according to demand and

market situation. For Ghanaian manufacturing firms, process integration capability is vital for enhancing coordination across procurement, production, and distribution (Donkor, Papadopoulos, & Speigler, 2024). Thus, by effectively linking internal operations with suppliers and customers, these firms can improve supply chain efficiency, ensure timely delivery, and respond swiftly to market changes (Donkor et al., 2024).

Operational flexibility

Operational flexibility refers to an organisation's ability to adapt its production processes, resource allocations, and operational strategies in response to internal and external changes such as fluctuations in market demand, supply chain disruptions, or shifts in technology (Yousuf et al., 2021). According to Yu, Zhao, Liu, and Song (2021), operational flexibility enables firms to modify or switch between operational approaches without significantly impacting performance, ensuring they remain efficient and competitive in dynamic environments. Additionally, operational flexibility encompasses a firm's capacity to reconfigure processes, adjust production levels, and reallocate resources across different functions, allowing for greater resilience and responsiveness during periods of uncertainty (Li et al., 2020). In the context of Ghanaian manufacturing firms, operational flexibility plays a crucial role in overcoming local challenges such as erratic power supply, supply chain inconsistencies, and unpredictable market demand (Anning-Dorson, 2021). Firms that develop high levels of flexibility are better positioned to adjust their operations quickly, manage resource constraints, and maintain customer satisfaction (Osei et al., 2023). This adaptability supports not only improved performance but also long-term competitiveness and sustainability in Ghana's evolving industrial landscape (Osei et al., 2023).

Procurement performance

Procurement performance is an indicator of the capability and performance of the organization in relation to purchasing the goods and services that the business requires for its day-to-day functions (Changalima & Mdee, 2023). Procurement performance comprises several metrics such as cost effectiveness, quality of purchased goods, supplier management and on-time delivery (Alsamarraie & Ghazali, 2023). According to Kimario and Kira (2024), good procurement performance is essential as it relates to the effectiveness of the total supply chain, the total cost of operations and the effectiveness of the flow of production processes. With respect to manufacturers, procurement performance is critical due to the uncertain nature of the supply chain, the inconsistent quality of domestic manufacturers and the requirement of other regulations (Kimario & Mwangike, 2024). Manufacturing firms are required to put in place effective procurement plans to overcome these challenges in the sourcing of raw materials of good quality at reasonable prices (Kimario & Mwangike, 2024).

Empirical review and hypotheses development

Effect of process efficiency capability on procurement performance

Empirical literature emphasizes that process efficiency capabilities are a critical aspect of procurement performance (Bienhaus & Haddud, 2018; Gregory, Ngo, & Karavdic, 2019; Han, Chong, & Li, 2020; Kakwezi & Nyeko, 2019). Dadzie et al. (2024) examined the impact of procurement training on process improvement and established that the enhancement of procurement processes resulted in better procurement performance. Nyamah et al. (2023) found that proper management of the procurement process has a significant impact on procurement performance in manufacturing firms. Furthermore, Mandala et al. (2024) found that procurement technology adoption has a positive impact on procurement efficiency and transparency and hence improves procurement performance. In this regard, it could be deduced that adopting process efficiency capabilities within the procurement functions enables organizations to be proactive in technology developments

and thus create a competitive edge in the manufacturing industry (Dadzie et al., 2024). Based on the literature (Bienhaus & Haddud, 2018; Dadzie et al., 2024; Gregory, Ngo & Karavdic, 2019; Han, Chong, & Li, 2020; Kakwezi & Nyeko, 2019; Mandala et al., 2024; Nyamah et al., 2023), our study hypothesizes as follows:

H1: A significant positive relationship exists between process efficiency capability and procurement performance.

