



Supply Chain Management Practices and Supply Chain Performance in the Manufacturing Industries of Bangladesh: An Empirical Study

Trisha Nag^{1*} & Dr. Shameema Ferdausy²

¹Graduate Student, Department of Management, University of Chittagong, Chittagong 4331, Bangladesh

²Professor, Department of Management, University of Chittagong, Chittagong 4331, Bangladesh

*Corresponding author: nagtrisha.mgt@gmail.com

<https://riopenjournals.com/index.php/Supply-Chain-Logistics-review/index>

Doi: <https://doi.org/10.38157/logistics-supply-chain-review.v2i1.192>

Citation: Nag, T. & Ferdausy, S. (2021). Supply Chain Management Practices and Supply Chain Performance in the Manufacturing Industries of Bangladesh: An Empirical Study. *Logistics & Supply Chain Review 2(1)*, 1-26. Doi: <https://doi.org/10.38157/logistics-supply-chain-review.v2i1.192>

Research Article

Abstract

Purpose: The paper aims to examine the association between supply chain management practices (SCMP) and supply chain performance (SCP) in the manufacturing industries of Bangladesh. SCMP was classified as strategic supplier partnership (SSP), customer relationship (CR), information sharing level (IS), information quality level (IQ), and postponement (POS).

Methods: It is a quantitative research based on a survey questionnaire. Supply chain management practices were measured by items adapted from Li, Nathan, and Rao (2006), while supply chain performance was measured by using key supply chain performance indicators suggested by Ambe (2013). Using convenience sampling technique, data were collected from 203 executives involved in supply chain activities working in different manufacturing organizations in two major cities of Bangladesh (Dhaka and Chittagong). Descriptive statistics, bivariate correlation, and regression analysis were used to analyze the data.

Results: Results demonstrated a positive correlation between supply chain management practices and supply chain performance ($r=0.67^{**}$). However, strategic supplier partnership, customer relationship, and postponement are more strongly related to improving supply chain performance than information sharing level and information quality level.

Implications: A significant implication of the study is that manufacturing organizations should develop supply chain management capabilities to improve supply chain performance and they should begin with developing their level of information sharing and level of information quality.

Limitations: The use of the convenience sampling technique limits the generalizability of the findings. The small sample size ($n=203$) also warrant caution in interpreting the results.

Keywords: Supply chain management practices, strategic supplier partnership, information sharing level, information quality level, supply chain performance.

1. Introduction

With the growth in global competition, many researchers have expressed the need for a coordinated, unified, and long term relationship between manufacturers and their supply chain partners (Lambert, Robeson, & Stock, 1978; Armistead & Mapes, 1993). Supply chain management (SCM) is considered a vital strategy for firms to increase profitability and stay competitive (Al-Shboul, Barber, Garza-Reyes, Kumar, & Abdi, 2017). SCM encompasses the planning and management of all activities involved in the process of sourcing, procurement, conversion, and all logistics management functions (Ellrama & Murfield, 2019). The phrase "Supply chain management" originated in the early 1980s. Oliver and Webber (1982) define supply chain management as the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible.

Supply Chain Management comprises some particular tactics and practices to effectively and efficiently incorporate suppliers, manufacturers, distributors, and customers to improve the sustainable individual firms' performance and supply chain altogether in a unified business model (Tatoglu, Bayraktar, Golgeci, Koh, Demirbag, & Zaim, 2015). SCM practices can be considered as a multi-dimensional paradigm that encompasses upstream and downstream sides of the supply chain (Li, Nathan, & Rao, 2006). Supply chain management practices circumscribe some perspectives and practices that aptly connect all suppliers, manufacturers, distributors, and consumers to achieve all long-term performance objectives (Basheer, Siam, Awn, & Hassan, 2019). Therefore, for staying competitive in the global race and for enhancing profitability, the understanding and practicing of SCM has become an important criterion (Al-tarawneh & Al-Shourah, 2018; Childhouse & Towill, 2003; Moberg, Cutler, Gross, & Speh, 2002).

Leading scholars now agree that various supply chain management practices in the organization helps increase competitive capability (Bima, Hoque, & Munapo, 2020; Kim, 2006), productivity and operational cost efficiency (Brewer & Speh, 2000), market share (Tan, Limen, & Wisner, 2002), operational performance (Koh, Demirbag, Bayraktar, Tatoglu, & Zaim, 2007), organizational performance (Attia & Eldin, 2018; Khan & Qianli, 2017), supply chain integrations (Sundram, Chandran, & Bhatti, 2016), supply chain efficiency and effectiveness (Abdulla, Obeidat, & Aqqad, 2014), and supply chain performance (Al-Shboul et al., 2017).

Supply chain performance can be defined as the ability of the supply chain to deliver the right product to the correct location at the appropriate time at the lowest cost (Zhang & Okoroafo, 2015). Leonczuk (2016) viewed supply chain performance as the capability of the entire supply chain to satisfy end-customer needs, including ensuring the availability of the product, on-time delivery, and appropriate inventory levels. The objective of the study is to examine the association between SCM practices and SCM performance in the context of the manufacturing industries of Bangladesh. The literature shows that such a study was not conducted so far in the context of Bangladesh. To achieve the major objective, the following sub-objectives are set:

- a. To assess the relationship between strategic supplier partnership and supply chain performance in the manufacturing industries of Bangladesh,

- b. To determine the relationship between customer relationship and supply chain performance in the manufacturing industries of Bangladesh,
- c. To evaluate the relationship between information sharing level and supply chain performance in the manufacturing industries of Bangladesh,
- d. To examine the relationship between information quality level and supply chain performance in the manufacturing industries of Bangladesh, and
- e. To investigate the relationship between postponement and supply chain performance in the manufacturing industries of Bangladesh.

2. Literature Review

2.1 Supply Chain Management Practices:

Supply chain management practices (SCMP) comprises a group of individual functional entities, approaches, and practices for increasing the long-term competitive performance of individual firms and their supply chain overall by integrating the internal functions within the firm and also effectively relating them with the external functions of suppliers, manufacturers, distributors, customers and their other channel members (Al-Shboul et al., 2017). It can be considered as the set of activities that taken place in an organization so that it can promote effective management of its supply chain (Attia & Eldin, 2018). Sundram, Chandran, and Bhatti (2016) defined SCMP as operational functions of an organization that helps to ascertain the effectiveness and efficiency of its supply chain. Two specific purposes of SCM will be enabled to interpret the strategic nature of SCMP. These two are, namely, to enhance the performance of an individual organization and to increase the performance level of the entire supply chain (Trkman, McCormack, Oliveira, & Ladeira, 2010). SCM requires more close integration of the firms' internal functions and also external involvement with their suppliers, customers, and other channel members to be highly competitive and to attain sustainable profitability growth. It can be possible to achieve this through the effective construction of various SCM practices (Sundram, Chandram, & Bhatti, 2016).

SCMP has numerous dimensions that have been identified by various authors. Chen and Paulraj (2004) mentioned various other dimensions to measure SCM practices. Those are supplier base reduction, proper communication, cross-functional teams, long-term relationship, and supplier collaboration. Moreover, to conceptualize SCM practices, Min and Mentzer (2004) added seven essential variables, such as supply chain leadership style, information sharing level, long-term relationship, agreed on vision and goals, risk and reward sharing, process integration, and its cooperation. To successfully implement the SCM; Mentzer, DeWitt, Keebler, Min, Nix, and Smith (2001) suggested the following necessary activities: integrated behavior, integration of processes, mutually sharing of information, cooperation, goal congruence, the same focus in serving customers, and, building and maintaining long term relationships. So that supply chain management practices have various dimensions and perspectives which ultimately enhance the performance of the overall organization. As a result, supply chain management practices are considered as a multidimensional concept. This study has focused on five constructs or dimensions of supply chain management practices. These five dimensions are

strategic supplier partnership, customer relationship, information sharing level, information quality level, and postponement.

2.1.1. Strategic Suppliers Partnership: Strategic supplier partnership (SSP) can be defined as the long-term and committed relationship that is developed between the organization and its suppliers (Al-Shboul et al., 2017; Li et al., 2006). It has been described as an SC collaboration, wherein more than two autonomous firms work together to plan and implement SC operations to achieve a fixed goal (Simatupang & Sridharan, 2002). Dell, Hewlett-Packard, Procter and Gamble, and IBM have all formed long-term collaborative connections with their main suppliers, and this has run to a decline of transaction costs and an increase in mutual competitive advantage (Sheu, Yen, & Chae, 2006). That kind of collaboration allows firms to share risks (Kogut, 1988), measure their complementary resources (Park et al., 2004), provide a lower transaction cost, increase productivity (Kalwani & Narayandas, 1995), and improve firm performance in terms of profit and competitive advantage (Mentzer, Foggin, & Golicic, 2000). To operate a leading-edge supply chain, SSP is considered as a crucial strategy (Lonngren, Rosenkranz, & Kolbe, 2010). Azar, Kahnali, and Taghavi (2008) have examined the impact of supplier management on the performance level and they have found that effective management of the supplier is directly linked to a higher performance level. The partnership with suppliers and information integration with them have an influence on the performance of the supply chain (Khan & Siddiqui, 2018).

