

Performance Implications of Supply Chain Management Practices among Manufacturing Firms in Ghana

Michael Ofori Martey¹ Seth Boahen*² Bright Ahlijah³

1. Computer Science Department, Sunyani Technical University – Sunyani

2. School of Business, Kwame Nkrumah University of Science and Technology – Kumasi

3. Department of Marketing, Ho Technical University – Ho

*Email of the corresponding author: boahenseth870@gmail.com

Abstract

The purpose of this study was to assess the causal relationship between five dimensions of supply chain management (strategic supplier relationship, quality of information sharing, level of information sharing, customer service relationship and postponement) and the performance of manufacturing firms in the Kumasi metropolis of Ghana. Data was collected using questionnaires responded to by 87 manufacturing firms in Kumasi. The relationships were modelled into a framework and hypothesised. A 7-point Likert Scale was used to measure the constructs. Pearson's Correlations and Ordinary Least Square (OLS) Regression analyses were conducted to test the hypothesis. The findings revealed that SSR and Post did not have any positive influence on OP. However, the result suggested that CR, IS, and IQ positively influence OP of manufacturing firms in Kumasi. The results also found only two hypotheses (H2 and H3) were supported, with the remaining three not supported. The finding that strategic supplier relationships have no positive effect on OP is suggestive that managers should invest significant resources to build a strong relationship with their suppliers. Connected to this path is to ensure that the quality of information shared with their trading partners is equally improved to enhance collaboration. While postponement has its attendant benefits for the organisation, it is also apparent from the study that managers must determine optimal postponement by examining the associated costs within various supply chain configurations according to the market needs. This study has provided evidence to show the impact of supply chain management practices on the performance of firms in an emerging manufacturing industry. This study may be one of the key supply chain related research projects conducted on the manufacturing industry in the Kumasi metropolis. The outcomes of this research have far-reaching implications for manufacturing companies in other regions of the country in an era where Ghana is attempting to use industrialisation as a major driver for economic development.

Keywords: Supply Chain Management Practices, Supply Chain, Organizational Performance, Manufacturing Firm, Firm Performance

DOI: 10.7176/EJBM/14-18-06

Publication date: September 30th 2022

1. INTRODUCTION

Over the last decade, the competitive landscape has shifted away from low prices to responding quickly to market needs and delivering the right product to the right client at the right time. As a result of this tendency toward speed, organisations have been forced to compete across their whole supply chain (Christopher, 1998). As a result, understanding and adopting supply chain management (SCM) has become necessary to compete and create supply chain excess worldwide (Collin, 2003; Avittathur and Ghosh, 2020; Madhani, 2020). According to Collin (2003), firms that practice SCM will continue to reap significant benefits from the increase in globalisation and demand volatility.

Fawcett et al. (2007) argue that the nature of competition traditionally faced by firms has changed; firms are no longer competing against each other solely based on quality. The new form of competition confronting firms is now found outside the firms' walls. It is determined by how they effectively link partners in their Supply Chain (SC), such as suppliers, distributors, wholesalers, retailers, and final consumers (Petrovic-Lazarevic et al., 2007). Consequently, the firm's success strongly depends on its capacity to coordinate and integrate partner relationships into an effective network. The ability of a firm to create and maintain a healthy and long-term business relationship with its customers, suppliers and other key partners makes a crucial competitive advantage (Chen, 2019). Hence, an effective SCM is a strategic tool for firms to attain a competitive advantage.

Supply Chain is defined by Kulkani and Sharma (2008) as "a network of the manufacturer's suppliers, distributors, and all others who engage in the value creation process." According to Fantazy et al. (2010), SC management is a critical component in company business operations since it helps to connect all other components into a cohesive entity for an effective and efficient response to changes in the business environment. Most studies, including Singh and Power (2009) and Wiengarten et al. (2010), have demonstrated that SC considerably impacts organisational performance. Firms' SCs are becoming increasingly complicated, and the use of information technology (IT) is critical for effective control and proper monitoring. It has been recognised

by previous studies, including Sanders and Premus (2002), as a powerful tool for competitive advantage and for responding to today's demand-driven market. Lee et al. (2021) report that IT is embedded in the SCM of companies seeking an opportunity to integrate with key business partners, including customers, suppliers and distributors. IT is recognised as a tool that integrates the scope of a company's SCM by extending both its upstream and downstream operations.

As the investments made by most companies in developing countries, supply chain management holds a vital position in maintaining the flow of materials to the processing units up to supplying finished goods to the final consumer. Mentzer et al. (2001) argued that supply chain management is defined as systematic, strategic coordination of the traditional business functions and the tactics across these businesses within the supply chain to improve the long-term performance of the individual companies and the supply chain. This implies that supply chain management processes are very paramount in ensuring the success of organisational objectives.

Supply chain management concepts and practices are very relevant in the business sector in Ghana, even in these times. Thus, this study considers implementing best practices that will influence organisational performance. Supply Chain Management (SCM) is a chain of business on one-to-one, business-to-business relationships and a network of multiple business relationships to ensure synergy of intra-company and inter-company integration and management. The advantage of such supply chain integration can be achieved through the efficient relationship among various supply chain activities, with a linkage based on the effective utilisation of various supply chain activities for an integrated supply chain. This means that for a firm to implement supply chain management practices effectively, it needs to pay attention to supply chain integration (SCI) (Hussain and Nassar, 2010).

Managers in many industries, such as manufacturing, mining, and oil and gas industry, all over the world and for that matter, firms in Ghana, are trying to improve their supply chain management processes. Articles and cases suggest that profit earnings or losses of most companies in the manufacturing, mining, oil and gas industry, etc., can be attributed to either an improvement or ineffectiveness in a supplier firm's supply chain management processes. Companies are seeking to integrate decisions across the supply chain, its management and its processes because it is very crucial to the survival of their existence. For some Ghanaian firms, SCM is one of the key strategies for improving operational effectiveness. This importance is increasing as the supply chain's complexity in products, markets, and members grow. Research and implementation of SCM practices to improve performance are crucial to any global company today.

However, little is known about the extensive research conducted in Ghana in supply chain management, particularly in the manufacturing sector. Studies by Aduku and Ayertey (2015), Bempong et al. (2018), Akafia et al. (2017) and Jum'a et al. (2021) have focused on the hospitality industry, road construction, automotive, and waste management rather than specifically on the manufacturing sector in the Kumasi metropolis. Thus, inadequate studies have been found on the supply chain in the manufacturing sector industry in the Ashanti Region, particularly the Kumasi Metropolis. Despite the evidence of the importance of supply chain practices, not much is known about the supply chain practices in the manufacturing sector.

Kumasi, located in the heart of Ghana, has recently emerged as a focus of industrial activity. The metropolis is distinguished by low labour costs, low logistical costs, and abundant input natural resources. This has drawn several manufacturing enterprises to the city throughout the years. As a result, the city has become one of the major commercial and industrial centres in Ghana's central belt.

There is no single, globally accepted definition of SCM. There has been a lack of agreement in the definitions provided by various authors (Gibson et al., 2005; Burgess et al., 2006). SCM has been defined by researchers based on their areas of study. The key distinction between the definitions is the emphasis on a certain aspect of the supply chain and SCM. For this article, "The Global Supply Chain Forum's definition of SCM will be used, which defined SCM as integrating key business processes from end-user through original suppliers that provide products, services, and information that add value for customers and other stakeholders". According to this definition of SCM, the value of SCM in a global supply chain network has been demonstrated by its role as an integrating important business activity across many industries.

