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SUPPLY CHAIN INNOVATION BOLSTERED UP BY SUPPLY CHAIN MODEL

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Abstract:

The purpose of this study was to examine the level and relationship between supply chain management practices (SCMP), competitive advantage (CA), and supply chain innovation (SCI) among manufacturing firms in Malaysia. Giri and Bardhan (2015) found out that supply chain process becomes inefficient and lack business strategies has affect the operation which led to poor profitability. That's why manufacturing supply chain needs to innovate constantly for maintaining their position in the marketplace and to fight uncertainties. Hence firms are focusing on strategies for developing innovation within and across its manufacturing supply chain. In line with following objectives, this study employed a quantitative research approach that utilized stratified sampling technique and self-administered questionnaire survey. The respondents for this survey were the senior managers (top management) in operations management from manufacturing firms in Malaysia. Subsequently, the survey data have been utilized to test the research framework and hypothesis. The results of the study are useful for supply chain practitioners and manufacturers in integrating the right SCMPs and competitive advantage on improving SCI. Furthermore, industrial practitioners also receive insight on how to take account of the mediating effect of competitive advantage in designing their supply chain innovation for better manufacturing performance. In fact, organizations are not certain of what to implement, due to a lack of understanding of what constitute a comprehensive set of SCMPs. There was far too little knowledge available on the role of competitive advantage in mediating the effect between SCMPs and supply chain innovation. As such, this paper is one of the first to address the mediating effect of competitive advantage between SCMPs and supply chain innovation. Also, the results have suggested successful dimensions of SCMPs that could be implemented in order to obtain competitive advantage and foster supply chain innovation in manufacturing industry in Malaysia.

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Keywords:

Supply Chain, Competitive Advantage, Supply Chain Innovation, Manufacturing Industry, Supply Chain Management Practices

Introduction

Modern supply chains are regarded as a considerable source of value to contemporary organizations. This value can be significantly enhanced through the strategic management of the supply chain, going beyond the provision of information, goods, and services to more sustainable forms of value for a wide range of stakeholders (Barney, 2012; Hammervoll, 2011). Indeed, the field of Supply Chain Management (SCM) continues to undergo major changes as increased uncertainty, volatility, and risk create many challenges in the global business environment. Under such circumstances, supply chains have become increasingly complex and lengthy.

This trend has been accompanied by a recognition of the potential of innovation and strategic SCM practices to create and deliver greater value across a much broader range of stakeholders than might have been the case in the past (Melnyk et al., 2021; Von Massow & Canbolat, 2014; Allesina et al., 2010). There would seem to be an ever-increasing set of sources of risk such as the COVID-19 pandemic, and opportunities such as Industry 4.0 digitalization technologies, that impact on supply chains and provide opportunities and requirements for their redesign. Such redesigns can include the pursuit of sustainability goals as they become increasingly required by stakeholders.

The concept of value arising from the strategic management of supply chains has been explored by numerous authors (Gloet & Samson, 2018; Baldwin & Lopez-Gonzalez, 2015; Basole & Bellamy, 2013). These works tend to stress that the success of achieving sustainable competitive advantage in SCM is highly dependent on knowledge and the extent to which it is effectively managed (Estampe et al., 2014). However, the main focus of this body of research has been the creation of value for sustained competitive advantage predominantly in terms of economic performance and measures, with a much lesser focus on environmental or social aspects of value creation within supply chains.

According to Meyer (2020), supply chain represents a conscious effort by the firm to develop and run supply chains in the most effective and efficient way possible. The growing competition in the marketplace have urged firms to increase and improve their operational activities and processes. In addition, firms have felt the need to integrate their operations and dominant activities with those of their key suppliers and distributors within the supply chain. Bode (2008) has identified that supply chain innovation become the new pre-requisite for the survival of firms in developing capabilities and strategies for sustaining their operations and performance in the market.

Supply chain innovation changes the roles and responsibilities of not only the firm, but also the individuals within the firm, primarily due to the specialized knowledge of individuals and the limited view of the value stream that the individual has in a supply chain. One key to network effectiveness is the ability to use tacit knowledge, or intuition and ‘subjective insights’ (Nonaka et al., 2016; Nonaka, 1991) to understand and expand explicit, or articulated, knowledge, and

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to transfer this newly created knowledge to others who can understand it and who have the strategic experience to make use of it.

Taghipour et al. (2015) posit that improvement in the overall supply chain performance can lead to improvements in the overall company performance. This is because improved supply chain performance has been associated with the improvement of the overall business efficiencies (Bosch, 2017). In recognising the increasing importance of the role of supply chains, firms have over the years sought to work on their supply chain practices, the nature and degree of collaboration with suppliers, the nature and extent of information sharing and the overall supply chain competence.