2.1.2. Customer Relationship: Customer relationship (CR) practices are considered as a set of tactics employed by an organization to accomplish some essential customer requirements which may include, customer relationship management, dealing with customer complaints, and enhancing customer satisfaction (Sundram, Chandram, & Bhatti, 2016). Close customer relationship enables an organization to differentiate and modify its product from its competitors and extend the value which it provides to its customers and that leads to sustaining customer loyalty through customer satisfaction (Cox, 2004; Dadzie & Winston, 2007). According to Bayraktar, Demirbag, Koh, Tatoglu, and Zaim (2009), forming a close customer relationship is as necessary as establishing a close supplier relation. And, Frohlich and Westbrook (2002) also claim the significance of establishing close customer partnerships to create customer value. It allows organizations to develop customized products, thus addressing different attributes of flexibility, enables tracking of and addressing changes in customer demand preferences and trends, thus addressing the attribute of responsiveness (Tarafdar & Qrunfleh, 2016). Customer relationship involves different forms and activities including integrated problem-solving initiatives, establishing long-term relations with customers, enhancing customer contacts, effective response to customer complaints, and increasing customer satisfaction (Boulding, Staelin, Ehret, & Johnston, 2005; Sousa, 2003).

2.1.3. Information Sharing Level: The information sharing level (IS) is a vital component in successful supply chains. It can be defined as the transfer of product-related information such as

inventory levels, delivery schedules, order status, and performance (Khan et al., 2018). Shared information has several kinds related to inventory, resources, products, demands, delays, and planning information. It also contains various quality-related information, logistics, customer preferences, the firm's general market information, and design information (Singh, 2013). It can accelerate the flow of information in the supply chain, enhance the flexibility and efficiency of the supply chain, and also increase responsiveness to changing customer needs by sharing available data with other supply chain partners. More information sharing leads to greater visibility across the supply chain, and as a result, it enables lower inventory levels and lower supply chain costs considerably and reduces lead time through reductions in inventories and shortages (Nimeh, Abdallah, & Sweis, 2018).

To create the best result, shared information has to be adequate, accurate, credible, and timely (Li, Nathan, & Rao, 2004). Information sharing affects performance in terms of improved customer responsiveness, decreased costs, enhanced service levels, and reduced levels of complexity (Zhao & Benton, 2007).

2.1.4. Information Quality Level: Information quality level (IQ) involves some aspects to manage information properly and communicate effectively and efficiently in the term of accuracy, adequacy, timeliness, and credibility (Sundram, Chandram, & Bhatti, 2016; Li et al., 2006). Lee, Strong, Kahn, and Wang (2002) defined four distinct categories of the attributes of business information quality, those are named as intrinsic, contextual, representational, and accessible. Information exchanged between trading partners should have a certain quality (i.e. timely, accurate, complete, adequate, and reliable), in which such quality information will assist firms to make informed decisions on the updated-ness of their processes, techniques, and technology and thus being technologically competitive (Lee, Ooi, Loong, & Sohal, 2018). Hence, ensuring the quality of shared information becomes a critical aspect of effective supply chain management (Banerjee & Mishra, 2017; Feldmann & Muller, 2003).

2.1.5. Postponement: Postponement (POS) is perceived as an organizational concept whereby some of the supply chain activities are not executed until precise customer order information becomes available (Carbonara & Pellegrino, 2018). It enables an organization-organization to achieve a great level of product customization along with production flexibility (Kisperska-Moron & Swierczek, 2011). Generally, inventories are retained undifferentiated for a specific period until customer demand is certain. Therefore, an organization becomes highly responsive as regards the changing pattern in customer demand (Li et al., 2006; Li, Rao, & Nathan, 2005). POS can bring several benefits to companies. It enables companies to control the risks related to product diversity and uncertain demand, increases flexibility, enables companies to keep their options open before the availability of sufficient information, reduces supply chain costs by keeping undifferentiated inventories, reduces levels of inventory, improves forecasting effectiveness, facilitates mass customization, and reduces production cycle times (Yang et al., 2007; Li et al., 2004).

2.2. Supply Chain Performance:

Supply chain performance (SCP) has become an indispensable source of sustainable competitive advantage in most industries. It considers multiple performance measures related to supply chain members, along with the integration and coordination of their performance (Al-Shboul et al., 2017).

Table 1: List of Key Supply Chain Performance Indicators

Attributes	Key Performance Indicators
Quality	Meeting quality performance standards
	Defect detected per unit produced per unit purchased
	Quality awards standards
	Products per unit sold
	Fitness of use
Flexibility	Supply chain response time
	Production flexibility
Cost	Cost measures within the organization
	Total supply chain management cost (across the supply chain)
Supplier reliability	Effectiveness of supplier
	Identification of supplier
	Improve supplier communication
	Improve supplier risk management
Innovation	Annual investment in research and development
	Radical and incremental changes
Responsiveness	Order fulfillment lead time
Order delivery lead time	Fulfillment of orders on time
	Damage-free delivery
	Complete delivery as required
	Delivery meets customers' requirement
Final product delivery reliable	Delivery performance
	Fill rates
	Product order fulfillment
Product variety	Product families processed in one facility
	Processing cost and flow times
	Range of products offered
Asset management	Cash-to-cash cycle time
	Inventory days of supply
	Asset turns

Source: Ambe (2013)

Besides this, SCP projects as a set of metrics reflecting activities or tasks pertaining to customer service, corrective actions, and preventive action (Gunasekaran, Patel, & McGaughey, 2004). The purpose of this supply chain performance is to meet its short-term and long-term objectives (Atilgan & McCullen, 2011). The short-term objectives of the SCP involve measures intended to improve the productivity of the total supply chain through (1) inventory reduction and (2)

shorter lead time. Simultaneously, the long-term objectives of the SCP involve measures considered to (1) increase market share and (2) integration of all trading partners in the total supply chain (Li et al., 2006; Lyons, Coleman, Kehoe, & Coronado, 2004). According to Petterson (2009), there are three types of components in an SCP measurement system: flexibility, resource, and output. To measure the supply chain performance Ambe (2013) assembled the possible indicators which are presented in Table 1.

2.2.1 Quality: Quality is considered to be identified as standards, procedures, and specifications. According to Hugo, Badenhorst, and Van Biljon (2004), managing product quality in the supply chain is the shared responsibility of all members. Some of the indicators of quality include a formal quality assurance system, continuous improvement, statistical process control, six sigma limits, fail-safe lot traceability, and incoming quality assured. Jacobs, Chase, and Aquilano (2009) emphasize that the quality of a specification of a product relays to decisions and actions made relative to the design and quality of conformance to the design.

2.2.2 Flexibility: In the supply chain, flexibility is the agility in responding to casual changes in the marketplace in order to achieve or sustain competitive advantage (Wisner, Tan, & Leong, 2012). Flexibility has become mainly valuable in new product development. Some organizations compete by developing new products faster than their competitors. This requires supply chain partners who are flexible and willing to work closely with designers, engineers, and marketing personnel (Bozarth & Handfield, 2006). Supply chain response time measures the number of days it takes a supply chain to respond to marketplace changes without cost penalties (Bowersox, Close, & Cooper, 2010).

2.2.3 Costs: Supply chain costs include all costs related to operating the supply chain, including the cost of goods and total supply chain management cost (Bolstorff & Rosenbaum, 2003). Supply chain costs are associated with forecasting, administration, transportation, inventory, manufacturing, customer service, and supplier relationship management (Burt, Petcavage, & Pinkerton, 2010).

2.2.4 Supplier Reliability: Organizations try to identify suppliers with exceptional performance or developmental needs, improve supplier communication, decrease risk, and manage the partnership based on the analysis by evaluating supplier performance (Wisner et al., 2012). According to Wisner et al. (2012), some of the key indicators of supplier reliability contain billing accuracy, order accuracy, on-time completion, and promises kept.

2.2.5 Innovation: Innovation in the supply chain ensures that existing technologies, as well as technologies under development, always face the possibility of being pushed aside by alternative developments. Some of the performance measures and indicators for innovation include the following: annual investment in research and development, the percentage of automated processes, the number of new product or service introductions, and the number of process steps required per product (Wisner et al., 2012).

2.2.6 Responsiveness: Supply chain responsiveness means how quickly a supply chain delivers products to the customer (Cohen & Rousell, 2005). It encompasses the time that elapses from a customer's order being received to completed delivery (Jonsson, 2008).

2.2.7 Order Delivery Lead Time: According to Wisner et al. (2012), order delivery lead time involves the fulfillment of the average proportion of orders arrive on time among supply chain members, complete and damage-free, satisfying customer desires.

2.2.8 Final Product Delivery Reliability: Supply chain delivery reliability means the performance of the supply chain in delivering the correct product to the correct place at the correct time in the correct condition and packaging in the correct quantity with the correct documentation to the correct customer (Cohen & Rousell, 2005). An organization can have long lead times, however still maintain a high level of reliability (Bozarth & Handfield, 2006). Three indicators identified to measure supply chain delivery reliability are delivery performance, fill rates and perfect order fulfillment. In top-performing supply chains, delivery dates are met 94% to 100% of the time. For average organizations, delivery performance is at **around** 70% to 80% (Wisner et al., 2012).

2.2.9 Product Variety: According to Wisner et al. (2012), product variety measures the number of product families processed in a facility.

2.2.10 Asset Management: Supply chain asset management refers to the effectiveness of an organization in managing assets to support demand satisfaction (Taylor, 2004). Three indicators that measure supply chain asset management efficiency are cash to cash cycle times, inventory days of supply, and asset turns. Top organizations have a cash-to-cash cycle time of approximately 30 days (Wisner et al., 2012).