Effect of process integration capability on procurement performance

Evidence is found in existing literature that there is a positive relationship between process integration capability and procurement performance (Chenini et al., 2021; Prajogo et al., 2018; Rajaguru & Matanda, 2019; Shee et al., 2018). Zhuo, Hu, Zhang, and Zheng (2024) advanced the argument that process integration provides synergy between procurement activities and supply chain operations, which leads to better procurement performance in manufacturing firms. Likewise, Farida, Joseph, Sheila, Levi, and Moses (2024) inferred that organizations with stronger integration of processes can enhance timely procurement activities with production levels and minimize holding costs and improve the delivery time of suppliers. Moreover, Odutola (2022) pointed out that integrated processes deliver information on time with respect to procurement decision making and enhanced performance. In conclusion, these studies highlight that process integration capability ranks as one of the primary determinants of procurement performance, leading to enhanced operational efficiency as well as strategic alignment (Farida et al., 2024). Based on the literature (Chenini et al., 2021; Farida et al., 2024; Odutola, 2022; Prajogo et al., 2018; Rajaguru & Matanda, 2019; Shee et al., 2018; Zhuo et al., 2024), our study hypothesizes that:

H2: A significant positive relationship exists between process integration capability and procurement performance.

Moderating role of operational flexibility on the relationship between process efficiency capability and procurement performance

Some empirical research has focused on the role of operational flexibility towards the integration of process efficiency capability with the level of procurement performance (Hou, 2020; Irfan, Wang, & Akhtar, 2020; Yu, Luo, Feng, & Liu, 2018). Gorondutse et al. (2021) indicated that operational flexibility contributes positively towards enhancing the positive effects of sustainability strategies in SMEs' performance, and therefore, the operationally flexible procurement processes are more likely to weather market changes. Likewise, Jiang (2020) noted that due to operational flexibility, firms can acquire new resources and new information and therefore adjust the procurement processes to suit changing market conditions. On the contrary, consistency as a trait may become a limitation on the ways of enhancing the procurement performance wherever leveraging process efficiency is the desire of the firm (Mora-Monge et al., 2023). Such findings reinforce the need for operational firmness in resolving some procurement contextual situations, particularly on a firm's process efficiency capabilities. Based on the literature (Gorondutse et al., 2021; Hou, 2020; Irfan et al., 2020; Jiang, 2020; Mora-Monge et al., 2023; Yu et al., 2018), our study hypothesizes that:

H3: Operational flexibility moderates the relationship between process efficiency capability and procurement performance.

Moderating role of operational flexibility on the relationship between process integration capability and procurement performance

In literature, the essence of operational flexibility has emerged as a moderating variable in the understanding of the relationship between process integration capability and procurement performance (Kumar et al., 2020; Jum'a & Bushnag, 2024; Wagner, Grosse-

Ruyken, & Erhun, 2018). Alzubaidi et al. (2023) attested that process integration capability positively influences procurement performance, especially when organisations exhibit high levels of operational flexibility. Operational flexibility enables firms to effectively utilise their integration capabilities by allowing them to adapt procurement activities, coordinate with suppliers, and respond swiftly to changes in demand or supply conditions, thereby enhancing overall procurement efficiency and outcomes (Shukor, Newaz, Rahman, & Taha, 2021). This flexibility gives firms an opportunity to control their supply chains and cooperate with the suppliers (Shukor, Newaz, Rahman, & Taha, 2021). In the same domain, Rajesh (2021) proved that operational flexibility helps firms in changing their integrated functionalities of the procurement process, hence yielding better results. On the other hand, the lack of operational flexibility in the organizations may mean that the firms will not be able to optimally utilize their process integration capabilities, thereby negatively impacting procurement processes. (Zhu, Zhao, & Yao, 2024). These conclusions underline the significance of operational flexibility in helping an organization perform its procurement activities through process integration. Based on the literature (Alzubaidi et al., 2023; Jum’a & Bushnag, 2024; Kumar et al., 2020; Rajesh, 2021; Shukor et al., 2021; Wagner et al., 2018; Zhu et al., 2024), our study hypothesizes that:

H4: Operational flexibility moderates the relationship between process integration capability and procurement performance.