2. Literature Review

2.1 Supply Chain Management Practices

It is recognised that the supply chain practices of service firms are likely to differ from manufacturing firms. However, Lambert (2008) listed some common SCM practices of firms, including strategic supplier partnerships (SSP), Customer Relationship Management (CRM), Level and Quality of Information Sharing (IS/IQ), and Postponement (POST). These practices have been discussed in the next section.

Strategic Supplier Partnership is the long-term relationship between the organisation and its suppliers. It is designed to leverage individual participating organisations' strategic and operational capabilities to help them achieve significant ongoing benefits (Karimi and Rafiee, 2014; Li et al., 2006). A strategic supplier partnership emphasises direct, long-term association and encourages mutual planning and problem-solving efforts (Bratić,

2011). Such strategic partnerships are entered into to promote shared benefits among the parties and ongoing participation in one or more key strategic areas such as technology, products, and markets (Hashim et al., 2019). Strategic partnerships with suppliers enable organisations to work more effectively with a few essential suppliers willing to share responsibility for the success of the products. Suppliers participating early in the product design process can offer more cost-effective design choices, help select the best components and technologies, and help in design assessment (Tan et al., 2002). Strategically aligned organisations can work closely together and eliminate wasteful time and effort. An effective supplier partnership can be a critical component of a leading-edge supply chain.

On customer relationship management, it is noted that to handle customer complaints, develop long-term customer relationships, and boost customer satisfaction (Ledro et al., 2022), customer relationship management remains a critical component of the SCM procedures. The rise of mass customisation and customised service has ushered in a new era in which customer relationship management has become critical to a company's existence (Tan et al., 1998). For the successful deployment of SCM programmes, good connections with supply chain members, especially customers, are required. Close client relationships enable a company to set itself apart from competitors, maintain customer loyalty, and significantly increase its value to its customers (Haddouch et al., 2019; Magretta, 1998).

Information sharing remains one of the key aspects of the supply chain facilitating coordination amongst parties in a supply chain. Supply chain efficiency is highly important in today's competitive business environment. Information sharing manifests in two aspects: quantity and quality. Both aspects are essential for the practices of SCM and have been treated as independent constructs in past SCM studies (Moberg et al., 2002; Monczka et al., 1996). Level (quantity aspect) of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Monczka et al., 1996). Shared information can vary from strategic to tactical in nature and information about logistics activities to the general market and customer information (Mentzer et al., 2000). Many researchers have suggested that the key to the seamless supply chain is making available undistorted and up-to-date marketing data at every node within the supply chain (Childhouse and Towill, 2003). Information can be used as a source of competitive advantage by taking the available data and sharing it with other parties within the supply chain (Chen, 2018). Wang and Hu (2020) consider sharing information as one of five building blocks characterising a robust supply chain relationship. According to Longo et al. (2019), supply chain partners who exchange information regularly can work as a single entity. Together, they can understand the needs of the end customer better and hence can respond to market change quicker. Moreover, Longo et al. (2019) pointed out the effective use of relevant and timely information by all functional elements within the supply chain as a critical competitive and distinguishing factor. Childhouse and Towill (2003) empirical findings reveal that simplified material flow, including streamlining and making all information flow visible throughout the chain, is the key to an integrated and effective supply chain.

Information sharing quality includes aspects such as the accuracy, timeliness, adequacy, and credibility of information exchanged (Suifan et al., 2020). While information sharing is essential, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom (Maskey et al., 2020). Literature is replete with examples of the dysfunctional effects of inaccurate/delayed information as information moves along the supply chain (McAdam and McCormack, 2001). Divergent interests, opportunistic behaviour of supply chain partners, and informational asymmetries across the supply chain affect the quality of information. It has been suggested that organisations deliberately distort information that can potentially reach their competitors, suppliers, and customers (Lee et al., 2021; Mason-Jones and Towill, 1997). There appears to be built-in reluctance within organisations to give away more than minimal information since information disclosure is perceived as a loss of power. Given these predispositions, ensuring the quality of the shared information becomes a critical aspect of effective SCM. Organisations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion (Velda, 2019).

Postponement as a supply chain function is the practice of moving forward one or more operations or activities (making, sourcing and delivering) to a much later point in the supply chain (Khalil et al., 2019). Two primary considerations in developing a postponement strategy are: (1) determining how many steps to postpone and (2) determining which steps to postpone (Beamon, 1998). Postponement allows an organisation to be flexible in developing different versions of the product to meet changing customer needs and differentiate a product or modify a demand function (Jabbarzadeh et al., 2019). Keeping materials undifferentiated for as long as possible will increase an organisation's flexibility in responding to changes in customer demand. Also, an organisation can reduce supply chain costs by keeping undifferentiated inventories (Gamini and Rajapaksa, 2020). Postponement needs to match the type of products, market demands of a company, and structure or constraints within the manufacturing and logistics system (Khalil et al., 2019). In general, the adoption of postponement may be appropriate in the following conditions: innovative products with high monetary density, high specialisation and wide range; markets characterised by long delivery time, low delivery frequency and

high demand uncertainty; and manufacturing or logistics systems with small economies of scales and no need for specialised knowledge (Jabbarzadeh et al., 2019; Khalil et al., 2019; Pagh and Cooper, 1998).

2.2 Organisational Performance (OP.)

An organisation’s performance measures how effectively it meets its financial and market-oriented objectives (Benson, 2022; Li et al., 2006). Organisational performance denotes the demonstrated output of an organisation as measured against its planned outputs (Al-Kurdiet al., 2020). Organisational performance is measured in the quality and productivity of organisational outputs, job satisfaction or turnover intentions of its resources, and returns on investments as financial outcomes. One of the most contentious problems in academic research today is the consideration of performance in research. Numerous academics have acknowledged the significance and importance of the performance idea and the larger subject of organisational effectiveness (Connally et al., 1980). Consequently, different fields of research use different measures of organisational performance. Giannakis (2007) opines that organisational performance measures can be considered from various aspects of the business in terms. In terms of measurement, organisational performance is based on the use of outcome-based financial indicators that are supposed to indicate the achievement of the economic goals of the firm, which has been the most widely used in empirical research (Luong et al., 2019). Typical of this approach would be to examine metrics like sales growth, profitability (as measured by ratios such as return on investment, return on sales, and return on equity), profits per share, etc. Some strategy studies have used metrics such as market-to-book or stock-market returns and its variations, reflecting the popular and current belief that “market” or “value-based” assessments are more suitable than accounting-based ones (Kumar and Dua, 2022). Nevertheless, this approach remains very much financial in its orientation. It assumes the dominance and legitimacy of financial goals in the firm’s system of goals, such as sales growth, returns on investment, competitive position and profit margins (Kumar and Dua, 2022). Therefore, Hsiao et al. (2008) use cost, flexibility, quantity and delivery to assess the organisation’s performance. Kannan and Tan (2006) also explain that business performance can be measured in quality, lead time improvements, and cost reductions.

Additionally, Tan et al. (1998) furthered that SCM’s short-term goals largely boost productivity. Its long-term goals are to increase market share and earnings for all supply chain members by reducing inventory levels. To compare and evaluate firms, financial indicators have been a useful tool (Al-Doori, 2019). Supply chain management is only one of several initiatives that should ultimately contribute to better overall performance in the firm.

2.3. Hypothesis Development

After carefully reviewing related theories, we use the classical research paradigm “Institution-Conduct-Performance” to construct our conceptual framework of supply chain management practices (SCMP) and Supply Chain Performance and propose corresponding researcher hypotheses. The model is depicted in Figure 1.