Due to Munson (2017), a chain that begins with wheat growing on a farm and ends with a customer buying a loaf of bread in a supermarket. Note that the value of the product increases as it moves through the supply chain. As our society becomes more technologically oriented, we see increasing specialization. Specialized expert knowledge, instant communication, and cheaper transportation also foster specialization and worldwide supply chains (Heizer, 2017). It just does not pay for a firm to try to do everything itself. The expertise that comes with specialization exists up and down the supply chain, adding value at each step. When members of the supply chain collaborate to achieve high levels of customer satisfaction, we have a tremendous force for efficiency and competitive advantage (Russell, 2019). Competition in the 21st century is not between companies; it is between supply chains.

Problem Statement

According to Department of Statistic Malaysia (2019), in the fourth quarter of 2018, Malaysia's economy recorded a better performance with a growth of 4.7 per cent. The favourable performance was mainly contributed by Services and Manufacturing sectors. However, Malaysia's economy, measured by gross domestic product (GDP), expanded 4.3 per cent last year from 4.7 per cent registered in 2018, Bank Negara Malaysia said. This was the slowest pace in a decade, (Bank Negara Governor, 2020). Since the whole world are being affected with pandemic corona Virus, the outbreak was expected to affect Malaysia's economy in the first-quarter (Q1) of 2020. The effects would largely be felt in tourism and manufacturing sectors due to air travel ban and factories closure in Malaysia.

As what happened to other country before, a researcher had found that these problems led to new supply chain risk exposure due to four major challenges: the rising labour cost, the shift in consumer expectations towards product quality, innovation and service, the increase of value chain complexity and the volatile global economic environment (Chenneveau et al., 2020; Eloot et al., 2013). Hence, supply risk is closely connected to manufacturing risk that can affect the ability of the focal company to produce high quality goods and services in a timely manner and, in turn, achieve profitability (Ho et al., 2015). Supply and manufacturing risks gained increasing attention due to the high connectivity of supply chains. Supply chains in fact are increasingly operating in networked and global environment, where the ability to build and maintain relationships with suppliers is equally critical and challenging for businesses (Hallikas & Lintukangas, 2016).

Furthermore, past research from Aberdeen (2018) found that there are four top challenges of manufacturing supply chain faced across the globe. The result from the study shows that there are 61% of rising supply chain management cost, 60% of customer mandates for faster, more

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accurate, and more unique fulfilment, 59% increase of demand volatility, and 42% growing complexity of global operations. Thus, manufacturing firms are suggested to improve their innovative practices across supply chain to further improve manufacturing performance (Kamaruddin et al., 2013; Zhu & Sarkis, 2007).

Particularly in Malaysia, there are the remarkable expansion of the supply chain in manufacturing industry. Supply chain has become a significant driving force in the development of the world economy (Azar, 2017; Wang et al., 2015). However, managing the supply chain innovation has been a neglected area of business activity in Malaysia (Chen & Krajbich, 2018; Nagarajan & Sošić, 2008.). In the past, companies are not aware of the advantage of having an effective ecosystem and thus have not given sufficient priority to the development of effective SCI strategies. If this continuously persist, then it will affect the operation and production of an organization, where the uncontrollable disruptions would lead to poor profitability of the company.

The study of competitive advantage has emerged as a prominent field in providing organizations with strategies to build long-term innovation in supply chain (Azadi et al., 2014; Mortensen et al., 2008; Boon & Paul, 2006). Moreover, past researchers had different perspective with various dimensions of supply chain management practices of ultimately improving supply chain innovation in manufacturing industries (Donohue & Schultz, 2019). In addition, the outcome of previous results has shown mixed results between the variables. Organizations do not know exactly what to implement, due to a lack of understanding of what constitutes a comprehensive set of SCMPs. Therefore, additional research is necessary to study how supply chain innovation bolstered up by supply chain model among manufacturing companies in Malaysia, with using competitive advantage as the mediating factor to the variables of this study. This paper intends to contribute to filling this gap by focusing on the antecedents of supply chain innovation.

Research Objectives and Research Questions

Table 1: Research Objectives and Research Questions

Number	Research Objectives	Research Questions
1	To examine the level of supply chain management practices, competitive advantage, and supply chain innovation among manufacturing industry employees.	What is the level of supply chain management practices, competitive advantage, and supply chain innovation among manufacturing industry employees?
2	To determine the effect of supply chain management practices towards supply chain innovation	Is there any effect of supply chain management practices towards supply chain innovation?
3	To determine the effect of supply chain management practices and competitive advantage towards supply chain innovation	Is there any effect of supply chain management practices and competitive advantage on supply chain innovation?
4	To determine the effect of competitive advantage towards supply chai innovation	Is there any effect of competitive advantage towards supply chain innovation?

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5	To ascertain the effect of competitive advantage in mediating the relationship between supply chain management practices and supply chain innovation.	Is there any impact of competitive advantage in mediating the relationship between supply chain management practices and supply chain innovation?