Conceptual framework

Our conceptual framework dwelt on the dynamic capabilities theory to predict the direct and moderating relationships between operation management capabilities (process efficiency capability, process integration capability), operational flexibility and procurement performance among manufacturing firms in Ghana. The conceptual framework shows the direct and moderating relationships leading to the formulation of four hypotheses, as shown in Figure 1 below:

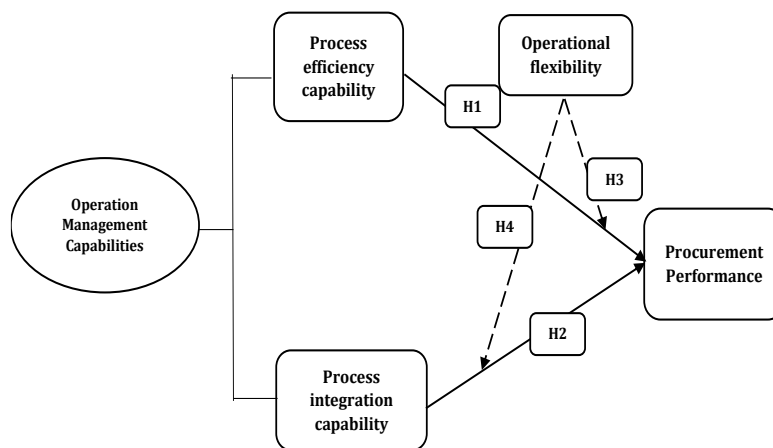


Figure 1. Hypothesised conceptual framework

Source: own processing

Methodology

A quantitative cross-sectional survey design was adopted for the study (Saunders et al., 2019). A total of one hundred and twenty (120) manufacturing firms in Accra, Ghana, formed the accessible population of the study. The stratified sampling technique was used to select a total of fifty (50) manufacturing firms in Accra, Ghana were selected. The use of stratified sampling for selecting manufacturing firms was justified on the premise that their selection was based on different strata such as agro and food processing, textile and garment, pharmaceuticals, building materials and construction, as well as metal and electronics manufacturing. For each of the fifty (50) manufacturing facilities, seven (7)

employees and managers were selected using the purposive sampling technique. The use of the purposive sampling technique ensured that only employees and managers who are directly involved in procurement and strategy were chosen for the study. In this regard, a total of three hundred and fifty (350) managers and employees of manufacturing firms formed the sample size of the study. Questionnaires served as the data collection instruments of the study. The questionnaires were designed based on the objectives of the study. Table 1 below provides details about the questionnaire items and the sources from which they were adopted:

Table 1. Constructs and sources

Construct	Number of items	Source
Process efficiency capability	5	Yeung (2008)
Process integration capability	3	Yeung (2008)
Organizational flexibility	8	Zhou & Wu (2010)
Procurement performance	5	Rorich (2015)

Source: own processing

Questionnaires were self-administered by the researchers in the workplace of manufacturing firms that participated in the study. The answering of questionnaires by respondents took a maximum of fifteen (15) minutes. The entire data collection process took a period of three months. Ethical considerations such as informed consent, anonymity and confidentiality were adhered to during the data collection process.

Findings

General results

We used the Statistical Package for Social Sciences (SPSS) version 26 and Smart PLS 4 for data analysis. The SPSS software was used to enter data gathered from questionnaires. Descriptive statistics were conducted to check for any missing values in the dataset before we proceeded to any other analysis.

With the absence of any missing values, we proceeded to transform items into composite variables using SPSS. Next, we checked for normality of all the variables to ensure that there were no extreme values or outliers that could affect the structural equation model. The SPSS data was then imported into Smart PLS 4 for structural equation modelling analysis. The results from the structural equation modelling are presented in Tables 2-5 above.