3. Hypotheses Development

3.1 Strategic Supplier Partnership and Supply Chain Performance

ArawatiAgu (2011) revealed that all the determinants of SSP such as 'quality' and 'continuous improvement programs' and 'joint-effort problem solving' exhibit a high and significant impact on supplier performance. It is recommended that the broader concept of supplier strategic partnering is supply chain partnering. It can be asserted that such a level of strategic collaboration will certainly uplift the performance level among supply chain collaborative partners (Boddy, **Macbeth**, & Wagner, 2000; Juste & Fierro, 2009). Thus we have proposed the first hypothesis as follows:

H1. Strategic supplier partnership is positively related to supply chain performance in the manufacturing industries of Bangladesh.

3.2 Customer Relationship and Supply Chain Performance

Chin, Tummala, Leung, and Tang (2004) have identified that if it is possible to maintain effective customer relationships, it will able to stimulate open communication among members of the supply chain and that will ultimately involve joint problem-solving efforts with a long term commitment. So it can be said that effective customer relationship practices can bring a significant impact in order to manage the entities of the total value chain across the supply

chain and to improve the performance of the total supply chain. So, customer relationship is expected to improve supply chain performance. Thus we have formulated the second hypothesis as follows:

H2. Customer relationship is positively related to supply chain performance in the manufacturing industries of Bangladesh

3.3 Information Sharing Level and Supply Chain Performance

Various researchers have empirically established the link between information sharing level and SCP. Lotfi, Mukhtar, Sahran, and Zadehb (2013) have investigated and summarized the benefits of the level of information sharing on SCP. Zhao (2002) and; Lee, So, and Tang (2000) give evidence of the positive impact of information sharing on inventory reduction and cost reduction. Fawcett, Osterhaus, Meghnan, Brau, and McCarter (2007) have investigated two dimensions of information sharing level– connectivity and willingness – which were both found to influence SCP. Ajay and Maharaj (2010) revealed that information sharing level has a great influence on the overall cost of running a successful supply chain, and improves the activities of holistic supply chain management. Rashed, Azeem, and Halim (2010) have explored the combined impact of information and knowledge sharing on supplier’s operational performance. Thus we have developed the third hypothesis as follows:

H3. Information sharing level is positively related to supply chain performance in the manufacturing industries of Bangladesh

3.4 Information Quality Level and Supply Chain Performance

Zailani and Rajagopal (2006) verified that when information quality level is maintained, then better SCP is attained. Zhou, Shou, Zhai, Wood, and Wu (2014) show that firms need to align supply chain practice with the level of their information quality in order to achieve enhanced overall business performance. The selected supply chain practices under investigation were sourcing practice and delivery practice. Therefore, it is important to determine whether a verifiable relationship exists between information quality and SCP. Deficiency in different information quality could impact the usefulness of forecast and its ability to influence SCP (Forslund & Jonsson, 2007). Thus we have developed the fourth hypothesis as follows:

H4. Information quality level is positively related to supply chain performance in the manufacturing industries of Bangladesh

3.5 Postponement and Supply Chain Performance

Abdallah, Obeidat, and Aqqad (2014) revealed that postponement can significantly and positively affect supply chain effectiveness or performance. The main objective of postponement is to push final product completion to the final customer as close as possible so that it can ultimately reduce inventory level and minimize the risk of the unsold product (Al-Shboul et al., 2017). POS can reduce inventory cost and eventually increase supply chain performance (Sundram, Chandran, & Awis, 2016; Yang, Yang, & Wijngaard, 2007). POS strategy can reduce marketing risks and supply chain costs (Xiong, Du, & Jiao, 2018). Thus we have proposed the fifth hypothesis as follows:

H5. Postponement is positively related to supply chain performance in the manufacturing industries of Bangladesh

4. Research Framework:

Based on the literature review and hypotheses considered for the study, the following research framework is conceived to illustrate the connections among strategic supplier partnership, customer relationship, information sharing level, information quality level, and postponement in Figure 1

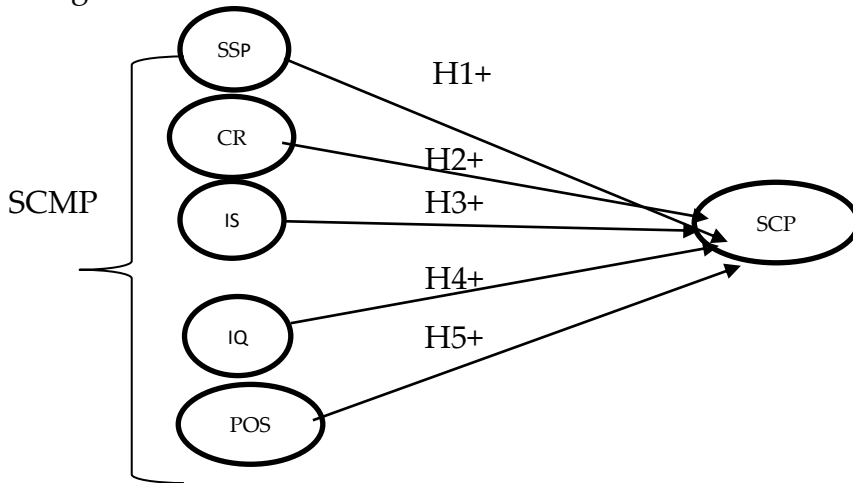


Figure 1: Hypothetical Model of the Study

Note: SCMP= Supply Chain Management Practices, SSP = Strategic Supplier Partnership, CR = Customer Relationship, IS = Information Sharing Level, IQ = Information Quality Level, POS = Postponement, SCP = Supply Chain Performance

5. Research Methods:

5.1 Participants

This research was conducted with samples of 203 employees working at different local and foreign manufacturing organizations in Bangladesh. The manufacturing industry was classified into seven categories, such as RMG, steel, pharmaceutical, automotive, cement, food and beverage, and others in Dhaka and Chittagong city. The respondents were assured that the information collected would be kept confidential and would be used only for academic purposes. A profile of the respondents is presented in Table 2. Respondents' age range was from 24 to 48 years, with a mean of 34.10 (SD = 5.8) years. Of them, 137 (67.5%) of the respondents were male while 66 (32.5%) of the respondents were female. The marital status of the respondent showed that 140 (69.0%) were married while 63 (31.0%) were unmarried. There were 58 (28.6%), 110 (54.2%), and 35 (17.2%) representation by the lower, middle, and top-level participants respectively. The average experience of the respondents was 4.7 (SD =3.2) years. All of the respondents were well educated: 21 (10.3%) had completed bachelor degrees, 182 (89.7%) had master degrees. The respondents were from different industries including 49 (24.1%) belonged to RMG, 63 (31.0%) to steel, 20 (9.9%) to pharmaceutical, 17 (8.4%) to automotive, 12 (5.9%) to cement, 15 (7.4%) food and beverage, and 27 (13.3%) to other industry. Among them, 133 (65.5%) belonged to local and 70 (34.5%) to foreign organizations.

Table 2: Summary of the Demographic Information of the Respondents

Mean and Standard Deviation of Age and Experience of the Respondents		Means	Standard Deviations
Age		34.1	5.8
Experience		4.7	3.2
Frequency and Percentage of other Demographic information of the Respondents		Frequency	Percentage
Gender of Respondent	Male	137	67.5
	Female	66	32.5
Marital Status of Respondents	Single	63	31.0
	Married	140	69.0
Organizational Position of Respondents	Top Level	35	17.2
	Mid-Level	110	54.2
	Lower Level	58	28.6
Educational Qualification of Respondents	Bachelor	21	10.3
	Master	182	89.7
Nature of the Industry	RMG	49	24.1
	Steel	63	31.0
	Pharmaceutical	20	9.9
	Automotive	17	8.4
	Cement	12	5.9
	Food & Beverage	15	7.4
	Others	27	13.3
	Nature of the Organization	Local	133
Foreign		70	34.5

Source: Authors' calculation, 2020

5.2 Survey Instruments:

The study used previously developed scales for measuring the selected variables. The study adopts the following measures to collect data from the participants:

Instruments of Measuring Supply Chain Management Practices: Supply chain management practices were measured using the questionnaire developed by Li et al. (2006). The supply chain management practices instrument uses 25 items to produce a scale to measure the five components of SCMP. The five components of the instrument are – i) Strategic supplier partnership, ii) Customer relationship, iii) Information sharing level, iv) Information quality level, and v) Postponement. Strategic supplier partnership, customer relationship, information sharing level, information quality level, and postponement were measured by 5, 6, 5, 6, and 3 items, respectively. The items were measured on a 5-point Likert scale from 5 (strongly agree) to 1 (strongly disagree) where a higher score indicates a greater SCMP performed by an employee in the organization. Sample items were ‘We consider quality as the number one criterion in selecting our suppliers’ (SSP), ‘We routinely measure and evaluate our customer satisfaction’ (CR), ‘We notify our trading partners afore of changing needs’ (IS), ‘Information interchange between our trading partners and us is timely’ (IQ), ‘Our products are designed for modular assembly’ (POS).

Instruments of Measuring Supply Chain Performance: Supply chain performance was measured by using key SCP indicators assembled by Ambe (2013). Ten items were used to assess the performance level of the organizations' supply chain rated by their employees. Sample items were 'The ability to meet quality performance standard', 'The ability to deal with variations in production volume and product design', 'The ability to provide damage-free delivery' etc. The items were also measured on a 5-point Likert scale. The response scale ranged from 1 (very poor) to 5 (excellent). A higher score indicates an outstanding performance level.