Literature Review

Zhong et al. (2017) described the manufacturing industry as an industry comprising creation, manufacture, assembly, and handling of raw materials or semi-finished items that pamper in either the formation of new goods and services or value adding. It is mainly classified into several sectors: construction, electric, electronic, chemical products, textile, food and beverage, energy, plastic, telecommunication, and metalworking industries. The industrial revolution that began initially in the 18th to 19th century dramatically affected the business process in manufacturing companies worldwide, especially with the emergence of the fourth industrial revolution (IR 4.0).

The Malaysian manufacturing business is varied but still has shown long-standing supremacy in the processing and managing rubber and palm oil and pharmaceuticals, medical technology and electronics, among others. However, in 2000 the country began to see the shift from the agricultural economy to an industry-based one, which reduced the reliance on commodity wages. The Malaysian government decided to implement a strategy to focus on economic activities with higher added value so that the country can improve diverse it's economy widely (UK Essays, 2018).

Supply Chain Innovation

A supply chain represents a network of companies that interact to turn raw materials into finished goods and services and to deliver them to end customers (Johnson, 2010). Literally it must be managed in the most streamlined and cost-effective way possible. Competitive pressures and turbulent business environments push companies toward innovation. Innovation is necessary for firms to respond to rapid changes in products and services as well as customer's demand and problems (Kim et al., 2015). Likewise, innovation is improvements in the way that products and services, information and relationships flow within the network that should be done by companies for they to survive (Osterwalder & Pigneur, 2010).

Generally, innovation occurs within processes, technologies, services, strategies and organisational structures (Rogers et al., 2016; Rogers, 2003). Innovation refers to the application of a new or improved product, process, marketing and organizational procedure, workplace arrangements and relations (Wagner, 2008). The innovation procedure takes in present knowledge. However, it frequently needs generating and obtaining new knowledge (Howells & Roberts, 2000). SC innovation is extensively acknowledged as significant for an organization's growth. Craighead, Hult and Ketchen (2009) had observed in SCs that knowledge, innovation strategy and actions are antecedents of firm performance.

The need to equate innovation cost and knowledge is the basic to attain better firm performance. The level of innovation in the SC allows a firm to stay resilient during uncertainties, and it is also the determinant of a firm's ability to show robustness (Kwak et al., 2018). The SC innovation is categorized as the product, process, technological, organizational, marketing and resource allocation innovation (Gao et al., 2017). Shete et al. (2020) revealed that SC partners'

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collaboration and engagement is the most crucial enabler in achieving SC innovation for manufacturing industries.

SCI is a procedure that can improve organizational processes to manage effective SCM through integrated interactions with suppliers, producers, distributors, and customers. (Lin, 2007). Thus, SCI causes time and cost reduction, developing novel operational techniques and reliable delivery system for coping with growing changes in the business (Lee et al., 2011). Chapman et al. (2003), propose that service industries should focus on SCI for effective delivery services. Researchers agree that supply chain innovation helps companies to maintain their competitive position and improve supply chain performance (Lee et al., 2011; Krabbe, 2007; Flint, Larsson, Gammelgaard, & Mentzer, 2005; Franks, 2000).

The literature on supply chain innovation has just started evolving. Lin (2008) described supply chain innovation as certain set of tools that can improve firm processes directed for efficient supply chain management through seamless integration with suppliers, manufacturers, distributors and customers. A host of benefits are present with supply chain innovation like cost and lead-time reduction, generation of new operational strategies and flexibility development (Stundza, 2009). After this, researcher will discuss further on Supply chain management practices, due to the relationship towards supply chain innovation.

Supply Chain Management Practices

Council of Logistics Management (CLM) (2000) defines SCM as the systemic, strategic coordination of the traditional business functions and tactics across these business functions within a particular organization and across businesses within the supply chain for the purposes of improving the long-term performance of the individual organizations and the supply chain as a whole. SCM has been defined to explicitly recognize the strategic nature of coordination between trading partners and to explain the dual purpose of SCM: to improve the performance of an individual organization, and to improve the performance of the whole supply chain. The goal of SCM is to integrate both information and material flows seamlessly across the supply chain as an effective competitive weapon (Childhouse & Towill, 2003).

The philosophy of SCM focuses on how firms utilize their suppliers' processes, technology, and capability to enhance competitive advantage (Farley, 1997) and the coordination of the manufacturing, logistics, materials, distribution, and transportation functions within an organization (Lee & Billington, 1992). Past research on SCM has tended to focus on traditional approaches that emphasize financial outcomes without much consideration for environmental or social/community concerns. As an example, a 2011 definition of SCM describes "a set of approaches to integrate supply chain participants so that products are produced and distributed at the right quantities, to the right locations and at the right time to ensure the total cost is minimized and the service level is maximized" (Simchi- Levi et al., 2011).