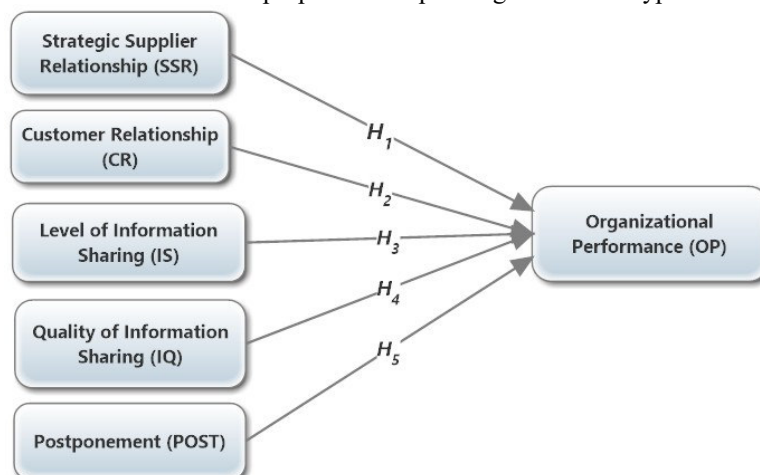


Figure 1: Hypothesised Conceptual Model

2.3.1 Strategic Supplier Relationship (SSR) and Organisational Performance (OP)

The first hypothesis deals with the interaction between strategic supplier relationship (SSR) and Organizational Performance (OP) in the manufacturing industry in the Kumasi metropolis. Empirical and theoretical studies have supported the link between SSR and OP. Several authors (Saragih et al., 2020; Shou, 2019) have emphasised the significant benefits of maintaining a good relationship with suppliers on the supply chain’s performance. Lambert (2004) demonstrated the positive effect of implementing effective SRM on the firm’s performance. Studies that have examined the relationship between SRM practices and the OP show that these

practices have positive and significant effects on the firm's financial performance. However, several of these studies suppose that companies need to implement a wide range of practices to meet their objectives to improve performance, not detailing the results that can be achieved with the individual application of specific practices (PRAJOGO et al., 2012). Manab and Aziz (2019) identified twelve SRM practices, including strategic purchases, long-term relationships, reduction of supply sources, and logistics integrations, and found a significant correlation with the organisation's performance, involving several dimensions such as quality cost and customer satisfaction. Hence, it is hypothesised that:

H₁. A positive relationship exists between SSR and OP.

2.3.2 Customer Relationship Management and Organisational Performance

The second hypothesis deals with the relationship between CRM and OP among manufacturing firms in the Kumasi metropolis. The need for a long-term relationship between firms and their customers has been well researched. For instance, Bullington and Bullington (2005) tested the relationship between CRM and Performance by surveying 6,000 SMEs and found a statistically significant positive relationship between CRM and enterprise performance. On the other hand, Lado et al. (2011) attempted to investigate the relationship among a firm's customer focus and the performance of 200 US manufacturing firms and found a positive relationship between customer focus practices and financial performance. Engelseth and Felzensztein (2012) explored the level of firm responsiveness to customer complaints on supply network performance and concluded that responsiveness to customer worries has a positive effect on the supply network's performance. That notwithstanding, Schniederjans et al. (2012) analysed the adoption of customer-relations management software from the operations management perspective and its impact on business performance. The authors identified that collaboration of OM and marketing managers using CRM software positively enhanced business performance. On the back of the above, the researchers hypothesised that:

H₂. A positive relationship exists between CRM and OP.

2.3.3 Information Sharing and Organisational Performance

Numerous researchers have empirically established the link between Information Sharing and Organizational Performance. For instance, Lotfi et al. (2013) give evidence of the positive impact of information Sharing on inventory and cost reduction. Fawcett et al. (2007) investigated two dimensions of Information Sharing – connectivity and willingness – which both influence operational performance. Ajay and Maharaj (2010) study discovered that information sharing significantly influences the overall cost of running a supply chain and improves the holistic management of all business activities. Rashed et al. (2010), who explored the combined effect of information and knowledge sharing on suppliers' operational performance, found that information sharing is a prerequisite for knowledge sharing. The close supplier-buyer relationship is vital for escalating the supplier's performance.

H₃. A positive relationship exists between IS and OP.

2.3.4 Information Quality and Organisational Performance

Several researchers have implied or empirically established the link between IQ and OP. For instance, Zhao et al. (2002), on the other hand, gave evidence of the positive impact of IQ on inventory reduction and cost reduction. Fawcett et al. (2007) also investigated two dimensions of IQ. Connectivity and willingness were both found to influence organisational performance positively. The study likewise revealed that IQ positively impacts the overall cost of running a successful business (Wieder and Ossimitz, 2015; Ajay and Maharaj, 2010). Rashed et al. (2010) explored the combined effect of information quality and knowledge sharing on suppliers' operational performance. They showed that information sharing quality is a prerequisite for knowledge sharing, and Zailani and Rajagopal (2006) verified that when IQ is maintained, then better organisational performance is attained. Zhou et al. (2014) show that firms need to align supply chain practice with the level of their information quality to enhance overall business performance. Therefore, the need to examine this relationship leads to the fourth hypothesis:

H₄: A positive relationship exists between QIS and OP.

2.3.5 Postponement and Organisational Performance

Postponement (POST) offers a potential core basis for making the most of information flow in the business. Several researchers have extended the notion of postponement and empirically studied its implication on the supply chain (Khanra et al., 2021). Jum'a et al. (2021), presenting a new way of thinking about the supply chain from a postponement point of view, found that postponement significantly impacts firms' level of flexibility, which ultimately influences their firm performance. Again, Oliveira-Dias et al. (2022) posited that postponement allowed firms to remain flexible relative to their productive activities, eliminating costs in the supply chain. Gupta and Somers (1992) found that firms that decide to compete using the postponement strategy reported a significant decrease in operational costs. Therefore, linking the postponement to the supply chain performance of manufacturing firms changes how manufacturing firms would interact with stakeholders in the industry. It would enable the firm to reap benefits in terms of enhanced performance. This led us to our fifth hypothesis:

H₅. A positive relationship exists between postponement and OP.

3. Methodology

The current study adopted the quantitative research approach, which provides the advantage of producing a more general picture of a population through sampling and statistical techniques (Ragab and Arisha, 2018). The survey method was adopted, wherein a self-administered questionnaire was used as the data collection tool. The major components of the study are built on the model shown in Fig 1. The six components of the conceptual model were adopted from previous literature. All items defining the five SCMPs were developed based on Li et al. (2006).

On the other hand, organisational performance was based on the instrument used by Reinatz et al. (2004). The instrument was pilot tested and refined. This study mainly surveyed respondents from the manufacturing industry in the Kumasi metropolis of the Ashanti Region of Ghana. These firms were the focus because the metropolis has emerged as a centre of industrial activity in the middle belt of Ghana.

Several manufacturing companies established satellite factories in the metropolis with low labour and logistical costs. As a result, the city has grown into one of Ghana's major commercial and industrial centres. Most enterprises are in the western areas of the metropolis, such as Kaase, Atonsu, Ahensan, and Asokwa. The survey instrument was mainly administered to manufacturers at the corporate level. The targeted research locations focused on international and local firms operating in the listed areas of the metropolis. Our contact database was provided by the Registrar General's Department (Agency in charge of Business Registration in Ghana) and represented over 100 manufacturing firms in the area. We were fortunate to be able to mobilise responses from 87 firms. This, we felt, provided us with a significantly sufficient sample to make observations for the study. To clarify doubts about the data's suitability, power analysis was conducted using the recommended threshold effect range of 0.3 – 0.8 and an error of probability of .05 (Asamoah *et al.*, 2021; Deeks *et al.*, 2005; Cohen, 2013). Cohen asserts that a minimum sample size of 82 responses was enough to attain statistical power.