5.3 Data Collection Procedure

The convenience sampling technique was used in this study for selecting the respondents. In order to data collection, printed questionnaires were distributed among 350 employees working at around 50 different local and foreign manufacturing organizations in Bangladesh. It took around 6 weeks to collect data from the respondents. In collecting data for this study, the author briefed the employees about the purpose of the study through the cover letter along with the questionnaire. The respondents took 15 minutes on average to complete the questionnaires. Due to some constraints, it was not possible to collect an equal number of responses from each organization. Follow-up telephone calls and mailings were used to improve the response rate and to address the potential missing data issues. Finally, a total of 203 (58%) usable responses were received out of 350 distributed questionnaires. Then, the raw data were analyzed by the SPSS (Statistical Package for Social Sciences) version 21.0.

5.4 Reliability of Scales and Validity of Data

Reliability reflects the consistency of a set of items in measuring the study variables (Cooper & Schinder, 2001). It illustrates the individual differences concerning the amount of agreement or disagreement of the concepts or variable studies (Page & Mayer, 2000). Cronbach's alpha is the most widely used method to measure the reliability of the scale (Field, 2005; Malhotra, 2002). It may be mentioned that Cronbach's alpha value ranges from 0 to 1, but a satisfactory value is required to be more than 0.60 for the scale to be reliable (Cronbach, 1951; Malhotra, 2002; Rahman, Ferdousy, Al-Amin, & Akter, 2020). Cronbach's alpha of all the variables is presented in Table 3.

Table 3: Reliability of Scales

Variables	Cronbach's alpha
Supply Chain Management Practices	0.76
Strategic Supplier Partnership	0.64
Customer Relationship	0.63
Information Sharing Level	0.66
Information Quality Level	0.73
Postponement	0.65
Supply Chain Performance	0.87

Source: Authors' calculation, 2020

Table 3 indicates Cronbach's alpha of the supply chain management practices for the current study was 0.76 while the components of supply chain management practices i.e. strategic

supplier partnership, customer relationship, information sharing level, information quality level, and postponement were 0.64, 0.63, 0.66, 0.73, 0.65 respectively. Similarly, Cronbach's alpha value for the supply chain performance was 0.87. So, Cronbach's alpha value of supply chain management practices is acceptable in the reliability test and Cronbach's alpha value of SCP is good in considering its reliability. Therefore, these two instruments were reliable for data collection.

On the other hand, the validity states to the degree to which variations in realized measurement outcome reveal authenticity among objects on aspects assessment instead of a methodological or irregular error (Saunders, Lewis, & Thornhill, 2011). It is worthy to mention that the validity of the instruments was ensured by conducting a good number of studies in different countries of the world through different reviews in other countries (Gunasekaran & McGaughey, 2004; Li et al., 2006; Sezen, 2008; Ambe, 2013).

6. Results

A Shapiro-Wilk's test ($p > 0.05$) (Shapiro & Wilk, 1965; Razali & Wah, 2011) and a visual inspection of histograms represented the normality of the data. This study test for the symmetric nature and peakedness/flatness for the data set using the shape descriptors, skewness, and kurtosis, respectively. An analysis of Skewness and Kurtosis analysis is presented in Table 4.

Table 4: Skewness and Kurtosis Analysis

Dimensions	Skewness		Kurtosis	
	Statistics	Std. Error	Statistics	Std. Error
SSP	-0.230	0.369	0.836	0.724
CR	0.439	0.333	0.272	0.656
IS	-0.207	0.340	0.025	0.668
IQ	0.453	0.340	-0.655	0.668
POS	0.239	0.456	-0.524	0.887

Note: **. Correlation is significant at the 0.01 level (2-tailed);* Correlation is significant at the 0.05 level (2-tailed); N = 203; SCMP= Supply Chain Management Practices, SSP = Strategic Supplier Partnership, CR = Customer Relation, IS = Information Sharing Level, IQ = Information Quality Level, POS = Postponement, SCP = Supply Chain Performance

Table 4 displays the skewness test and kurtosis test of all constructs (e.g. strategic supplier partnering, customer relationship, information sharing, information quality, and postponement). The skewness value for measurement item ranges from -0.230 to 0.453, are well within the recommended range of -1 to +1 (Hair, Black, Babin, Anderson, & Tatham, 2006). Kurtosis value for measurement item ranges from -0.655 to +0.836, are well within the recommended range of -2 to +2 (Carlos & Anil, 1980). As such, the test indicates that this result has been revealed having data of normal distribution.

The mean and standard deviation calculated for the components of SCMP and SCP are presented in Table 5.

Table 5: Means, Standard Deviations, Reliabilities and Correlations between variables

Variables	Mean	Standard Deviation	A	Correlations						
				1	2	3	4	5	6	7
SCMP	4.18	0.19	0.76	1						
SSP	4.35	0.29	0.64	0.56**	1					
CR	4.20	0.25	0.63	0.61**	0.64**	1				
IS	4.18	0.28	0.66	0.60**	0.67**	0.70**	1			
IQ	4.24	0.31	0.73	0.70**	0.69**	0.71**	0.57**	1		
POS	3.85	0.39	0.65	0.59**	0.31*	0.33*	-0.48	0.44*	1	
SCP	4.37	0.25	0.87	0.67**	0.57**	0.67**	0.48*	0.47*	0.53**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed);* Correlation is significant at the 0.05 level (2-tailed); N = 203; SCMP= Supply Chain Management Practices, SSP = Strategic Supplier Partnership, CR = Customer Relation, IS = Information Sharing Level, IQ = Information Quality Level, POS = Postponement, SCP = Supply Chain Performance

Evaluation of **Table-5** shows that there was a significant positive correlation between components of supply chain management practices and supply chain performance i.e. strategic supplier partnership and supply chain performance ($r=0.57^{**}$, $p<0.01$), customer relationship and supply chain performance ($r=0.67^{**}$, $p<0.01$), information sharing level and supply chain performance ($r=0.48^*$, $p<0.01$), information quality level and supply chain performance ($r=0.47^*$, $p<0.01$) and postponement and supply chain performance ($r=0.53^{**}$, $p < 0.01$). The overall supply chain management practices are positively correlated with supply chain performance ($r=0.67^{**}$). Thus, all hypotheses were supported by the results. An analysis of potential covariates with SCMP and SCP are presented in Table 6.

Table 6: Summary of Regression analysis of potential covariates with Supply Chain Management Practices and Supply Chain Performance

Covariates	Co-efficient (β)		Standard Error (β)		Value of t- statistics		Value of R ²		Value of F-statistic	
	SCMP	SCP	SCMP	SCP	SCMP	SCP	SCMP	SCP	SCMP	SCP
Age	0.41	-0.53	0.01	0.07	2.54	-1.28				
Education	-0.48	0.54	0.43	0.45	-0.67	3.14**				
Nature of industry	0.03	-0.02	0.06	0.02	0.40	-0.26				
Experience	-0.07	0.10	0.01	0.04	0.52	0.70				
Position	-0.16	0.01	0.03	0.13	-1.38	0.27				
Marital status	-0.01	0.03	0.03	0.05	-0.17	0.28	0.07	0.14	0.91	3.64*
Nature of organization	-0.23	-0.14	0.07	0.04	-3.10	-1.96				
Gender	0.01	0.06	0.27	0.39	0.75	0.82				

Note:* Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed), N = 203; SCMP = Supply Chain Management Practices, SCP = Supply Chain Performance

An analysis of **Table-6** implies that only 7% and 14% of the variance in SCMP and SCP were explained by the demographic factors such as age, education, industry, experience, position, marital status, nature of the organization, and gender respectively. The presence of unexplained variance suggests that other implied variables account for variations in SCMP and SCP. The results of Regression Analysis regarding dimensions of SCMP and SCP are presented in Table 7.

Table 7: Summary of Regression Analysis regarding Dimensions of Supply Chain Management Practices and Supply Chain Performance

Predictor Variables	Co-efficient (β)	S.E. (β)	Value of t-statistic	Value of R^2	Value of F-statistic (ANOVA)
SSP	0.14	0.14	1.37		
CR	0.35	0.19	3.58*		
IS	0.08	0.12	0.66	0.56	28.14**
IQ	-0.13	0.11	-1.13		
POS	0.23	0.09	2.67*		

Note: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed); N = 203; SSP = Strategic Supplier Partnership, CR = Customer Relation, IS = Information Sharing Level, IQ = Information Quality Level, POS = Postponement, SCP = Supply Chain Performance

Examination of **Table-7** indicates that $R^2 = 0.56$ i.e. 56% variances of supply chain performance are depicted by SSP, CR, IS, IQ, and POS. It indicates that about 56% of the variances in supply chain performance were explained by the components of supply chain management practices, in which customer relationships and postponement were significant. The presence of unexplained variance suggests that there might be other variables that account for variations in SCP.