According to results from Table 2, construct validity was achieved as factor loadings for all the items used for measuring the constructs of the study, namely process efficiency capability, process integration capability, operational flexibility, and procurement performance, were greater than 0.5 (Tavakol & Wetzel, 2020).

Table 2. Construct validity

Process efficiency capability	Factor loadings
SB1 <- Process efficiency capability	0.705
SB2 <- Process efficiency capability	0.759
SB3 <- Process efficiency capability	0.689
SB4 <- Process efficiency capability	0.840
SB5 <- Process efficiency capability	0.861
Process integration capability	Factor loadings
SB8 <- Process Integration capability	0.510
SB9 <- Process Integration capability	0.886
SB10 <- Process Integration capability	0.942
Operational Flexibility	Factor loadings
SC1 <- Operational flexibility	0.842

SC2 <- Operational flexibility	0.814
SC3 <- Operational flexibility	0.832
SC4 <- Operational flexibility	0.823
SC5 <- Operational flexibility	0.680
SC6 <- Operational flexibility	0.639
SC7 <- Operational flexibility	0.718
SC8 <- Operational flexibility	0.766
Procurement Performance	Factor loadings
SD1 <- Procurement Performance	0.664
SD2 <- Procurement Performance	0.889
SD3 <- Procurement Performance	0.685
SD6 <- Procurement Performance	0.507
SD7 <- Procurement Performance	0.853

Source: own processing

From Table 3, convergent validity was also achieved as the Average Variance Extracted (AVE) for each of the constructs was greater than 0.5 (Hair & Alamer, 2022). Reliability statistics were checked using Cronbach's alpha values (Table 3). From the results attained, it was found that the items used for measuring each of the constructs, namely process efficiency capability, process integration capability, operational flexibility and procurement performance, had good levels of internal consistency since Cronbach's alpha values were greater than 0.7.

Table 3. Reliability statistics and convergent validity

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Process Integration capability	0.758	0.917	0.837	0.644
Process efficiency capability	0.832	0.858	0.881	0.599
Procurement Performance	0.777	0.833	0.848	0.537
Operational flexibility	0.899	0.904	0.919	0.589

Source: own processing

Discriminant validity was assessed using the Fornell-Lacker criterion as shown in Table 4. According to Hair et al. (2021), for discriminant validity to be achieved, the square root of the AVE extracted by variables must be greater than the correlation between a variable and any other variable. From Table 4, it could be deduced that discriminant validity was achieved because the square root of AVE for each of the variables (process efficiency capability, process integration capability, operational flexibility and procurement performance) was greater than the correlation between any of the variables and other variables used in the model.

The assumption of multicollinearity was also checked using the Variance Inflation Factor (VIF) values of each of the items used for measuring the constructs. From Table 5, it could be deduced that there was no multicollinearity among the items used for measuring constructs, namely process efficiency capability, process integration capability, operational flexibility and procurement performance, since the VIF values of each item were less than 10 (Tabachnick & Fidell, 2019).

Table 4. Discriminant validity using Fornell-Lacker criterion

Construct	Process integration capability	Process efficiency capability	Procurement performance	Strategic flexibility
Process Integration capability	0.803			
Process efficiency capability	0.376	0.774		
Procurement Performance	0.393	0.746	0.733	
Operational flexibility	0.476	0.828	0.690	0.768

Source: own processing

Table 5. Multicollinearity statistics using Variance Inflation Factor (VIF)

Construct	VIF	Construct	VIF	Construct	VIF
SB1	1.554	SC1	6.318	SD1	1.801
SB10	2.082	SC2	5.512	SD2	4.055
SB2	2.159	SC3	5.042	SD3	1.925
SB3	2.223	SC4	3.688	SD6	1.722
SB4	2.692	SC5	2.643	SD7	2.999
SB5	2.567	SC6	2.361		
SB8	1.295	SC7	2.246		
SB9	1.887	SC8	4.462		

Source: own processing

Hypotheses testing

This section tests the hypotheses proposed for direct and indirect (mediating) effects (Figure 2 and Table 6). Decisions were taken as to whether the hypotheses tested were supported or not. Furthermore, the results based on the research hypotheses were discussed in line with the relevant literature.