Supply chain management (SCM) has nowadays become a crucial strategy for firms to enhance their profitability and stay competitive (Li et al., 2006). Thus, SCM has been recognized as an important phenomenon that has generated extensive interest among managers and academic researchers. SCM encompasses all activities, which are involved in planning and management, sourcing and procurement, conversion and all logistics management activities as well as coordination and collaboration with channel partners (Soosay et al., 2008).

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SCM practices are implemented to achieve and enhance performance through supply chain, which require an internal cross-functional integration within the firm and external integration with suppliers and customers to be successful (Kannnan & Tan, 2010; Kim, 2006). SCM practices are defined as a multi-dimensional concept, including both downstream and upstream sides of the supply chain, (Papakiriakopoulos & Pramatari, 2010). Supply chain management practices involve several dimensions that were developed, tested and validated in the literature by previous researchers and has been explored from many different perspectives. These practices are considered crucial, and they cover both upstream and downstream sides of the SC. By considering both sides of the SC, this study allows researchers to test the antecedents and consequences of SCM practices, and also in the context of a specific developing sector and country.

SCM encompasses various activities such as planning and management, procurement, coordination, collaboration, outsourcing and all other logistics management activities with other channel partners (Soosay et al., 2008). Majority of the studies have emphasized that the ultimate goal of SCM is to enhance and improve the performance of firms (Li et al., 2006, 2005; Chen & Paulraj, 2004; Min & Mentzer, 2004). According to Kumar and Kushwaha (2018), supply chain management practices could improve the financial and operational performance of an organization. Odongo, Dora, Molnar, Ongeng, and Gellynck (2016) concurred with Kushwaha regarding the effect of supply chain management practices on the operational performance of an organization.

Dimensions of Supply Chain Management Practices

They found that SCM practices as a multidimensional concept cover upstream and downstream supply chain as well as internal supply chain (Li et al., 2006). The seven constructs constitute the combination of comprehensive model (Li et al., 2006, 2005) and system approach model (Min & Mentzer, 2004). In other words, the proposed total SCMP in this study will cover all the important dimensions such as upstream (SSP) and downstream (CR) sides of a supply chain, information flow across a supply chain (IS and IQ), internal supply chain processes. The nature of SCMPs will be able to explain the dual purpose of SCM as it improves the performance of an individual firm as well as the performance of the whole supply chain. This could be achieved through the effective adoption and construction of the best SCM practices (Kim, 2006).

The best supply chain management practices can positively impact on performance (Tan, 2002). The degree of attention paid to SCM has increased in developing countries. However, for this study a researcher chooses 7 dimensions below as supply chain management practices to be independent variable;

Strategic Supplier Partnership (SSP)

Strategic Supplier Partnership (SSP) is defined by Li et al. (2006) as "the long-term relationship between the organisation and its suppliers". It focuses on direct, long-term association and it is interested in mutual planning and problem-solving efforts (Arawati & Zafaran, 2008). Therefore, it is designed to enhance the operational and strategic efforts and capabilities of individual participating firms to achieve their goals (Li et al., 2005). An effective supplier partnership is a critical component of leading-edge supply chains (Arawati & Zafaran, 2008). A strategic partnership allows a company to work more effectively with suppliers willing to share responsibility to ensure success of the product.

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Level of Information Sharing (LIS)

LIS is defined by Li et al. (2006) as "the extent to which critical and proprietary information is communicated to one's supply chain partner". Shared information can vary from strategic to tactical in nature and from information about logistics to customer and general market information (Min & Mentzer, 2004). (Barney, 1998) considers sharing of information as one of five building blocks that characterize a solid supply chain relationship. According to researcher, supply chain partners who exchange information regularly are able to 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, Tompkins (1999) consider the effective use of relevant and timely information by all functional elements within the supply chain as a key competitive and distinguishing factor. Disney and Towill (2003) found that the smooth movement of materials and information along the supply chain is key to achieving an effective and integrated chain.

Quality of Information Sharing (QIS)

Quality of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Monczka, Petersen, Handfield, & Ragatz, 1998). This dimension includes facets such as timeliness, accuracy, adequacy and credibility of information exchanged (Li et al., 2006). According to Li and Lin (2006), ensuring the quality of shared information plays a key role in achieving effective SCM, and hence Li et al. (2006) suggest that organisations should ensure that it flows with minimum delay and distortion. The impact of information sharing is strongly influenced by the quality of information that is shared. To eliminate distortion and to improve the quality of information shared, companies should take steps to ensure that the information is as accurate as possible and that it flows smoothly throughout the chain, without delay.