This study hypothesized that supply chain management practices will have an impact on supply chain performance. Supply chain management practices were measured in terms of strategic supplier partnering, customer relationship, information sharing level, information quality level, and postponement. The findings of table 5 showed that (1) the extent of strategic supplier partnership was positively and significantly related to supply chain performance ($r=0.57^{**}$, $p<0.01$), (2) customer relationship was significantly and positively related to supply chain performance ($r=0.67^{**}$, $p<0.01$), (3) the extent of information sharing level was positively related to supply chain performance ($r=0.48^*$, $p<0.01$), (4) the extent of information quality level was positively related to supply chain performance ($r=0.47^*$, $p<0.01$) and (5) the extent of postponement was positively and significantly related to supply chain performance ($r=0.53^{**}$, $p < 0.01$). The overall supply chain management practices are significantly and positively correlated with supply chain performance ($r=0.67^{**}$, $p<0.01$). Thus, all hypotheses were supported by the results.

Table 8: Summary Results of Hypothesis

Hypotheses	Statements	Result
1	Strategic supplier partnership is positively related to supply chain performance in the manufacturing industries of Bangladesh	Supported
2	Customer relationship is positively related to supply chain performance in the manufacturing industries of Bangladesh	Supported
3	Information sharing level is positively related to supply chain performance in the manufacturing industries of Bangladesh	Supported
4	Information quality level is positively related to supply chain performance in the manufacturing industries of Bangladesh	Supported
5	Postponement is positively related to supply chain performance in the manufacturing industries of Bangladesh	Supported

7. Discussions

The present study intends to explore the association between supply chain management practices and supply chain performance in Bangladesh. The first aim of this study was to examine the relationship between strategic supplier partnership and SCP. The first hypothesis stated that the strategic supplier partnership is positively related to SCP in the manufacturing industries of Bangladesh. The result of the current study supported this argument. So, strategic supplier partnership helps to stimulate SCP. This finding is consistent with other studies that highlight the significant role of strategic supplier partnership in achieving high supply chain performance (Azar et al., 2008, Li et al., 2006; Li et al., 2005). Moreover, Bordonaba-Juste and Cambra-Fierro (2009) asserted supply chain partnering, one of the broader concept of supplier strategic partnering enhance performance among supply chain collaborative partners. The result of the study supports that an effective supplier partnership can be a critical component of a leading-edge supply chain and helps to achieve a high level of SCP.

The second objective of the study was to ascertain the relationship between customer relationship and SCP. The second hypothesis stated that customer relationship is positively related to SCP in the manufacturing industries of Bangladesh. The result of the current study supported this assertion. It means that good relationships with customers are needed for improving the performance level of the supply chain. This finding is consistent with other studies that indicate the significant role of customer relationships in achieving high performance (Lee, Kwon, & Severance, 2007; Li et al., 2006). If the customers are allowed to keep direct contact with the organizations that will enable the organizations to offer long-lasting, distinctive, value-added offerings to some extent; consequently represent more value to the supply chain. However, the result of the study indicated that customer integration has the strongest positive relation with SCP in the manufacturing industries of Bangladesh.

The third purpose of the study was to examine the relationship between information sharing level and SCP. The third hypothesis stated that the information sharing level is positively related to SCP in the manufacturing industries of Bangladesh. In this study, information sharing refers to the degree of information communicated between partners in the respective supply chain such as suppliers, distributors, and customers (Ding, Guo, & Liu, 2011; Li et al., 2006; Li et al., 2005; Sezen, 2008). The relationship between information sharing level and SCP was found

to be positive. This result indicates that sharing crucial and proprietary information to the supply chain partners may be an important stimulus for better SCP. This finding is consistent with other studies that highlight the significant role of information sharing in achieving high supply chain performance (Chin et al., 2004; Ding et al., 2011; Graham & Hardaker, 2000; Hong & Jeong, 2006; Li et al., 2006; Li et al., 2005). Such as Hong and Jeong (2006) claim that information sharing seemed to be important in both large enterprises and medium or small enterprises to influence the numerous performance goal of its supply chain. It is expected that the information sharing level plays an important role to improve SCP by improving customer responsiveness, enhancing the service level, and reducing some level of complexity. The result also indicated that information sharing level has a stronger positive relation with SCP than information quality level, however, less strong positive relation than strategic supplier partnership, customer relationship, and postponement in the manufacturing industries of Bangladesh.

The fourth purpose of the study was to identify the relationship between information quality level and supply chain performance. The fourth hypothesis stated that information quality level is positively related to SCP in the manufacturing industries of Bangladesh. The findings of the current study supported this hypothesis. So, the result of the study provides support for the assumption that ensuring the quality of the shared information with minimum delay and distortion becomes a critical aspect of effective supply chain performance. This finding of the study is reliable with the resource-based view and other studies that highlight the significant role of information quality in achieving high performance (Forsslund *et al.*, 2007; Li et al., 2006; Li et al., 2005). These former studies also found significant relationships between information quality and performance. For instance, Forsslund & Jonsson (2007) claimed that information quality is the fundamental driver in attaining high supply chain performance. Without information quality, there will be little value of information reliability and validity (Moberg et al., 2002). Hence, this study presents evidence that information quality may increase supply chain performance. Additionally, the results indicated that the level of information quality is positively related to supply chain performance but not as strong as strategic supplier partnership, customer relationship, information sharing level, and postponement.

The final objective of the study was to inspect the relationship between postponement and SCP. The fifth hypothesis stated that postponement is positively related to SCP in the manufacturing industries of Bangladesh. The result of the current study supported this hypothesis. The result supports the assumption that the adoption of postponement may be an important stimulus for improving the SCP of the organization. This finding is consistent with other studies that highlight the significant role of postponement in achieving high performance (Chung & Ng, 2008; Hoek, Voss, & Commandeur, 1999; Pagh & Cooper, 1998; Yang et al., 2007; Yeung, Selen, Deming, & Min, 2007). These previous studies also found significant relationships between POS and SCP. Krajewski, Wei, and Tan (2005); Yeung et al., (2007) exclaimed that postponement practices as the key element in achieving reduced inventory cost and improved supply chain performance in the manufacturing environment. Moreover, the result of this study is reliable with a case study research in the United Kingdom automobile industry which represented the

substantial evidence that postponement influences the supply chain output performance in terms of manufacturing lead time and shipping information accuracy (Sako, Lamming, & Helper, 1994). Hence, this study presents evidence that postponement may increase supply chain output performance. Postponement increases flexibility reduces supply chain cost and reduces the level of inventory. The result also indicated that postponement has a stronger positive relation with SCP than information sharing level, and information quality level; however, less strong positive relation than strategic supplier partnership and customer relationship in the manufacturing industries of Bangladesh.

8. Implications for Management

This study indicates a number of managerial implications in the context of Bangladesh. Firstly, the analysis indicates that supply chain management practices have a positive relationship with supply chain performance i.e. these practices contribute to enhance supply chain performance in the manufacturing industries. Therefore, manufacturing organizations should intentionally develop different SCMP to improve SCP. Secondly, strategic supplier partnership, customer relationship, information sharing level, and postponement are more strongly related to improving supply chain performance than information quality level while customer relationship is most strongly related. Hence, manufacturing organizations should begin SCMP by developing good customer relationships and making it as the foundation for building other practices. Finally, the theoretical contribution of the study is that it provides to scholars new avenues for future research, as well as extracting new dimensions. The findings of the current study may also help the practitioners as well as business leaders to identify how mostly SSP, good relation with the customer, sharing good quality information, and postponement strategy can facilitate SCP in the organizations and also help to identify new dimensions of SCM practices that linked to SCP. Additionally, better consideration of the association between supply chain management practices and supply chain performance in the manufacturing industries of Bangladesh can enhance the body of knowledge of supply chain management students, researchers, and academicians from the academic perspective.

9. Limitations and Direction for Future Research

The study has suffered from some limitations. Firstly, the most important limitation was to use the convenience sampling technique which might limit the generalizability of the findings. A random sampling procedure could be the best alternative to assure the generalizability of the results. The sample size (n=203) was inadequate for the study. A larger number of samples are needed to further explore the association between supply chain management practices and supply chain performance. Required data were only collected from supply chain employees from manufacturing organizations in Bangladesh, not from their other supply chain partners including suppliers and customers. Therefore, the research scope can be amplified by collecting data from all supply chain partners, including suppliers, manufacturers, and customers. Finally, the study is focused on only the five dimensions of supply chain management practices while there may have some others. It is recommended for future studies to investigate other important

SCMP dimensions and link them to SCP in the manufacturing industry of Bangladesh. Future research may extend to cover the other dimensions of SCMP such as supply chain leadership, process integration, and long-term relationship, etc. The association between SCM practices and competitive advantage, sustainability performance, organizational performance are other interesting areas for future study.

Authors' Contributions: Trisha Nag and Shameema Ferdausy conceived the idea; Trisha Nag collected data and both the authors jointly wrote the paper.