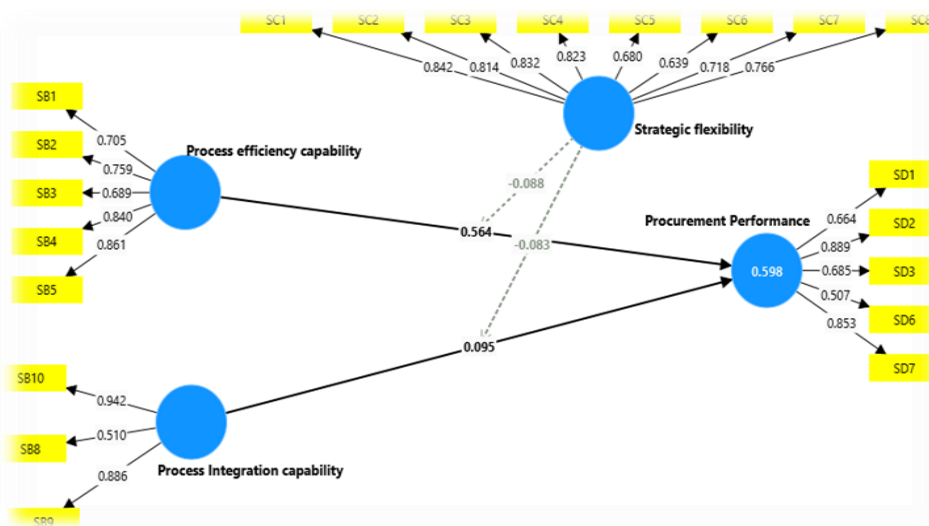


Figure 2. Structural model

Source: own processing

Table 6. Hypothesis testing

Hypotheses	β -value	t-statistics	p-values
Process Integration capability -> Procurement Performance	0.095	1.255	0.210
Process efficiency capability -> Procurement Performance	0.564	5.074	0.000
Operational flexibility x Process Integration capability -> Procurement Performance	-0.083	1.439	0.150
Operational flexibility x Process efficiency capability -> Procurement Performance	-0.088	2.368	0.018

Source: own processing

The result from Table 6 showed that a non-significant positive relationship exists between process integration capability and procurement performance among manufacturing firms in Ghana (B=0.095, p=0.210). This indicates that process integration capability as an operations management capability does not enhance procurement performance among manufacturing firms in Ghana. A significant positive relationship was found to exist

between process efficiency capability and procurement performance ($B=0.564$, $p=0.000$). This implies that process efficiency capability enhances procurement performance among manufacturing firms in Ghana. Meanwhile, operational flexibility does not moderate the relationship between process integration capability and procurement performance among manufacturing firms in Ghana ($B=-0.083$, $p=0.150$). This indicates that operational efficiency does not dampen or strengthen the relationship between process integration capability and procurement performance among manufacturing firms. However, operational flexibility negatively moderates the relationship between process efficiency capability and procurement performance ($B=-0.088$, $p=0.018$). This indicates that operational flexibility dampens the relationship between process efficiency capability and procurement performance among manufacturing firms in Ghana.