Customer Relationship Management (CRM)

According to Lee et al. (2007), CRM is "concerned with planning, implementing, and evaluating successful relationships between providers and recipients either upstream or downstream of supply chain". CRM mainly refers to activities such as sharing product information with customers, interacting with them to manage demand and satisfy their wants and needs, accept customer orders, having an order placing system, sharing order status with customers during order scheduling, and the product delivery phase (Lee et al., 2007). Karr (2017) States that these measures basically concern improved cost management practices, improved customer relations, improved product quality control, improved effective communication networks to expand target markets, informed and better pricing decisions. Various research concentrates mainly on whether customers stay loyal to and are pleased with their brand (Aydin, Özer & Arasil, 2015) and satisfaction is a critical component of retention. Another important aspect to be vigilant about is accessibility.

Internal Lean Practice

The lean management approach focuses on the reduction of waste for increasing the actual value added to fulfil customers' needs and maintaining profits. Vonderembse et al. (2006) reported that a lean supply chain is the one that uses continuous improvements focusing on eliminating waste or nonvalue steps along the supply chain. According to them, the internal manufacturing efficiency and setup time reduction are the enablers of the economical production of small quantities, cost reduction, profitability and manufacturing flexibility. Lean

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has gained popularity in a wide range of industrial sectors, beyond manufacturing, all around the world (Reyes et al., 2018). This help achieving long term economic sustainability of many organisations (Arkader, 2001).

Postponement

Postponement is defined by Li et al. (2006) as "the practice of moving forward one or more operations or activities (e.g. making, sourcing, and delivering) to a much later point in the supply chain". Its main objective is to push final product completion as close to the final customer as possible in order to reduce inventories and minimise risk of unsold product (Ferreira et al., 2015) or delaying further investment in a product or service until the last possible moment in order to satisfy the preferences of the customer at that moment. Two major considerations in developing a postponement strategy are (1) how much delay is needed, and (2) which steps should be taken to achieve the delay. Postponement strategies allow a company greater flexibility in developing products that meet the changing needs of consumers and in differentiating a product to modify the demand function. These strategies are important because they relate to types of products, market demand, and structural bottlenecks in manufacturing systems and logistics (Pagh & Cooper, 1998).

Supply Chain Integration (SCIn)

Supply chain integration (SCI) links a firm with its customers, suppliers and other channel members by integrating their relationships, activities, functions, processes and locations (Naslund & Hulthen, 2012; Kim & Narasimhan, 2002). SCI includes two stages: internal integration between functions and external integration with trading partners. Internal integration establishes close relationships between functions such as shipping and inventory or purchasing and raw material management (Trkman & Groznik, 2006). While external integration has two directions: forward integration for physical flow of deliveries between suppliers, manufacturers, and customers and backward coordination of information technologies and the flow of data from customers, to manufacturers, to suppliers (Schoenherra & Swink, 2012; Frohlich & Westbrook, 2001).

Table 2.1: Summarize of Each Dimensions

Dimensions	Summary
Strategic Supplier Partnership	it is designed to enhance the operational and strategic efforts and capabilities of individual participating firms to achieve their goals
Level of Information Sharing	the effective use of relevant and timely information by all functional elements within the supply chain as a key competitive and distinguishing factor.
Quality of Information Sharing	It includes facets such as timeliness, accuracy, adequacy and credibility of information exchanged and plays a key role in achieving effective SCM
Customer Relationship Management	these measures basically concern improved cost management practices, improved customer relations, improved product quality control, improved effective communication networks to expand target markets, informed and better pricing decisions
Internal Lean Practice	the internal manufacturing efficiency and setup time reduction are the enablers of the economical production

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	of small quantities, cost reduction, profitability and manufacturing flexibility.
Postponement	strategies allow a company greater flexibility in developing products that meet the changing needs of consumers and in differentiating a product to modify the demand function
Supply Chain Integration	links a firm with its customers, suppliers and other channel members by integrating their relationships, activities, functions, processes and locations

Competitive Advantage

Competitive advantage refers to the factors that allow a company to produce goods and services better or cheaper than its rivals. These factors allow the productive entity to generate more sales or superior margins compared to its rivals. Competitive advantages are attributed to variety of factors including cost structure, branding, the quality of product offerings, the distribution network, intellectual property and customer service. Competitive advantage is the extent to which an organization is able to create a defensible position over its competitors (Subba, 2006). It comprises capabilities that allow an organization to differentiate itself from its competitors and is an outcome of critical management decisions (Thatte, 2007). The empirical literature has been quite consistent in identifying price/cost, quality, delivery, and flexibility as important competitive capabilities (Subba, 2006).

Competitive advantage is composed of the action results and managerial decisions which result in the organization's superior performance when compared to those of their competitors (Guimaraes et al., 2016; Barney, 1991). Competitive advantages pertain to a firm's ability to show a higher degree of competitiveness as compared to its rivals within a given industry, such as being able to reduce cost, creating distinct products or services, or better satisfy customers (Porter, 2011). A firm is said to have competitive advantage when the existed or potential competitors cannot duplicate or it will cost much to imitate. Besides being significantly different from competitors, firms have to consider other key success factors, such as being able to cope with environmental changes and resist the actions of competitors (Aaker, 2008).