Table 1 Respondent Demographic Profile

Characteristic	Categories	Total	Percentage %
Ownership Type	State-owned	12	14
	Private Ghanaian	34	39
	Foreign Owned	41	47
	Total	87	100
Size (number of Employees)	< 5	0	0
	5 – 10	1	1
	11 – 15	5	6
	16 – 20	5	6
	21+	76	87
	Total	87	100
Years of Operation (yrs.)	< 10	58	67
	11 – 20	20	23
	21+	9	10
	Total	87	100
Turnover per annum (Gh¢,000)	< 500	29	33
	500 – 1m	15	17
	1.1m – 4.9m	18	21
	5m+	11	13
	Not disclosed	14	16
	Total	87	100

In total, 87 firms participated in the survey conducted for this study. The distribution of respondent samples in terms of firm ownership type, size, years of operations and turnover per annum is shown in Table 1. Analysis revealed that 47% of the firms surveyed were foreign-owned, 39% Privately owned, but by Ghanaians, with less than a quarter being state-owned. In terms of size, the overwhelming majority had 21 or more employees. On the maturity of the organisations, the results show that 67% have been in operation for up to 10 years, whereas 23% have been working for 11 – 20 years, and 10% being in operation for more than 20 years. The annual turnover for the surveyed organisations showed that 33% earned less than Gh¢ 500m annually; 21% earned between Gh¢1.1m to Gh¢4.9m; 16% were unwilling to disclose that information.

3.1 Testing of Model

One sample t-test was performed to determine whether the sample were drawn from a population with a specific mean. The results revealed that the mean values for all the constructs were found to be statistically significant at $p=.05$, thus providing some level of confidence that the respondents, to some extent, agree that the strategic supplier relationships (SSR), customer relationships (CR), level of information sharing (IS), quality of information (IQ) and postponement (P) are the supply chain management practices as shown in Table 2.

Table 2: Overall perception on SCMP One-Sample Test

Variables	Test Value = 4						
	Mean	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
SSP	4.97	9.492	86	.000	.97126	.7678	1.1747
CR	5.27	10.328	86	.000	1.27126	1.0266	1.5160
IS	4.84	6.824	86	.000	.83908	.5946	1.0835
IQ	4.88	8.197	86	.000	.87816	.6652	1.0911
POST	4.01	.056	86	.956	.00766	-.2656	.2809

Table 2 shows variability in the respondents' scores on organisational performance, and the mean score was more than 4.0, as shown in Table 3, which generally indicates that workers perceive organisational performance as an outcome of supply chain management practices. The one-sample t-test revealed that the mean value for all the constructs was statistically significant at $p=.05$, thus providing some confidence that the respondents, to some extent, agree that OP is an outcome of SCMP (Table 3).

Table 3 Overall perception on SCP One-Sample Test

Variables	Test Value = 4						
	Means	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
SC Performance	5.17	8.959	86	.000	1.17241	.9123	1.4326

3.2 Measurement Model Analysis

We conducted the measurement model analysis in two ways (1) reliability test and (2) performing exploratory factor analysis (EFA). In all, six constructs were assessed. In checking for the reliability of the measures, Cronbach's alpha was used to verify the internal consistency among the measures (Pallant, 2007). This was performed in IBM SPSS version 26. The results shown in table 4 indicate alpha values ranging from .792 to .953. This implies that the items used in measuring all constructs passed. However, all items for the four other constructs passed the initial reliability test, far above the recommended threshold of .70 (Nunnally, 1978). The summary of the results could be seen in Table 4.

Table 4 Reliability Test Results

Construct	Number of items	Alpha value
Strategic Supplier Relationship	6	0.792
Customer Relationship	5	0.912
Information Sharing	6	0.905
Information Quality	5	0.892
Postponement	3	0.799
Org. Performance	7	0.953

3.3 Exploratory Factor Analysis (EFA)

Although the results from the reliability test shown in Table 4 indicate that all the scales for their respective constructs had strong internal consistency, it became necessary to perform exploratory factor analysis (EFA) to help explore the interrelationships among and the dimensionality of constructs (Pallant, 2007). Hence, running EFA on each sub-construct was necessary to demonstrate convergent validity. EFA was found more appropriate as some of the items were developed by the researcher and the study's sample size was not large enough to allow for confirmatory factor analysis (CFA). Using Principal Axis Factoring and Direct Oblimin with Kaiser Normalization for rotation, with Varimax rotation, four factors were fixed to extract. The system was set to extract components with Eigenvalues above 1.0 and suppress coefficients with smaller loadings (thus, less than 0.50) in all the analyses. The Kaiser-Meyer-Okin value was .853, exceeding the recommended value of .6 and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix (Pallant, 2007).

In stage one, a block-wise technique was employed to assess convergent validity. Each sub-construct was analysed separately to determine if the items that measure it should be. The retained items were all analysed together. This was done to ensure discriminant validity. The extractions produced only six components with

eigenvalues exceeding one (1), which explained 41.70%, 9.05%, 5.98%, 4.68%, 3.3%, and 2.89% of the variance. Inspection of the inter-correlation among the components revealed the presence of many coefficients above .50. Given a minimum loading of .50, the following items were retained. For Strategic Supplier Relationships, items retained were SS4-6, then for Customer Relationships, items retained were CR2-5, and for Information Sharing, items retained were IR2 – 4 and 6. All other items for Information Quality (IQ1 – 5), Postponement (P1 – 5) and Organizational Performance (OP1 – 7) were retained. The remaining items after the EFA can be seen in Table 5.

Table 5: Factor Loadings and Validity and Reliability Results from EFA.

Items	Measures/Indicators	Components					
		1	2	3	4	5	6
SSP4	Your organisation has continuous improvement programs that include your key suppliers.				-.663		
SSP5	Your organisation includes your key suppliers in our planning and goal-setting activities.				-.892		
SSP6	Your organisation actively involves our key suppliers in new product development processes.				-.652		
CR2	Your organisation frequently measures and evaluate customer satisfaction.					.673	
CR3	Your organisation frequently determines future customer expectations.					.540	
CR4	Your organisation facilitates customers' ability to seek assistance from you.					.558	
CR5	Your organisation periodically evaluates the importance of your relationship with your customers					.830	
IS2	Your organisation's trading partners share proprietary information with you.	.653					
IS3	Your organisation's trading partners keep you fully informed about issues that affect your business.	.550					
IS4	Your organisation's trading partners share business knowledge of core business processes.	.508					
IS6	You and your organisation's trading partners keep each other informed about events or changes that may affect the other partners	.507					
IQ1	Information exchange between you and your organisation's trading partners is timely.						.547
IQ2	Information exchange between you and your organisation's trading partners is accurate.						.709
IQ3	Information exchange between you and your organisation's trading partners is complete.						.763
IQ4	Information exchange between you and your organisation's trading partners is adequate.						.718
IQ5	Information exchange between you and your organisation's trading partners is reliable						.719
P1	Your organisation's products are designed for modular assembly.			.721			
P2	Your organisation delays final product assembly activities until customer orders have been received.			.769			
P3	Your organisation delays final product assembly activities until the last possible position in the supply chain.			.791			
OP1	Market share.		-.898				
OP2	Return on investment.		-.834				
OP3	The growth of market share.		-.877				
OP4	The growth of sales		-.808				
OP5	Growth in return on investment.		-.771				
OP6	Profit margin on sales.		-.783				
OP7	Overall competitive position.		-.725				
Eigenvalues		13.64	3.19	2.28	1.80	1.43	1.20
% of Variance		41.70%	9.05%	5.98%	4.68%	3.30%	2.89%
Cronbach α		0.878	0.953	0.799	0.845	0.913	0.892
KMO = .853 Bartlett's test of Sphericity: $\chi^2(DF) = 2503.296(496)$; $p=0.000$							

3.4 Test of Model

In establishing the effect of supply chain management practices on the performance of the manufacturing businesses, five main supply chain practices were considered: Strategic Supplier Relationships (S), Customer Relationships (C), Information Sharing (I), Information Quality (Q) and Postponement (P); while the dependent variable was Organisational Performance (OP).