Discussion of the findings

The study's results, which show a non-significant positive relationship between process integration capability and procurement performance of manufacturing firms in Ghana, align somewhat with existing literature and dynamic capabilities theory. The non-significant result suggests that the impact of process integration capability may not be direct or strong unless there are enabling factors. The research literature emphasizes the presence of other capabilities that have a synergistic effect on the integration of processes. Dadzie et al. (2024) showed that procurement training leads to an increase in the efficiency of the process, which translates into higher procurement performance. In the same vein, Nyamah et al. (2023) found that the management of the procurement activities on the whole has a great bearing on performance in manufacturing companies. Mandala et al. (2024) also noted the use of procurement technologies as increasing efficiency and transparency of procurement and hence improving procurement performance. The findings of this study are also explicable through the dynamic capabilities theory. This theory argues that organizations have to keep altering their processes and capabilities for the changing environment or market (Teece, 2018). The positive relationship, although non-significant in the study, could therefore imply that manufacturing firms in Ghana are unable to integrate their process integration capabilities with any external opportunities or threats. This is in line with the "sensing" dimension of the dynamic capabilities theory that explains the need for the firm to be able to recognize and seize opportunities and changes in the environment, such as new technologies or new trends in the supply chain. In the absence of such strategic alignment, the capabilities of process integration remain underexplored.

Secondly, the study's finding, which shows that a significant positive relationship exists between process efficiency capability and procurement performance, aligns with existing literature and the dynamic capabilities theory. The results provide the implication that companies that build and deploy process efficiency capabilities will witness enhanced procurement performance in terms of better integration with supply chain activities, improved decision making and increased operational performance. According to Zhuo, Hu, Zhang, and Zheng (2024), the integration of processes allows for the integration of procurement functions into supply chain management, and this will lead to better procurement performance. In the same manner, Farida et al. (2024) attest that through process integration capability, firms can effectively match the amount of the purchase process a firm has with the production capacity, therefore stocks held are optimized and suppliers' performance is improved. Furthermore, Odutola (2022) also opine that integrated processes can be helpful in making procurement decisions since they provide timely and relevant information, which in turn has a direct positive impact on procurement effectiveness. The findings also align with the dynamic capabilities theory, which underscores the importance of developing, integrating, and reconfiguring organizational capabilities to respond to changing environments and achieve sustained performance. The theory's core aspects, which comprise sensing, seizing, and transforming, offer a framework for interpreting the relationship between process efficiency capabilities and procurement performance. From the "sensing" perspective,

process efficiency capability enables firms to anticipate and address challenges or opportunities within their procurement operations, such as fluctuating supplier lead times or shifting market demands. The finding that process efficiency significantly improves procurement performance suggests that firms in the study successfully identify and respond to these dynamics.

The study's finding that operational flexibility does not moderate the relationship between process integration capability and procurement performance suggests that such flexibility may not play a significant role in enhancing this relationship for manufacturing firms in Ghana. This result contradicts the findings of some empirical investigations, which highlight the positive moderating role of operational flexibility on the relationship between process integration capability and procurement performance. For instance, Gorondutse et al. (2021) established that operational flexibility enhances the impacts of sustainability strategies, enabling procurement processes to adapt to market changes. Jiang (2020) also posited that operational flexibility provides firms with new resources and information that enables them to adjust their procurement processes to dynamic conditions. However, other studies suggest potential limitations of operational flexibility. Mora-Monge et al. (2023) emphasized that consistency, rather than operational flexibility, may sometimes be more effective in leveraging process integration capabilities for procurement performance. This aligns with the idea that over-reliance on operational flexibility could lead to inefficiencies or disruptions in established processes. The dynamic capabilities theory, therefore, offers a framework for interpreting these mixed findings. While the theory emphasizes sensing, seizing, and transforming, the lack of moderation by operational flexibility may indicate that firms in Ghana focus more on process stability than adaptability to optimize integration capabilities. This suggests that dynamic capabilities, in this context, may favor operational firmness to maintain consistent procurement performance. Thus, operational flexibility might not universally enhance process integration outcomes, depending on contextual factors.