Resource-Based View Theory

The underpinning theory used for this study based on the topic of this which is supply chain innovation, supply chain management practices, and competitive advantage among manufacturing industry in Malaysia. Hence, the underpinning theory that are relevant to this study are Resource Based-View.

Based on resource-based view (RBV), SCI integrates innovative activities with logistic approach (logistics-related services), innovative marketing-focused activities (customer needs), and other related activities (e.g., developing technologies, creating new knowledge and technical skills) to augment joint profit (Wong & Ngai, 2019; Brah, & Hassan, 2017; Bello et al., 2004; Jajja, Kannan, Paulraj & Chen, 2004). SCI is a change in processes, technology, and network, meaning that SCI improves competitive advantage and organizational performance. According to this theory, the competitiveness of any organization is based on the resources it masters to develop core competencies. Sezen (2008) mentioned increasing the level of integration and information sharing, communication, and relationship management among the members of a supply chain has become a necessity for improving the effectiveness of supply

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chains.

A strong relationship with the supplier helps alleviate innovation expenditures, and change becomes a shared investment. The changes positively affect quality, performance, and cost. By improving quality and performance, manufacturing costs lower and profits increase. Another aspect of resources, which contribute to competitive advantage, revolves around the relationship between buyer and supplier (Moser & Blome, 2008). Grant (2001) viewed Research Based View as a way of formulating a firm's strategy by doing an analysis of the firm's resources.

Conceptual Framework

The conceptual framework will provide a guide in obtaining a better understanding of the Impact of Supply Chain Management practices on Supply Chain Innovation and competitive advantage of manufacturing industry in Malaysia. Supply chain management practice is conceptualized in seven-dimensional construct, The seven dimensions being strategic supplier partnership, customer relationship management, level of information sharing, quality of information sharing, lean practices, postponement, and supply chain integration.

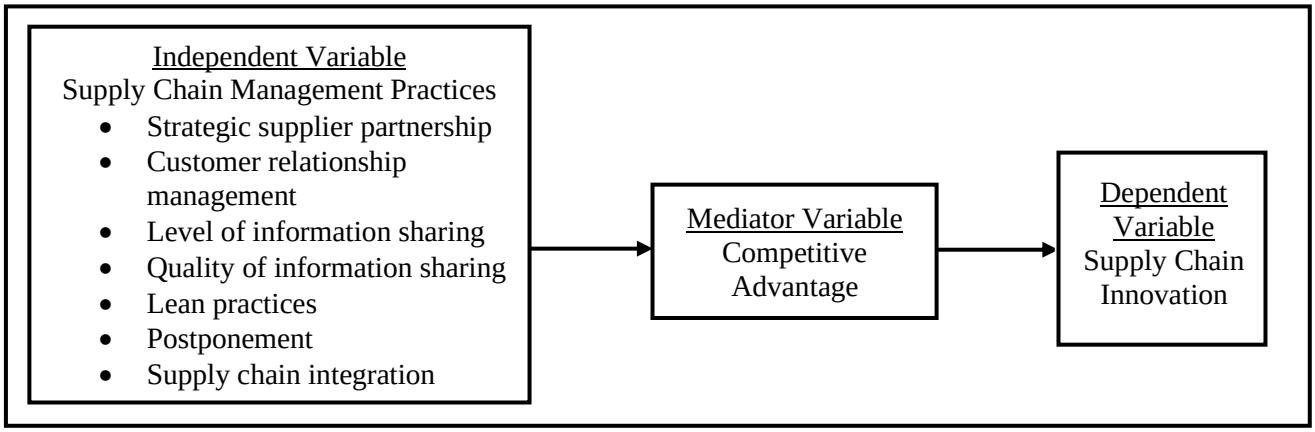

Figure 1: Conceptual Framework of This Study.

Source: Li et al., (2006); Zhang, (2006); Kwak, Seo, and Mason (2015).

Research Design

Researcher used a quantitative for this study. Research design for this study is using correlational method, this study is using descriptive research, which is describes the characteristics of a population. Thus, for this research is to investigate the antecedents of supply chain innovation among manufacturing firms in Malaysia and the effect of competitive advantage as mediating role. The purpose of the study was to identify whether supply chain innovation can be affected by supply chain management practices and competitive advantage. Meanwhile to measure the relationship between these three variables. This study has been carried out by using the survey method in which each respondent has been given a set of questionnaires and the respondent has to answer the questions within a specific time.

Population and Sample Size

The target population for this study were an assorted set of Malaysian manufacturing companies in Malaysia. The target respondents are covered among Peninsular Malaysia, which mainly focus on Penang, Klang Valley, Johor and Terengganu. This study, it is estimated that the population of respondents from manufacturing companies in Klang Valley, Penang, Johor

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and Terengganu to answer the questionnaire are 379 respondents. While, the sample selected are from the population. The researcher chose 379 respondents for this study which all the respondents came from manufacturing companies in Malaysia.