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

- Abdulla, B. A., Obeidat, B. Y., & Aqqad, O. N. (2014). The Impact of Supply Chain Management Practices on Supply Chain Performance in Jordan: The Moderating Effect of Competitive Intensity. *International Business Research*, 7(3), 13-27
- Ambe, I. M. (2013). Key Indicators for Optimizing Supply Chain Performance: The Case of Light Vehicle Manufacturers in South Africa. *Journal of Applied Business Research*, 30(1), 277-290
- Agu, A. (2011). The Significant Effect of Information Sharing and Strategic Supplier Partnership on Supplier Performance. *International Journal of Business and Management Science*, 4(1), 75-92
- Ajay, A., & Maharaj, M. (2010). Effects of Information Sharing within Supply Chains. SACLA, 35-42, Pretoria: University of Pretoria.
- Al-Shboul, M. A. R., Barber, K. D., Garza-Reyes, J. A., Kumar, V., & Abdi, M. R. (2017). The Effect of Supply Chain Management Practices on Supply Chain and Manufacturing Firms' Performance. *Journal of Manufacturing Technology Management*, 28(5), 577-609.
- Al-tarawneh & Al-Shourah, (2018). The Impact of Supply Chain Management and Manufacturing Flow Management Practices on Competitive Advantage of Jordanian Industry. *European Journal of Scientific Research*, 148(3), 394-407.
- Armistead, C. G., & Mapes, J. (1993). The Impact of Supply Chain Integration on Operating Performance. *Logistics Information Management*, 6 (4), 9-14
- Atilgan, C., & McCullen, P. (2011). Improving Supply Chain Performance through Auditing: A Change Management Perspective. *Supply Chain Management: An International Journal*, 16(1), 11-19.
- Attia, A., & Eldin, I. E., (2018). Organizational Learning, Knowledge Management Capability, and Supply Chain Management Practices in the Saudi Food Industry. *Journal of Knowledge Management*, 22(6), 1217-1242
- Azar, A., Kahnali, R. A., & Taghavi, A. (2008). Relationship between Supply Chain Quality Management Practices and their Effects on Organisational Performance. *Singapore Management Review*, 32(1), 45-68.
- Banerjee, M., & Mishra, M. (2017). Retail Supply Chain Management Practices in India: A Business Intelligence Perspective. *Journal of Retailing and Consumer Services*, 34(C), 248-259.
- Basheer, M. F., Siam, M. R. A., Awn, A. M., & Hassan, S. G., (2019). Exploring the Role of TQM and Supply Chain Practices for Firm Supply Performance in the Presence of Information Technology Capabilities and Supply Chain Technology Adoption: A case of Textile Firms in Pakistan. *Uncertain Supply Chain Management*, 7(2), 275-288
- Bayraktar, E., Demirbag, M., Koh, S. C. L., Tatoglu, E. & Zaim, H. (2009), A Causal Analysis of the Impact of Information Systems and Supply Chain Management Practices on Operational Performance: Evidence from Manufacturing SMEs in Turkey, *International Journal of Production Economics*, 122 (1), 133-149.
- Bhatnagar, R., & Teo, C. (2009). Role of Logistics in Enhancing Competitive Advantage: A Value Chain Framework for Global Supply Chains. *International Journal of Physical Distribution & Logistics Management*, 39(3), 202-226.

- Bimha, H., Hoque, M., & Munapo, E. (2020). The Impact of Supply Chain Management Practices on Industry Competitiveness: A Mixed-methods Study on the Zimbabwean Petroleum Industry. *African Journal of Science, Technology, Innovation and Development*, 12(1), 97-109.
- Boddy, D., Macbeth, D., & Wagner, B. (2000). Implementing Collaboration between Organizations: An Empirical Study of Supply Chain Partnering. *Journal of Management Studies*, 37(7), 1003-1018.
- Bolstorff, P., & Rosenbaum, R. (2003). *Supply Chain Excellence: A Handbook for Dramatic Improvement Using the SCOR Model*. 2nd ed. New York: Amacom.
- Boubekri, N. (2001). Technology Enablers for Supply Chain Management. *Integrated Manufacturing Systems*, 12(6), 394-399.
- Boulding, W., Staelin, R., Ehret, M., & Johnston, W. (2005). A CRM Roadmap: What We Know, Potential Pitfalls, and Where to Go. *Journal of Marketing*, 69 (4), 155– 167.
- Bowersox, D. J., Closs, D. J., & Cooper, MB. (2010). *Supply Chain Logistics Management*. (3rd edition). Singapore: McGraw - Hill.
- Bozarth, C.C., & Handfield, R. B. (2006). *Introduction to Operations and Supply Chain Management*. (Global Edition). New York: Pearson Prentice Hall.
- Brewer, P. C., & Speh, T. W. (2000). Using the Balanced Scorecard to Measure Supply Chain Performance. *Journal of Business Logistics*, 21(1), 75-92.
- Burt, D. N., Petcavage, S. D., & Pinkerton, R. L. (2010). *Supply Management*. Boston: McGraw - Hill Irwin
- Carbonara, N., & Pellegrino, R. (2018). Real Options Approach to Evaluate Postponement as Supply Chain Disruptions Mitigation Strategy. *International Journal of Production Research*, 56(15), 5249-5271.
- Carlos, M. J., & Anil, K. B. (1980). Efficient Tests for Normality, Homoscedasticity, and Serial Independence of Regression Residuals. *Economics Letter*, 6(3), 255-259.
- Carter, C. R. & Ellram, L. M. (2003). Thirty-Five Years of the Journal of Supply Chain Management: Where Have We Been and Where Are We Going? *Journal of Supply Chain Management*, 39(1), 27-39.
- Chen, I. J., & Paulraj, A. (2004). Towards a Theory of Supply Chain Management: The Constructs and Measurements. *Journal of Operations Management*, 22(2), 119-150.
- Chin, K. S., Tummala, V. M. R., Leung, J. P. F., & Tang, X. (2004). A study on Supply Chain Management Practices. The Hong Kong Manufacturing Perspective. *International Journal of Physical Distribution & Logistics Management*, 34(6), 505-524.
- Childhouse, P., & Towill, D. R. (2003). Simplified Material Flow Holds the Key to Supply Chain Integration. *OMEGA*, 31(1), 17-27.
- Chung, W., & Ng, T. W. (2008). A Study of How Distributors Provide Postponement Services in the Supply Chain. *International Review of Business Research Papers*, 4(4), 92-101.
- Cohen, S., & Rousell, J. (2005). *Strategic Supply Chain Management: The Five Disciplines for Top Performance*. New York: McGraw - Hill.
- Cox, A. (2004). The art of the possible: Relationship Management in Power Regimes and Supply Chains. *Supply Chain Management: An International Journal*, 9(5), 346-356.
- Cronbach, L. J. (1951). Coefficient Alpha and the Internal Structure Oftests. *Psychometrika*. 16 (3), 297–334.
- Dadzie, K. Q., & Winston, E. (2007). Consumer Response to Stock-out in the Online Supply Chain. *International Journal of Physical Distribution & Logistics Management*, 37(1), 19-42.
- Ding, H., Guo, B., & Liu, Z. (2011). Information Sharing and Profit Allotment Based on Supply Chain Cooperation. *International Journal of Production Economics*, 133, 70-79.
- Ellrama, L. M., & Murfield, M. L. U., (2019). Supply Chain Management in Industrial Marketing–Relationships Matter. *Industrial Marketing Management*, 79, 36-45
- Fawcett, S. E., Osterhaus, P., Magnan, G.M., Brau, J.C., & McCarter, M.W. (2007). Information Sharing and Supply Chain Performance: The Role of Connectivity and Willingness. *Supply Chain Management: An International Journal*, 12(5), 358–368.
- Feldmann, M., & Müller, S. (2003). An Incentive Scheme for True Information Providing in Supply Chains. *OMEGA*, 31(2), 63-73

- Frohlich, M. T. & Westbrook, R. (2002), Demand Chain Management in Manufacturing and Services: Web-based Integration, Drivers and Performance, *Journal of Operations Management*, 20 (6), 729-745.
- Forslund, H., & Jonsson, P. (2007). The Impact of Forecast Information Quality on Supply Chain Performance. *International Journal of Operations & Production Management*, 27(1), 90-107.
- Fugate, B. S., Mentzer, J. T., & Stank, T. P. (2010). Logistics Performance: Efficiency, Effectiveness, and Differentiation. *Journal of Business Logistics*, 31(1), 43-62.
- Graham, G., & Hardaker, G. (2000). Supply Chain Management across the Internet. *International Journal of Physical Distribution & Logistics Management*, 30(3/4), 286-295.
- Gunasekaran, A., Patel, C., & McGaughey, R. E. (2004). A Framework for Supply Chain Performance Measurement. *International Journal of Production Economics*, 87(3), 333-347.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis* (6th ed.). Upper Saddle River, NJ: Peason Education Inc.
- Harland, C. (1997). Supply Chain Operational Performance Roles. *Integrated Manufacturing Systems*, 8(2), 70-78.
- Hoek, V., Voss, R. I., & Commandeur, H. R. (1999). Restructuring European supply chain by implementing postponement strategies. *Long Range Planning*, 32(5), 505-518.
- Hoek, V. R. (1998). Measuring the Unmeasurable: Measuring and Improving Performance in the Supply Chain. *Supply Chain Management*, 3(4), 187-192.
- Hong, P., & Jeong, J. (2006). Supply Chain Management Practices of SMEs: From a Business Growth Perspective. *Journal of Enterprise Information Management*, 19(3), 292-302.
- Hugo, W. M. J., Baden horst- Weiss, J. A., & Van Biljon, E. H. B. (2004). *Supply Chain Management: Logistics in Perspective*. 3rd ed. Pretoria: Van Schaik.
- Ibrahim, S. B., & Hamid A. A. (2012). Supply Chain Management Practices and Supply Chain Effectiveness. *International Journal of Science and Research*, 3(8), 187-195
- Jacobs, F. R., Chase, R. B., & Aquilano, N. J. (2009). *Operations and supply management*. 12th ed. New York: McGraw-Hill.
- Jonsson, P. (2008). *Logistics and Supply Chain Management*. London: McGraw - Hill.
- Juste, V., & Fierro, J. J. (2009). Managing Supply Chain in the Context of SMEs: A Collaborative and Customized Partnership with the Suppliers as the Key for Success. *Supply Chain Management: An International Journal*, 14(5), 393-402.
- Kalwani, M. U. & Narayandas, N. (1995), Long-term manufacturer-supplier relationships: Do They Pay?, *Journal of Marketing*, 59 (1), 1-15.
- Kaplan, R., & Norton, D. (1996). Using the Balanced Scorecard as a Strategic Management System. *Harvard Business Review*, 74(1), 75-85.
- Kayakutlu, G., & Buyukozkan, G. (2010). Effective Supply Value Chain Based on Competence Success. *Supply Chain Management: An International Journal*, 15(2), 129-138.
- Khan, A., & Siddiqui, D. A. (2018). Information Sharing and Strategic Supplier Partnership in Supply Chain Management: A Study on Pharmaceutical Companies of Pakistan. *Asian Business Review*, 8(3), 117-124
- Khan, S. A. R., & Qianli, D. (2017). Impact of Green Supply Chain Management Practices on Firms' Performance: An Empirical Study from the Perspective of Pakistan. *Environmental Science and Pollution Research*, 24(20), 16829-16844.
- Khurana, M., Mishra, P., & Singh, A., (2011). Barriers to Information Sharing in Supply Chain of Manufacturing Industries. *International Journal of Manufacturing Systems*, 1, 9-29.
- Kim, S. (2006). Effects of supply chain management practices, integration, and competition capability on performance. *Supply Chain Management: An International Journal*, 11(3), 241-248.
- Kogut, B. (1988), Joint Ventures: Theoretical and Empirical Perspectives, *Strategic Management Journal*, 9(4), 319-332.
- Koh, S. C. L., Demirbag, M., Bayraktar, E., Tatoglu, E., & Zaim, S. (2007). The impact of supply chain management practices on performance of SMEs. *Industrial Management & Data Systems*, 107(1), 103-124.
- Krajewski, L., Wei, J. C., & Tang, L. L. (2005). Responding to Schedule Changes in Build-to-order Supply Chains. *Journal of Operations Management*, 23, 452-469.