The finding that operational flexibility negatively moderates the relationship between process efficiency capability and procurement performance indicates that there are different configurations of operational flexibility and process efficiency at the firm level. Though operational flexibility is desired, its negative moderation also implies that there are good reasons to impose some restrictions on the level of operational flexibility within a firm, as it may interact negatively with the operational efficiency structures within procurement. There is growing support for the two-sided view of operational flexibility. Alzubaidi et al. (2023) argue that process integration capability boosts procurement performance when combined with operational flexibility since it facilitates firms' management of supply chains and cooperation with their suppliers. Shukor et al. (2021) also attest that flexibility allows a firm to modify procurement processes to deal with changing conditions satisfactorily. On the other hand, Zhu et al. (2024) pointed out that the absence of operational flexibility affects the effective use of process integration capabilities, which in turn affects the performance of procurement negatively. This corroborates the study of Rajesh (2021), which attests that operational flexibility has an impact on enhancing procurement by giving firms the ability to alter integrated processes. The dynamic capabilities theory allows for such an interpretation of these findings. The theory focuses on sensing, seizing, and transforming capabilities, which are critical for a firm's success in a turbulent environment. These functions are reinforced by operational flexibility; however, their negative moderation might indicate over-adjustment, which can result in inefficiencies or misfits in what would otherwise be efficient procurement processes. In this context, companies could find it difficult to achieve appropriate and adequate levels of operational flexibility through process stability and vice versa, compromising the advantages of process efficiency capability among manufacturing firms in Ghana.

Conclusions and recommendations

Summary of the findings

Firstly, the study concludes that manufacturing firms in Ghana can significantly enhance their procurement performance by investing in process efficiency capabilities. The positive relationship identified between process efficiency and procurement performance indicates that streamlining operations through lean practices, automation, and staff development is essential for achieving procurement excellence and overall operational effectiveness.

Secondly, the study concludes that although process integration capability did not show a statistically significant direct impact on procurement performance, it remains relevant. In this regard, manufacturing firms are encouraged not to disregard integration efforts, as strengthening communication, implementing integrated systems, and fostering cross-functional collaboration can lead to improved coordination and long-term procurement performance enhancements.

Thirdly, the study concludes that operational flexibility is a critical enabler of procurement performance, allowing firms to respond effectively to market volatility and changing customer demands. Approaches such as diversifying suppliers, adopting flexible procurement agreements, and investing in adaptive logistics help build resilience and agility in procurement operations.

Finally, the study concludes that while operational flexibility contributes positively to procurement, excessive emphasis on flexibility may weaken the benefits gained from process efficiency. The observed negative moderating effect highlights the need for a deliberate balance. Firms must assess the trade-offs between flexibility and efficiency to avoid undermining the very processes that support high procurement performance.

Theoretical contributions

The theoretical implications of the study based on the dynamic capabilities theory are significant and multifaceted. The findings emphasize the importance of understanding how operations management capabilities, specifically process efficiency capability and process integration capability, interact with operational flexibility in influencing procurement performance among manufacturing firms in Ghana.

Firstly, the study reinforces the dynamic capabilities theory by illustrating that organizations must cultivate not only operational management capabilities like process efficiency and integration, but also the interplay between these capabilities and operational flexibility. This interrelationship emphasizes the necessity for firms to develop a comprehensive capability set that enables them to adapt effectively to changing market conditions.

Secondly, the lack of significant moderating effects of operational flexibility on the relationship between process integration capability and procurement performance highlights the importance of aligning capabilities within organizations. It suggests that firms realize the full benefits of their integrated processes; they must focus on strengthening their integration strategies, rather than relying solely on flexibility. This aligns with the dynamic capabilities theory, which posits that organizations must be adept at sensing, seizing, and transforming their capabilities to achieve competitive advantage. Additionally, the finding that operational flexibility negatively moderates the relationship between process efficiency capability and procurement performance indicates that operational flexibility, while crucial, can also lead to inefficiencies if not managed appropriately. This insight calls for a reevaluation of how operational flexibility is perceived within the dynamic capabilities framework. It suggests that firms need to

develop a nuanced understanding of when and how to apply operational flexibility to optimize performance, rather than adopting flexibility as a blanket strategy.