The regression estimates were given as follows:

$$OP = b_0 + b_1S + b_2C + b_3I + b_4Q + b_5P + \epsilon$$

Where,

b_0 = constant of proportionality

b_1 = Coefficient of SSP Independent Variable

b_2 = Coefficient of CR Independent Variable

b_3 = Coefficient of IS Independent Variable

b_4 = Coefficient of IQ Independent Variable

b_5 = Coefficient of POST Independent Variable

ϵ = error term

OP = Organizational Performance [Outcome]

Table 6: Correlations of Variables and Descriptive Statistics

Variables	1	2	3	4	5	6
Strategic Supplier Relationship	1					
Customer Relationship	.576**	1				
Information Sharing	.610**	.637**	1			
Information Quality	.446**	.569**	.654**	1		
Postponement	.232*	.135	.296**	.205	1	
Organisational Performance	.400**	.662**	.564**	.465**	.067	1
Mean	4.49	5.27	4.78	4.88	4.01	5.17
Standard Deviation	1.35	1.22	1.20	1.00	1.28	1.22

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

The correlation results shown in Table 6 above generally revealed that respondents partly attribute their organisational performance (outcome) to their supply chain practices. Also, trust for suppliers and competition among suppliers are antecedents of supplier relationship management as their associations were positive and significant at 0.01 or 0.05. However, most of the associations with performance were not strong since the coefficients (r) were less than 0.5, with only customer relationships and information sharing being more than 0.5, with $r = .564$ and $.465$, respectively, at $p < 0.1$.

3.5 Model Assessment

Items that did not pass the reliability and validity tests were removed. The model estimation process began with creating composite variables and interaction terms and then examining relevant assumptions underlying the method of estimation employed in the study. The arithmetic means were used to create the composite variables based on each set of retained measures. The five supply chain management practices were treated as a composite variable by averaging their respective items remaining. The same was done with the organisational performance variable.

The researcher used Ordinary Least Squares (OLS) regression analysis to estimate the study's model. The primary outcome variable was organisational performance, and the main predictor variables were Strategic Supplier Relationships (S), Customer Relationships (C), Information Sharing (I), Information Quality (Q) and Postponement (P). The null hypothesis was that these supply chain management practices significantly affect organisational performance. As such, in the model run, organisational performance was predicted by Strategic Supplier Relationships (S), Customer Relationships (C), Information Sharing (I), Information Quality (Q) and Postponement (P). The results can be seen in the OLS regression estimates table in Table 7.

Table 7: Ordinary Least Square Regression Estimates

Variables:	Standard Estimates
	OP Model 1
Hypothesised <i>Direct Effect</i>	
Strategic Supplier Relationship	-0.055(-0.566)
Customer Relationship	0.513(4.522)*
Information Sharing	0.276 (2.145)**
Information Quality	0.046(0.346)
Postponement	-0.073(-0.907)

FIT INDICES: χ^2 (df)= 61.636(5), χ^2 /df=12.3272, F-Statistics = 15.017, R^2 =.481

t-values are in the parenthesis; \pm represents significant F value significant at 1%

* & ** represent significant path at 5% (1-tailed test: 1.645) and 1% (1-tailed test: 2.33) respectively

Hypothesised paths evaluated at a 5% significance level (1-tailed test)

3.6 Hypothesis Testing and Findings

The first hypothesis (H_1) posited that strategic supplier relationships positively influence organisational performance. This hypothesis was not supported from the standardised estimates of Model 1 because the path from SSR to OP was negative ($\beta = -0.055$; $t = -0.566$), and it was not statistically significant at 5%. These study findings revealed that the strategic supplier relationship negatively influences organisational performance as per the results generated. The finding failed to corroborate earlier works (Saragih et al., 2020; Shou, 2019). Proactive suppliers can provide more cost-effective options for product design, aid in selecting optimal components and technology options, and assist in the evaluation of design concepts. Work may be done more efficiently if companies strategically collaborate with their suppliers. It is possible to have a leading-edge supply chain without an efficient supplier alliance.

The second hypothesis (H_2) posits that customer relationships positively influence organisational performance. From model 1, this hypothesis was supported in this study as the standardised estimates ($\beta = 0.513$; $t = 4.522$) supported the hypothesis. From the results of the findings, it could be seen that customer relationship positively affects OP. This supports earlier findings that good relationships with supply chain members, including customers, are needed to successfully implement SCM programs (Bullington and Bullington, 2005). Close customer relationship allows an organisation to differentiate its product from competitors, sustain customer loyalty, and dramatically extend the value it provides to its customers (Vesal et al., 2021).

The third hypothesis (H_3) posits that information sharing positively influences organisational performance. From model 1, this hypothesis was also supported in this study as the standardised estimates ($\beta = 0.276$; $t = 2.145$) support the hypothesis. From the results of the findings, it could be seen that IS has a positive effect on OPF. This supports earlier findings (Bullington and Bullington, 2005; Lado et al., 2011; Engelseth and Felzensztein, 2012) that the key to the seamless supply chain is making available undistorted and up-to-date information at every node within the supply chain. Information can be used as a competitive advantage source by sharing the available data with other parties within the supply chain (Shcherbakov and Silkina, 2021).

The fourth hypothesis (H_4) posits that the quality of information positively influences organisational performance. From model 1, this hypothesis was not supported in this present study as the standardised estimates ($\beta = 0.046$; $t = 0.346$) produced did not support the hypothesis. It could be seen that even though it had a positive effect, it was not significant, $p < 0.05$. From the results of the findings, it could be seen that the quality of information does not positively affect OP. In relation to the literature reviewed, information sharing is essential; the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom (Lotfi et al., 2013; Ajay and Maharaj (2010). It has been suggested that organisations deliberately distort information that can potentially reach their competitors, suppliers, and customers. Organisations need to view their information as a strategic asset and ensure it flows with minimum delay and distortion.

Finally, the last hypothesis (H_5) posits that postponement positively influences organisational performance. This hypothesis was not supported from the standardised estimates of Model 1 because the path from POST to OP was negative ($\beta = -0.073$; $t = -0.907$), and it was not statistically significant at 5%. These study findings revealed that postponement negatively influences organisational performance as per the results generated. This is not consistent with Jum'a et al. (2021) findings, who found a significant impact of postponement on firm-level flexibility and, ultimately, the firm's performance.