- Lambert, D. M & Cooper, M. C. (2000). Issues in Supply Chain Management. *Industrial Marketing Management*, 29(1), 65-83.
- Lambert, D. M., Robeson, J. F., & Stock, J. R. (1978). An Appraisal of the Integrated Physical Distribution Management Concept. *International Journal of Physical Distribution and Materials Management*, 9 (1), 74–88.
- Lee, C. W., Kwon, I. G. and Severance, D. (2007), Relationship between Supply Chain Performance and Degree of Linkage among Supplier, Internal Integration, and Customer, *Supply Chain Management*, 12 (6), 444-452.
- Lee, H. L., So, K. C., & Tang, C. S. (2000). The Value of Information Sharing in a Two-level Supply Chain, *Management Science*, 46(5), 626-643.
- Lee, V.-H., Ooi, K. -B., Loong, A. C. Y., & Sohal, A. (2018). The Effects of Supply Chain Management on Technological Innovation: The Mediating Role of Guanxi. *International Journal of Production Economics*, 205(C), 15-29.
- Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002), AIMQ: A Method for Information Quality Assessment, *Information & Management*, 40 (2), 133-146.
- Leonczuk, D. (2016). Categories of Supply Chain Performance Indicators: An Overview of Approaches. *Business, Management and Education*, 14(1), 103-115.
- Li, S., Dean, S., Li, Z., Horecka, J., Deschenes, R. J., & Fassler, J. S. (2002). The Eukaryotic Two-Component Histidine Kinase Sln1p Regulates *OCH1* via the Transcription Factor. *Molecular Biology of the Cell*, 13(2), 412-424
- Li, S., Nathan, R. B., & Rao, S. S. (2006). The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance. *International Journal of Management Science*, 34(2), 107 - 124
- Li, S., Nathan, R. B., Nathan, R. T. S., & Rao, S. S. (2004). The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance. *OMEGA*. 34(2), 107–124.
- Li, S., Rao, S. S., Nathan, R. T. S., & Nathan, R. B. (2005). Development and Validation of a Measurement Instrument for Studying Supply Chain Management Practices. *Journal of Operations Management*, 23(6), 618-641.
- Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Subba Rao, S. (2004). The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance. *Omega*, 34(2), 107–124.
- Lockamy, A., & McCormack, K. (2004). Linking SCOR Planning Practices to Supply Chain Performance. An Exploratory Study. *International Journal of Operations & Production Management*, 24(12), 1192-1218.
- Lockamy, A., & McCormack, K. (2004). The Development of a Supply Chain Management Process Maturity Model Using the Concepts of Business Process Orientation. *Supply Chain Management: An International Journal*, 9(4), 272-278.
- Lonngren, H. M., Rosenkranz, C., & Kolbe, H. (2010). Aggregated Construction Supply Chains: Success Factors in Implementation of Strategic Partnerships. *Supply Chain Management: An International Journal*, 15(5), 404-411.
- Lotfi, Z., Mukhtar, M., Sahran, S., & Zadeh, A. T. (2013). Information Sharing in Supply Chain Management. *4th International Conference on Electrical Engineering and Informatics, Procedia Technology*, 11, 298-304.
- Lumms, R. & Vokurka, J. (1999). Defining Supply Chain Management: A Historical Perspective and Practical Guidelines. *Industrial Management & Data Systems*, 99 (1), 11-17.
- Lyons, A., Coleman, J., Kehoe, D., & Coronado, A. (2004). Performance Observation and Analysis of an Information Re-engineered Supply Chain: A Case Study of an Automotive Firm. *Industrial Management & Data Systems*, 104(8), 658 - 666.
- Malhotra, N. K. (2002). *Marketing Research: An Applied Orientation* (3rd ed.). New Delhi: Pearson Education Asia.
- Matopoulos, A., Vlachopoulou, M., Manthou, V., & Manos, B. (2007). A Conceptual Framework for Supply Chain Collaboration: Empirical Evidence from the Agri-Food Industry. *Supply Chain Management: An International Journal*, 12(3), 177-186.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., & Smith, C. D. (2001). Defining Supply Chain Management. *Journal of Business Logistics*, 22(2), 1-25
- Mentzer, J. T., Foggin, J. H. & Golicic, S. L. (2000), Collaboration: The Enablers, Impediments, and Benefits, *Supply Chain Management Review*, 5 (6), 52-58.
- Min, S., & Mentzer, J. T. (2004). Developing and Measuring Supply Chain Management Concepts. *Journal of Business Logistics*, 25(1), 63-99.

- Moberg, C., Culter, B. D., Gross, A., & Speh, T. W. (2002). Identifying Antecedents of Information Exchange within Supply Chains. *International Journal of Physical Distribution and Logistics Management*, 32(9), 755-770.
- Nimeh, H. A., Abdallah, A. B. & Sweis, R. (2018). Lean Supply Chain Management Practices and Performance: Empirical Evidence from Manufacturing Companies. *International Journal of Supply Chain Management*, 7(1), 1-15
- Oliver, R. K. & Webber, M. D., (1982). Supply-Chain Management: Logistics Catches Up with Strategy. In: M. Christopher, ed.1992. *Logistics: The strategic issues*. London: Chapman & Hall.
- Olorunniwo, F. O., & Li, X. (2010). Information Sharing and Collaboration Practices in Reverse Logistics. *Supply Chain Management: An International Journal*, 15(6), 454-462.
- Onge, S. A. (1996). New Concepts in Supply Chain Management. *Modern Materials Handling*, 51(3), 33.
- Ou, C. S., Liu, F. C., Hung, Y.C. & Yen, D.C. (2010). A Structural Model of Supply Chain Management on Firm Performance. *International Journal of Operations & Production Management*, 30(5), 526-545.
- Page, C., & Mayer, D. (2000). *Applied Research Design for Business and Management*. New York: McGraw – Hill.
- Pagh, J., & Cooper, M. (1998). Supply Chain Postponement and Speculation Strategies: How to Choose the Right Strategy. *Journal of Logistics Management*, 19(2), 13-33.
- Perry, M. & Sohal, A. (2000). Quick Response Practices and Technologies in Developing Supply Chains: A Case Study. *International Journal of Physical Distribution & Logistics Management*, 30(7/8), 627-639.
- Petrovic-Lazarevic, S. Y. O., Sohal, A. S., & Baihaqi, I. (2007). Supply Chain Management Practices and Supply Chain Performance in the Australian Manufacturing Industry. In A. Prasevic (Ed.), *Proceedings of the International Scientific Conference: Contemporary Challenges of Economic Theory and Practice*. Belgrade Serbia: University of Belgrade.
- Petrovic-Lazarevic, (2007). Supply Chain Improvement Initiatives in the Australian Textiles, Clothing, Footwear and Leather Industry: A Field Study", *International Journal of Logistics Systems and Management*, 3(1), 1-19.
- Petterson, J. (2009). Defining Lean Production: Some Conceptual and Practical Issues. *TQM Journal*, 21(2), 127-142.
- Rahman, M.S., Ferdausy, S., Al-Amin, M., & Akter, R. (2020). How Does Emotional Intelligence Relate to Transformational Leadership, Creativity, and Job Performance? *Society & Sustainability*, 2(1), 1-15.
- Rashed, C. A. A., Azeem, A., 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.
- Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilloefors, and Anderson-Darling Tests. *Journal of Statistical Modeling and Analytics*, 2(1), 21-33
- Sako, M., Lamming, R., & Helper, S. R. (1994). Supplier Relations in UK Car Industry: Good News–Bad News. *European Journal of Purchasing & Supply Management*, 1, 237-248.
- Saunders, M., Lewis, P., & Thornhill, A. (2011). *Research Methods for Business Students* (5th ed.), India: Prentice-Hall.
- Sezen, B. (2008). Relative Effects of Design, Integration, and Information Sharing on Supply Chain Performance. *Supply Chain Management: An International Journal*, 13(3), 233-240.
- Shang, K. C., Lu, C. S., & Li, S. (2010). A Taxonomy of Green Supply Chain Management Capability among electronics-related Manufacturing Firms in Taiwan. *Journal of Environmental Management*, 91(5), 1218-1226.
- Shapiro, J. F., Singhal, V. M., & Wagner, S. N. (1993). Optimizing the Value Chain. *Interfaces*, 23(2), 102-117.
- Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, 52(3/4), 591-611
- Sheu, C., Yen, H. R. & Chae, D. (2006), Determinants of Supplier-Retailer Collaboration: Evidence from an International Study, *International Journal of Operations and Production Management*, 26 (1), 24-49.
- Simatupang, T. M. & Sridharan, R. (2002), The Collaborative Supply Chain, *International Journal of Logistics Management*, 13 (1), 15-30.
- Singh, R. K. (2013). Prioritizing the Factors for Coordinated Supply Chain Using Analytic Hierarchy Process (AHP). *Measuring Business Excellence*, 17(1), 80–98.
- Sousa, R. (2003). Linking Quality Management to Manufacturing Strategy: An Empirical Investigation of Customer Focus Practices, *Journal of Operations Management*, 21 (1), 1–18.
- Stonebraker, P. W., & Liao, J. (2006). Supply Chain Integration: Exploring Product and Environmental Contingencies. *Supply Chain Management: An International Journal*, 11(1), 34-43.