Moreover, the study highlights the necessity for firms to integrate multiple capabilities effectively. The positive effects of process efficiency capability on procurement performance, coupled with the moderating role of operational flexibility, illustrate that firms can achieve superior outcomes when they leverage their capabilities synergistically. This finding aligns with the dynamic capabilities theory's emphasis on the interconnectedness of capabilities in responding to market dynamics and achieving sustained competitive advantage.

Finally, the study contributes to the ongoing development of dynamic capabilities theory by examining the interactions between process capabilities and operational flexibility. It opens avenues for further research to explore how various combinations of capabilities can influence organizational performance in different contexts. Future studies could investigate other moderating variables or different dimensions of dynamic capabilities, thereby enriching the theoretical framework.

Practical contributions

The practical implications of this study on the relationship between operation management capabilities (process efficiency capability and process integration capability) and procurement performance, alongside the moderating role of operational flexibility among manufacturing firms in Ghana, are substantial and actionable for practitioners in the field.

Firstly, the findings emphasize the necessity for manufacturing firms to invest in enhancing their process efficiency capabilities. As the study revealed a significant positive relationship between process efficiency capability and procurement performance, organizations should prioritize streamlining their procurement procedures and operational workflows. This could involve adopting lean practices, utilizing technology for automation, and training staff to foster a culture of efficiency.

Secondly, while process integration capability was found to have a non-significant effect on procurement performance, the study indicates that firms should not neglect the importance of integration strategies. In this regard, manufacturing firms must focus on fostering effective communication and collaboration among their procurement and supply chain functions. Implementing integrated information systems, enhancing data sharing, and establishing cross-functional teams can facilitate better coordination and alignment of procurement activities with production schedules, which may lead to improved performance over time.

Thirdly, the study highlights the crucial role of operational flexibility in procurement practices. Therefore, firms should develop adaptive strategies that allow them to respond quickly to market changes and fluctuations in demand. This could involve creating flexible procurement contracts, establishing relationships with multiple suppliers, and investing in adaptive logistics solutions. Thus, by enhancing their operational flexibility, firms can better leverage their process efficiency capabilities and mitigate potential disruptions in procurement, thus optimizing performance.

Finally, the negative moderating effect of operational flexibility on the relationship between process efficiency capability and procurement performance suggests that firms must strike a balance between flexibility and efficiency. Practitioners should carefully assess their operational flexibility initiatives to ensure that they do not inadvertently introduce inefficiencies. This may require a more nuanced approach to decision-making, where firms evaluate the trade-offs between maintaining operational flexibility and ensuring operational efficiency.

Limitations and future research

This study has inherent limitations. The research is confined to manufacturing enterprises in Ghana, perhaps restricting the applicability of the findings to other industries or geographical regions. Subsequent research may broaden the focus to encompass service-oriented sectors or organizations in different countries, to ascertain whether the identified associations among the variables are consistent across different circumstances and countries. Secondly, the study utilizes cross-sectional data, which provides a picture of the links among operation management capabilities, procurement performance, and operational flexibility at a certain moment in time. This design constrains the capacity to deduce causation or detect temporal changes. Longitudinal studies may yield profound insights into the interactions among the variables and their long-term effects on procurement performance.

Another limitation is that the study investigates process efficiency and process integration as aspects of operation management capabilities, although it does not address other possible elements affecting procurement performance, including technological adoption, market circumstances, and organizational culture. Future studies could therefore explore these further factors to enhance the knowledge of procurement performance dynamics. Future studies should also investigate the impact of supplementary operation management competencies on procurement performance, extending beyond mere process efficiency and integration. This is because examining factors such as innovation, supply chain resilience, and customer orientation could provide a comprehensive understanding of how firms might improve procurement performance.

Furthermore, analyzing the interaction between operational flexibility and other moderating variables, such as organizational culture or leadership styles, could provide significant insights into how organizations might enhance their procurement strategy. This could enhance an understanding of the mechanisms by which operational flexibility influences procurement performance.

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