4. Conclusions

The first hypothesis theorised that a positive relationship exists between SSR and OP. The study did not find support for this assertion. This presupposes that among manufacturing businesses in Kumasi metropolis, it is not

certain that if there is a strategic relationship with suppliers, it will lead to firm performance. This can be attributed to antagonistic relationships between suppliers and organisations as they do not fight for mutual gains but opportunistic gains. With the second, it was hypothesised that customer relationships positively influence organisational performance. The study found support for this hypothesis. This implies that if organisations become customer focus and incorporate the voice of their customers in their operations, it would help them improve their performance. They can ensure customer relationships by segmenting customers and creating a niche that would make them satisfied. A satisfied customer is a repeat customer who consistently contributes to meeting the goals and objectives of the organisation.

Similarly, the third hypothesis asserts that the level of information sharing with supply chain partners positively influences organisational performance. Again, there was support for this assertion in the study's findings. This implies that information is vital to all stages of relationships and across the supply chain. Where there is information asymmetry, it causes a bullwhip effect which does not augur well for organisational performance. The fourth hypothesis posited that the quality of information shared among supply chain partners positively relates to organisational performance. Even though this study's findings met this hypothesis, it is relevant to note that the effect was not statistically significant. This implies that organisations sometimes deliberately distort information that can potentially reach their competitors, suppliers, and customers. Therefore, organisations must view their information as a strategic asset and ensure it flows with minimum delay and distortion.

Finally, the last hypothesis hypothesised that postponement positively influences procurement performance. From the literature review, postponement is defined as the practice of moving forward one or more operations or activities (making, sourcing and delivering) to a much later point in the supply chain. Postponement needs to match the type of products, the market demands of a company, and structure or constraints within the manufacturing and logistics system. Unfortunately, the study found no support for this hypothesis, which implies that when it comes to supply chain activities, it would be suicidal to move key strategic activities to the latter stages of the supply chain as it would affect the firm's profitability, which would eventually affect organisational performance. The study's findings have revealed that supply chains have grown physically longer (e.g., geographical dispersion) and have become far more complex (e.g., increased reliance on outsourcing, increased number of critical embedded technologies, additional product design complexity). There has been the urge to adopt a lean mentality to drive out waste and excess inventory, yield increased inter-firm dependency, and help reduce business risk from supply chain disruptions. Therefore, there is a need for effective management of supply chain management practices to contribute to organisational performance. Notwithstanding, some challenges mitigate implementing supply chain management practices effectively in organisations.

5. Managerial Implications

There are relevant implications of the study for management consideration. The finding that strategic supplier relationships have no positive effect on OP of manufacturing firms in the Kumasi metropolis is suggestive that managers of manufacturing firms should invest significant resources to improve their relationship with their suppliers. Managers should build a strong relationship with their suppliers. Ensure proper communication with their partners in problem resolution, product development, and improvement activities. Embrace technology to ease the relationship-building process. Technology today offers enormous benefits to supply chain parties when integrated effectively into their processes. Moreover, with the finding that the quality of information Shared positively affects firm performance, managers of manufacturing firms need to recognise that distortion of information by one key supply chain partner may lead to the bullwhip effect in the supply chain. This is suggestive that receiving firms in the chain should double-check the information to ensure the information is accurate before processing.

The study also highlights the negative relationship between postponement and firm performance. While postponement has attendant benefits for the organisation, managers must determine optimal postponement by examining the associated costs within various supply chain configurations according to the market needs. Care must be taken because extensive postponement brings a big challenge to controlling the supply chain; hence, managers must find the balance or optimal postponement levels. Again, the study observed that information sharing positively relates to organisational performance. This means that firms can leverage a higher level of information exchange and coordination of activities in the supply chain. Managers should do their best to share vital information concerning the quality of products, delivery schedules, tools of the trade, etc., for effective operations and better supply chain management.

References

- Aduku, J.M. and Ayertey, S.N. 2015 'Supply Chain Management Integration and Its Effects on, *Universal Journal of Industrial and Business Management*, 2(1).
- Ajay, A., & Maharaj, M. (2010). Effects of Information Sharing within Supply Chains. *SACLA* (35-42). Pretoria:

- University of Pretoria.
- Akafia, E.K., Muntaka, A.S. and Boahen, S. 2017. 'Impact of Service Operation Strategies on the Supply Chain Performance of Private Automobile Companies in Ghana', *Journal of Logistics Management*, 6(1), 11–25.
- Al-Doori, J.A., 2019. The impact of supply chain collaboration on performance in the automotive industry: Empirical evidence. *Journal of Industrial Engineering and Management*, 12(2), 241-253.
- Al-Kurdi, O.F., El-Haddadeh, R. and Eldabi, T., 2020. The role of organisational climate in managing knowledge sharing among academics in higher education. *International Journal of Information Management*, 50, 217-227.
- Asamoah, D. et al. 2021 'Inter-organisational systems use and supply chain performance: The mediating role of supply chain management capabilities, *International Journal of Information Management*, 58(December 2019), p. 102195.
- Avittathur, B., & Ghosh, D. (2020). Operations and supply chain management: The initial journey. In *Excellence in Supply Chain Management (1-8)*. Routledge.
- Beamon, B. M. (1998). Supply chain design and analysis: models and methods. *International Journal of Production Economics*, Vol 55(3):281–94.
- Bempong, E.J., Fugar, F.D. And Eshun, B.T., 2018. The Contractors' perspective is strategies for achieving supply chain sustainability in the Ghanaian construction industry. 5 conceptualised affordable housing framework, p.223.
- Benson, S.A., 2022. A review of corporate governance practices in the service industry in modern-day business. *ADRRJ Journal of Arts and Social Sciences*, 19(1 (7), January 2022-March), 147-158.
- Bratić, D., 2011. Achieving a competitive advantage by SCM *IBIMA Business Review*, 2011, 1-13.
- Bullington, K.E. and Bullington, S.F., 2005. Stronger supply chain relationships: learning from research on strong families. *Supply Chain Management: An International Journal*.
- Burgess, K., Singh, P.J. and Koroglu, R. (2006), "Supply chain management: a structured literature review and implications for future research", *International Journal of Operations & Production Management*, Vol. 26 No. 7, 703-729.
- Chen, C. J. (2019). Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage. *Management Decision*.
- Chen, C.J., 2018. Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage. *Management Decision*.
- Childhouse P, Towill DR. (2003). Simplified material flow holds the key to supply chain integration. *OMEGA*, Vol. 31(1), 17–27
- Christopher, M. (1998), "Logistics and supply chain management: strategies for reducing cost and improving service", (2nd ed.). London: Financial Times Publishing.
- Cohen, J., 2013. *Statistical power analysis for the behavioural sciences*. Routledge.
- Collin, J. (2003). *Selecting the right Supply Chain for a Customer in project business*. Diss. Tekniska högskolan Helsingfors. Helsingfors.
- Connolly, T., Conlon, E.J. and Deutsch, S.J., 1980. Organisational effectiveness: A multiple-constituency approach. *Academy of management review*, 5(2), 211-218.
- Deeks, J.J., Macaskill, P. and Irwig, L., 2005. The performance of tests of publication bias and other sample size effects in systematic reviews of diagnostic test accuracy was assessed. *Journal of clinical epidemiology*, 58(9), 882-893.
- Engelseth, P. and Felzensztein, C., 2012. Intertwining relationship marketing with supply chain management through Alderson's transvection. *Journal of Business & Industrial Marketing*.
- Fantazy, K.A., Kumar, V. and Kumar, U., 2010. Supply management practices and performance in the Canadian hospitality industry. *International Journal of Hospitality Management*, 29(4), 685-693.
- Fawcett, S. E., Osterhaus, P., Magnan, G.M., Brau, J.C. and McCarter, M.W. (2007). "Information Sharing and Supply Chain Performance: The Role of Connectivity and Willingness. *Supply Chain Management International Journal*, Vol. 2(5), 358–568
- Gamini, L.P.S. and Rajapaksa, P.K., 2020. Impact of Supply Chain Management Practices on Competitive Advantage and Organisation Performance: Evidence from the Manufacturing Industry in Sri Lanka. *Sri Lanka Journal of Management Studies*, 2(1).
- Haddouch, H., Beidouri, Z. and El Oumami, M., 2019. Supply chain management: A review of approaches, practices and impact on performance. *International Journal of Supply Chain Management*, 8(6),1-13.
- Hashim, M., Baig, S.A., Amjad, F., Nazam, M. and Akram, M.U., 2019, August. Impact of supply chain management practices on organisational performance and moderating role of innovation culture: A case of Pakistan textile industry. In *International Conference on Management Science and Engineering Management (390-401)*. Springer, Cham.
- Hussain A. H A., and Nassar M. O. 2010. "Supply Chain Integration: Definition and Challenges", Proceedings