Instrument

This questionnaire was the main instrument for this study. The researcher used the reference from past researchers and also journals to develop questionnaire. The entire questionnaire has been attached with the cover letter and the approval from the lecturer and research advisor in explaining the purpose of the study. This is to ensure that all the data collected from the respondents will be kept confidentially where the integrity is guaranteed. A questionnaire has been developed and was distributed to the respondents. The questionnaire for this study used bilingual which English language and Bahasa Malaysia. The method used to conduct the survey is through self-administered questionnaire and it considered the most suitable for the objectives. As for the method of distributing questionnaires, it has been electronically disseminated to the respondents by email.

The questionnaire of this study consisted of supply chain management practices dimensions namely; strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, lean practices, postponement, and supply chain integration. Whereas it is adapted from Fornell & Bookstein (1982). As for moderating variable of this study which is competitive advantage, the questions were adapted from (Li et al, 2006; Yamin et al., 1999; Tracey et al., 1999; and Stalk, 1988). Lastly, questionnaire of supply chain innovation which as a dependent variable to this study. The questionnaire derived from Seo et al. (2014) and Kwak (2018) study.

Data Collection and Time of Study

For the researcher to facilitate the collection of data, a questionnaire was developed so that it has been distributed to the respondents. The questionnaire has been distributed personally to the respondents. The survey, through the mailed questionnaire, have been carried out for a specific period in early 2023. As a measure to speed up and improve response rate, follow-up calls were next action of researcher to get the complete data from respondents. A total of 379 sets of questionnaires were distributed in Klang Valley, Penang, Terengganu and Johor. The rationale of distributing the questionnaire in are of Klang Valley, Penang, Johor and Terengganu was because there are all populated with the most manufacturing firms in Malaysia. This is also would be able a researcher to collect varies of data which firm's view from North, West, South and East part of Malaysia. A total of 350 sets of questionnaires were collected, which can be translated into a response rate of 95%. The process of distributing and collecting the questionnaire took approximately two (2) months.

Data Analysis

The plan for data analysis explained the techniques used to analyze data obtained from the questionnaire. For the respondents' selection, in order to receive high quality responses, the surveys were directed to respondents who are mainly responsible in the organization's supply chain, purchasing, logistics and operations because these people are expected to have the best knowledge of supply chain management in their respective departments and what are the challenges that they face. The researcher was required to prepare a table describing the research objectives, research questions, hypothesis, and data analyzed that will be used.

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Table 3.1: Table of Data Analysis

Research Objectives	Research Questions	Measurement	Statistic
To identify the level of supply chain management practices, competitive advantage, and supply chain innovation among manufacturing industry employees	What is the level of supply chain management practices, competitive advantage, and supply chain innovation among manufacturing industry employees?	Interval	Mean/ standard deviation
To determine the relationship between supply chain management practices and supply chain innovation	Is there any relationship between supply chain management practices and supply chain innovation	Interval	Multiple Regression
To identify the supply chain management practices and competitive advantage	Is there any relationship between supply chain management practices and competitive advantage	Interval	Multiple Regression
To ascertain the relationship between competitive advantage and supply chain innovation	Is there any relationship between competitive advantage and supply chain innovation	Interval	Multiple Regression
To investigate the effect of competitive advantage in mediating the relationship between supply chain management practices and supply chain innovation.	Is there any impact of competitive advantage in mediating the relationship between supply chain management practices and supply chain innovation	Interval	Hierarchical Regression Analysis

Data Analysis and Findings

Questionnaire has been used to collect the data and feedback from respondents. After all the data already collected, researcher must analyze the data. In this chapter, the data gained will be analyzed by using the application of SPSS software.

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Correlation Matrix

A total of 350 questionnaires were used for the correlation analysis. The Pearson correlation analysis was used to diagnose the inter-relationships among the variables in this study. To interpret the correlation between the variables, the degrees of correlation by Pearson correlation coefficient was used. Table 2 below shows the interpretation of correlation coefficients.

Table 4.1: Results of Correlation Matrix between DV and IV

		SSP	CRM	LIS	QIS	POS	LP	SCIn	SCI
SSP	Pearson Correlation	1	.564**	.500**	.510**	.506**	.643**	.516**	.535**
CRM	Pearson Correlation	.564**	1	.622**	.523**	.506**	.596**	.615**	.530**
LIS	Pearson Correlation	.500**	.622**	1	.626**	.562**	.664**	.532**	.446**
QIS	Pearson Correlation	.510**	.523**	.626**	1	.555**	.584**	.634**	.396**
POS	Pearson Correlation	.506**	.506**	.562**	.555**	1	.646**	.524**	.325**
LP	Pearson Correlation	.643**	.596**	.664**	.584**	.646**	1	.629**	.416**
SCIn	Pearson Correlation	.516**	.615**	.532**	.634**	.524**	.629**	1	.404**
SCI	Pearson Correlation	.535**	.530**	.446**	.396**	.325**	.416**	.404**	1