- Storey, J., Emberson, C., Godsell, J., & Harrison, A. (2006). Supply Chain Management: Theory, Practice, and Future Challenges. *International Journal of Operations & Production Management*, 26(7), 754-774.
- Sundram, V. P. K., Chandran, V., & Bhatti, M. A., (2016). Supply Chain Practices and Performance: The Indirect Effects of Supply Chain Integration. *Benchmarking: An International Journal*, 23(6), 1445-1471
- Tan, K. C., Lyman, S. B., & Wisner, J. D. (2002). Supply Chain Management: A Strategic Perspective. *International Journal of Operations and Production Management*, 22(6), 614-631.
- Tarafdar, M., & Qrunfleh, S., (2016). Agile Supply Chain Strategy and Supply Chain Performance: Complementary Roles of Supply Chain Practices and Information Systems Capability for Agility. *International Journal of Production Research*, 55(4), 925-938
- Tatoglu, E., Bayraktar, E., Golgeci, E., Koh, S. C. L., Demirbag, M., & Zaim, S., (2015). How Do Supply Chain Management and Information Systems Practices Influence Operational Performance? Evidence from Emerging Country SMEs. *International Journal of Logistics: Research and Applications*, 19(3), 181-199
- Taylor, D. A. (2004). *Supply Chains: A Manager's Guide*. Boston: Addison - Wesley.
- Theeranuphattana, A., & Tang, J. C. S. (2008). A Conceptual Model of Performance Measurement for Supply Chains Alternate Considerations. *Journal of Manufacturing Technology Management*, 19(1), 125-148.
- Trkman, P., McCormack, K., Oliveira, M. P. V. d., & Ladeira, M. B. (2010). The Impact of Business Analytics on Supply Chain Performance. *Decision Support Systems*, 49(3), 318-327.
- Walters, D., & Rainbird, M. (2007). Cooperative Innovation: A Value Chain Approach. *Journal of Enterprise Information Management*, 20(5), 595-607.
- Wisner, J. D, Tan, K. C., & Leong, G. K. (2008). *Principles of Supply Chain Management: A Balanced Approach*. 5th ed. Mason, OH: South-Western Cengage Learning.
- Wong, C.Y. & Johansen, J. (2005). Supply Chain Management Practices in Toy Supply Chains. *Supply Chain Management: An International Journal*, 10(5), 367-378.
- Xiong, Y., Du, G., & Jiao, R. J. (2018). Modular Product Platforming with Supply Chain Postponement Decisions by Leader-follower Interactive Optimization. *International Journal of Production Economics*, 205(C), 272-286.
- Yang, B., Yang, Y., & Wijngaard, J. (2007). Postponement: An Inter-organisational Perspective. *International Journal of Production Research*, 45(4), 971-988.
- Yang, T.-M. & Maxwell, T.A. (2011). Information-sharing in Public Organizations: A Literature Review of Interpersonal, Intra-organizational, and Inter-organizational Success Factors, *Government Information Quarterly*, 28, 164-175.
- Yeung, J. H. Y., Selen, W., Deming, Z., & Min, Z. (2007). Postponement Strategy from a Supply Chain Perspective: Cases from China. *International Journal of Physical Distribution & Logistics Management*, 37(4), 331-356.
- Zailani, S., & Rajagopal, P. (2006). The effects of Information Quality on Supply Chain Performance: New Evidence from Malaysia. In Latif Al-Hakim (Ed.), *Information Quality Management: Theory and Applications*, Chapter XII, 275- 229.
- Zhang, H. & Agarwal, N. (2009). The Mediating Roles of Organizational Justice on the Relationships between HR Practices and Workplace Outcomes: An Investigation in China. *The International Journal of Human Resource Management*, 20(3), 676-693
- Zhang, H., & Okoroafo, S. C. (2015). Third-party Logistics (3PL) and Supply Chain Performance in the Chinese Market: A Conceptual Framework. *Engineering Management Research*, 4(1), 38-48
- Zhao, Y. (2002). *The Impact of Information Sharing on Supply Chain Performance*. Ph.D. Thesis, Industrial Engineering and Management Sciences, Northwestern University, Evanston, Illinois.
- Zhao, X., Xie, J., & Leung, J. (2002). The Impact of Forecasting Model Selection on the Value of Information Sharing in a Supply Chain. *European Journal of Operational Research*, 142 (2), 321-344.
- Zhou, H., Shou, Y., Zhai, X., Li, L., Wood, C., & Wu, X. (2014) Supply Chain Practice and Information Quality: A Supply Chain Strategy Study, *International Journal of Production Economics*, 147 (C), 624-633.



© 2021 by the authors. Licensee Research & Innovation Initiative, Michigan, USA. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

Appendix**Instruments for supply chain management practices (SCMP)****Strategic supplier partnership (SSP)**

Code	
SMP/SSP1	We consider quality as the number one criterion in selecting our suppliers.
SMP/SSP2	We routinely solve our problems in concert with our suppliers.
SMP/SSP3	We have helped our suppliers to improve their product quality
SMP/SSP4	We have continuous improvement programs that generally include our main suppliers.
SMP/SSP5	We include our main suppliers in our planning and goal-setting activities and programs.
SMP/SSP6	We effectively involve our main suppliers in our new product development processes.

Customer relationship (CR)

Code	
SMP/CR1	We often interact with our customers to set reliability, responsiveness, and other standards for our betterment.
SMP/CR2	We routinely measure and evaluate our customer satisfaction.
SMP/CR3	We repeatedly determine future customer expectations.
SMP/CR4	We facilitate customers' capability so that they can seek assistance from us.
SMP/CR5	We periodically assess the importance of our relationship with our customers.

Information sharing level (IS)

Code	
SMP/IS1	We notify our trading partners afore of changing needs.
SMP/IS2	Our trading partners exchange proprietary information with us.
SMP/IS3	Our trading partners keep us fully informed about issues that affect our business.
SMP/IS4	Our trading partners share business knowledge of core business processes with us.
SMP/IS5	We and our trading partners frequently interchange information that aids the establishment of business planning.
SMP/IS6	We and our trading partners keep each other well informed about various events or changes that may affect the other partners.

Information quality level (IQ)

Code	
SMP/IQ1	Information interchange between our trading partners and us is timely.
SMP/IQ2	Information interchange between our trading partners and us is accurate.
SMP/IQ3	Information interchange between our trading partners and us is complete.
SMP/IQ4	Information interchange between our trading partners and us is adequate.
SMP/IQ5	Information interchange between our trading partners and us is reliable.

Postponement (POS)

Code	
SMP/POS1	Our products are designed for modular assembly.
SMP/POS2	We delay our final product assembly activities until customer orders have truly been received.
SMP/POS3	We delay our final product assembly activities till the last possible position (nearest to customers) in the supply chain.

Supply chain performance (SCP)

Code	
SCP1	The ability to meet quality performance standards.
SCP2	The ability to deal with variations in production volume and product design in order to respond quickly to market demand.
SCP3	The ability to minimize supply chain management cost (across the supply chain).
SCP4	The ability to consistently supply products at the required time.
SCP5	The amount of annual investment in research and development
SCP6	The ability to respond to customer requests quickly.
SCP7	The ability to fulfill orders on time.
SCP8	The ability to provide damage-free delivery.
SCP9	The ranges of products offered to customers
SCP10	The use of a firm's assets to generate revenue