- of Multinational Conference of Engineers and Computer Scientist, (1), Hong Kong.
- Jabbarzadeh, A., Haughton, M. and Pourmehdi, F., 2019. A robust optimisation model for efficient and green supply chain planning with postponement strategy. *International Journal of Production Economics*, 214, 266-283.
- Jum'a, L., Zimon, D. and Ikram, M., 2021. A relationship between supply chain practices, environmental sustainability and financial performance: evidence from manufacturing companies in Jordan. *Sustainability*, 13(4), 2152.
- Kannan, V.R. and Tan, K.C., 2006. Buyer-supplier relationships: the impact of supplier selection and buyer-supplier engagement on relationship and firm performance. *International Journal of Physical Distribution & Logistics Management*. 10(5)
- Karimi, E. and Rafiee, M., 2014. Analysing the impact of supply chain management practices on organisational performance through competitive priorities (case study: Iran pumps company). *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4(1), 1-15.
- Khalil, M., Khalil, R. and Khan, S., 2019. A study on the effect of supply chain management practices on organisational performance with the mediating role of innovation in SMEs. *Uncertain Supply Chain Management*, 7(2), 179-190.
- Khanra, S., Dhir, A., Kaur, P. and Joseph, R.P., 2021. Factors influencing the adoption postponement of mobile payment services in the hospitality sector during a pandemic. *Journal of Hospitality and Tourism Management*, 46, 26-39.
- Kumar, S. and Dua, P., 2022. Environmental management practices and financial performance: evidence from large listed Indian enterprises. *Journal of Environmental Planning and Management*, 65(1), 37-61.
- Lado, A.A., Paulraj, A. and Chen, I.J., 2011. Customer focus, supply-chain relational capabilities and performance: Evidence from US manufacturing industries. *The International Journal of Logistics Management*. 75, 145-181.
- Lambert, D. M. 2008. "Supply chain management: processes, partnerships, performance", 3rd Ed., Sarasota, FL: Supply Chain Management Institute.
- Lambert, D. M. 2008. Supply Chain Management: Processes, Partnerships, Performance. Available: <http://www.scm-institute.org>. [Accessed, 3rd March 2022]
- Ledro, C., Nosella, A. and Vinelli, A., 2022. How to assess organisational and strategic impacts of Customer Relationship Management: A multi-perspective performance evaluation method. *Expert Systems with Applications*, 117024.
- Lee, J.Y.H., Saunders, C., Panteli, N. and Wang, T., 2021. Managing information sharing: Interorganizational communication in collaborations with competitors. *Information and Organization*, 31(2), 100354.
- Li, S. et al. (2006) 'The impact of supply chain management practices on competitive advantage and organisational performance, *Omega*, 34(2), 107-124.
- Li, S. et al. (2006) 'The impact of supply chain management practices on competitive advantage and organisational performance, *Omega*, 34(2), 107-124.
- Longo, F., Nicoletti, L., Padovano, A., d'Atri, G. and Forte, M., 2019. Blockchain-enabled supply chain: An experimental study. *Computers & Industrial Engineering*, 136, 57-69.
- Luong, T.C.T., Jorissen, A. and Paeleman, I., 2019. Performance measurement for sustainability: Does firm ownership matter. *Sustainability*, 11(16), 4436.
- Madhani, P. M. (2020). Customer-focused supply chain strategy: developing 4Rs framework for enhancing competitive advantages. *International Journal of Services and Operations Management*, 36(4), 505-530.
- Magretta, J. (1998). The power of virtual integration: an interview with Dell computers' Michael Dell. *Harvard Business Review*, Vol 76(2):72-84.
- Manab, N. and Aziz, N., 2019. Integrating knowledge management in sustainability risk management practices for company survival. *Management Science Letters*, 9(4), 585-594.
- Maskey, R., Fei, J. and Nguyen, H.O., 2020. Critical factors affecting information sharing in supply chains. *Production Planning & Control*, 31(7), 557-574.
- Mason-Jones, R. and Towill, D. R. 1997. Information enrichment: designing the supply chain for competitive advantage. *Supply Chain Management*, Vol 2(4):137-48.
- McAdam, R. and McCormack, D. 2001). Integrating business processes for global alignment and supply chain management. *Business Process Management Journal*, Vol 7(2):113-30.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D. & Zacharia, Z. G. (2001), "What is supply chain management" in Mentzer, J.T. (Ed.), *Supply Chain Management*, Sage, Thousand Oaks, CA, 1-25.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Soonhoong M., Nix, N. W., Smith, C. D., and Zacharia, Z. G. 2001, "Defining Supply Chain Management". *Journal of Business Logistics*, 22(2), 1-25.
- Moberg, C.R., Cutler, B.D., Gross, A. and Speh, T.W., 2002. Identifying antecedents of information exchange

- within supply chains. *International Journal of Physical Distribution & Logistics Management*, 32(9):755–70.
- Monczka, R. M., Morgan, J. 1997. What's wrong with supply chain management? *Purchasing*, Vol 122(1):69–72.
- Nunnally, J.C. 1978. *Psychometric theory*. New York, NY: McGraw-Hill.
- Oliveira-Dias, D., Maqueira, J.M. and Moyano-Fuentes, J., 2022. The link between information and digital technologies of industry 4.0 and agile supply chain: Mapping current research and establishing new research avenues. *Computers & Industrial Engineering*, 108000.
- Pagh, J. D. and Cooper, M. C. 1998. Supply chain postponement and speculation strategies: how to choose the right strategy. *Journal of Logistics Management*, Vol 19(2):13–33.
- Pallant, J. (2007) *SPSS Survival Manual: A Step-by-Step Guide to Data Analysis using SPSS for Windows*. Third Edit. New York NY: Open University Press (McGraw Hill Education).
- Pallant, J. (2007) *SPSS Survival Manual: A Step-by-Step Guide to Data Analysis using SPSS for Windows*. Third Edit. New York NY: Open University Press (McGraw Hill Education).
- Petrovic-Lazarevic, S., Sohal, A. and Baihaqi, I., 2007. Supply chain management practices and supply chain performance in the Australian manufacturing industry. Monash University Faculty of Business and Economics.
- Prajogo, D., Chowdhury, M., Yeung, A.C. and Cheng, T.C.E., 2012. The relationship between supplier management and firm's operational performance: A multi-dimensional perspective. *International journal of production economics*, 136(1), 123-130.
- Ragab, MA and Arisha, A., 2018. Research methodology in business: A starter's guide. *Management and organisational studies*, 5(1), 1-14.
- Rashed, C.A.A., Azeem, A. and Halim, Z., 2010. Effect of information and knowledge sharing on supply chain performance: a survey-based approach. *Journal of Operations and Supply Chain Management*, 3(2), 61-77.
- Reinartz, W., Krafft, M. and Hoyer, W.D., 2004. The customer relationship management process: Its measurement and impact on performance. *Journal of marketing research*, 41(3), 293-305.
- Reinartz, W., Krafft, M. and Hoyer, W.D., 2004. The customer relationship management process: Its measurement and impact on performance. *Journal of marketing research*, 41(3), 293-305.
- Sanders, N.R. and Premus, R., 2002. IT applications in supply chain organisations: a link between competitive priorities and organisational benefits. *Journal of business logistics*, 23(1), 65-83.
- Saragih, J., Tarigan, A., Silalahi, E.F., Wardati, J. and Pratama, I., 2020. Supply chain operational capability and supply chain operational performance: Does the supply chain management and supply chain integration matters. *Int. J Sup. Chain. Mgt Vol*, 9(4), 1222.
- Schniederjans, M.J., Cao, Q. and Ching Gu, V., 2012. An operations management perspective on adopting customer-relations management (CRM) software. *International Journal of Production Research*, 50(14), 3974-3987.
- Shahbaz, M.S., Rasi, R.Z.R.M., Zulfakar, M.H., Ahmad, M.B., Abbas, Z. and Mubarak, M.F., 2018. A novel metric of measuring performance for supply chain risk management: drawbacks and qualities of good performance. *Journal of Fundamental and Applied Sciences*, 10(3S), 967-988.
- Shcherbakov, V. and Silkina, G., 2021. Supply chain management open innovation: Virtual integration in the network logistics system. *Journal of Open Innovation: Technology, Market and Complexity*, 7(1), 54.
- Shou, Y., Shao, J., Lai, K.H., Kang, M. and Park, Y., 2019. The impact of sustainability and operations orientations on sustainable supply management and the triple bottom line. *Journal of Cleaner Production*, 240.
- Singh, P.J. and Power, D., 2009. The nature and effectiveness of collaboration between firms, their customers and suppliers: a supply chain perspective. *Supply Chain Management: An International Journal*.
- Suifan, T., Saada, R., Alazab, M., Sweis, R., Abdallah, A. and Alhyari, S., 2020. Quality of information sharing, agility, and sustainability of humanitarian aid supply chains: an empirical investigation. *Int. J Sup. Chain. Mgt.*, 9(5), 1-13.
- Tan, K. C., Kannan, V.R. and Handfield, R. B. (1998). Supply chain management: supplier performance and firm performance. *International Journal of Purchasing and Materials Management*. Vol 34(3):2–9.
- Tan, K. C., Lyman, S. B., Wisner, J. D. (2002). Supply chain management: a strategic perspective. *International Journal of Operations and Production Management*. Vol 22(6):614–31.
- Velda, AME, 2019, June. Impact of Supply Chain Management Practices on Financial Performance: Case Study of Automotive Suppliers in Morocco. In *2019 International Colloquium on Logistics and Supply Chain Management (LOGISTIQUA)* (1-5). IEEE.
- Vesal, M., Siahtiri, V. and O'Cass, A., 2021. Strengthening B2B brands by signalling environmental sustainability and managing customer relationships. *Industrial Marketing Management*, 92, 321-331.
- Wang, C. and Hu, Q., 2020. Knowledge sharing in supply chain networks: Effects of collaborative innovation activities and capability on innovation performance. *Technovation*, 94, 102010.

- Wieder, B. and Ossimitz, M.L., 2015. The impact of Business Intelligence on the quality of decision making—a mediation model. *Procedia Computer Science*, 64, 1163-1171.
- Wiengarten, F., Humphreys, P., Cao, G., Fynes, B. & McKittrick, A. (2010). Collaborative Supply chain Practices and Performance: Exploring the Key Role of Information Quality. *Supply Chain Management: An International Journal*, Vol 15(6), 463-473.
- Zailani, S., Rajagopal, P., Jauhar, J. and Wahid, N.A., 2007. New product development benchmarking to enhance operation competitiveness. *International Journal of Services and Operations Management*, 3(1), 23-40.
- Zhao, Z., Waszink, A. and Wijngaard, J. (2002), “An instrument for measuring TQM implementation for Chinese manufacturing companies”, *International Journal of Quality & Reliability Management*, Vol. 17 No. 7, 730-755.
- Zhou, H. and Benton, W.C. Jr (2007), “Supply chain practice and information sharing”, *Journal of Operations Management*, Vol. 25 No. 6, 1348-1365.

Appendix I – Instrument

Supply Chain Management Practices						
Strongly Disagree	Disagree	Somehow Disagree	Neutral	Somehow Agree	Agree	Strongly Agree
1	2	3	4	5	6	7
Strategic Supplier Relationship (SSP)				Response		
1. Your organisation consider quality as your number one criterion in selecting suppliers.						
2. Your organisation regularly solves problems jointly with your suppliers.						
3. Your organisation has helped your suppliers to improve their product quality.						
4. Your organisation has continuous improvement programs that include your key suppliers.						
5. Your organisation includes your key suppliers in our planning and goal-setting activities.						
6. Your organisation actively involve our key suppliers in new product development processes.						
Customer Relationship (CR)				Response		
1. Your organisation frequently interacts with customers to set reliability, responsiveness, and other standards for you.						
2. Your organisation frequently measures and evaluate customer satisfaction.						
3. Your organisation frequently determines future customer expectations.						
4. Your organisation facilitates customers’ ability to seek assistance from you.						
5. Your organisation periodically evaluates the importance of your relationship with your customers						
Level of Information Sharing (IS)				Response		
1. Your organisation informs trading partners in advance of changing needs.						
2. Your organisation’s trading partners share proprietary information with you.						
3. Your organisation’s trading partners keep you fully informed about issues that affect your business.						
4. Your organisation’s trading partners share business knowledge of core business processes with you.						
5. You and your organisation’s trading partner exchange information that helps establishment of business planning.						

6. You and your organisation's trading partners keep each other informed about events or changes that may affect the other partners.													
Level of Information Quality (IQ)							Response						
1. Information exchange between you and your organisation's trading partners is timely.													
2. Information exchange between you and your organisation's trading partners is accurate.													
3. Information exchange between you and your organisation's trading partners is complete.													
4. Information exchange between you and your organisation's trading partners is adequate.													
5. Information exchange between you and your organisation's trading partners is reliable													
Postponement (P)							Response						
1. Your organisation's products are designed for modular assembly.													
2. Your organisation delays final product assembly activities until customer orders have been received.													
3. Your organisation delays final product assembly activities until the last possible position (or nearest to customers) in the supply chain.													
Organisational Performance													
Significantly Decreased	Decreased	Somehow Decreased	Same as Before	Somehow Increased	Increased	Significantly Increased							
1	2	3	4	5	6	7							
Organisational Performance (OP) Indicators							Response						
1. Market share.													
2. Return on investment.													
3. The growth of market share.													
4. The growth of sales													
5. Growth in return on investment.													
6. Profit margin on sales.													
7. Overall competitive position.													