**. Correlation is significant at the 0.01 level (2-tailed).

All supply chain management practices dimensions are found to be significantly and positively correlated with each other. The linkages between supply chain management practices and the dependent variables were also established. Based on the result, all dimensions of independent variables (strategic supplier partnership, customer relationship management, level of information sharing, quality of information sharing, postponement, lean practices, and supply chain integration) are significantly and positively correlated with supply chain innovation. After researcher run and analyze the data, it shows that all the dimensions of supply chain management practices have a supported result as in the table below;

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Table 4.2: Summarize of Hypothesis Testing

Hypothesis	Statements	Results
H l a	There is a significant relationship between strategic supplier partnership and supply chain innovation.	Supported
H1 b	There is a significant relationship between customer relationship management and supply chain innovation.	Supported
HI c	There is a significant relationship between level of information sharing and supply chain innovation.	Supported
H1 d	There is a significant relationship between quality of information sharing and supply chain innovation.	Supported
H1e	There is a significant relationship between postponement and supply chain innovation.	Supported
H1f	There is a significant relationship between lean practices and supply chain innovation.	Supported
H1g	There is a significant relationship between supply chain integration and supply chain innovation.	Supported

According to Schlaefke (2018), the relationship between supply chain management practices and supply chain innovation is an important area of research and practice. Supply chain management practices refer to the strategies, processes, and activities employed by organizations to manage their supply chains effectively. Therefore, supply chain management practices really give positive impact on SMEs in order to implement supply chain innovation (Osterwalder & Pigneur, 2010). By actively apply the practices of supply chain management as a virtual corporation, manufacturers and their suppliers can source, produce, and deliver products with minimal lead time and expense. Supply chain management practices has nowadays become a crucial strategy for firms to enhance their profitability and stay competitive (Li et al., 2006). Since the goal of a company is to maximize profits, it must weigh the benefits versus the costs of its decisions along the supply chain (Chima & Hills, 2007). Thus, according to previous researcher Tan (2002), Min and Mentzer (2004), Li et al. (2006), Chowa (2008), Inda et al. (2012), and Kumar (2008) have found that supply chain management practices as a good element to improve supply chain innovation and positively impact on a firm to have a better supply chain.

Table 4.3: Results of Correlation Matrix between IV and MV

		SSP	CRM	LIS	QIS	POS	LP	SCIn	CA
SSP	Pearson Correlation	1	.564**	.500**	.510**	.506**	.643**	.516**	.537**
CRM	Pearson Correlation	.564**	1	.622**	.523**	.506**	.596**	.615**	.646**

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LIS	Pearson Correlation	.500**	.622**	1	.626**	.562**	.664**	.532**	.691**
QIS	Pearson Correlation	.510**	.523**	.626**	1	.555**	.584**	.634**	.671**
POS	Pearson Correlation	.506**	.506**	.562**	.555**	1	.646**	.524**	.448**
LP	Pearson Correlation	.643**	.596**	.664**	.584**	.646**	1	.629**	.574**
SCIn	Pearson Correlation	.516**	.615**	.532**	.634**	.524**	.629**	1	.587**
CA	Pearson Correlation	.537**	.646**	.691**	.671**	.448**	.574**	.587**	1

**. Correlation is significant at the 0.01 level (2-tailed).

The results of correlation coefficient between supply chain management practices and competitive advantage are shown in table 3 above. All the dimensions were found have a strong positive relationship and the hypothesis are supported as shown in table below;

Table 4.4: Summarize of Hypothesis Testing

Hypothesis	Statements	Results
H4a	Competitive advantage will positively mediate relationship between strategic supplier partnership and supply chain innovation	Supported
H4b	Competitive advantage will positively mediate relationship between customer relationship and supply chain innovation	Supported
H4c	Competitive advantage will positively mediate relationship between level of information sharing and supply chain innovation	Supported
H4d	Competitive advantage will positively mediate relationship between quality of information sharing and supply chain innovation	Supported
H4e	Competitive advantage will positively mediate relationship between postponement and supply chain innovation	Supported
H4f	Competitive advantage will positively	Supported

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	mediate relationship between supply chain integration and supply chain innovation	
H4g	Competitive advantage will positively mediate relationship between lean practices and supply chain innovation	Supported

Markley and Davis (2007) imply that firms can develop future competitive advantage by using sustainable supply chain management and proposes that this is possible through accordance with the "triple bottom line" to improve their competitiveness. The previous study from Anatan (2014) resulted that supply chain management practices have significant effects on supply competitive advantage. Supply chain management includes a variety of practices carried out within an organization to achieve and maximize effectiveness by managing the flow of finished goods, services, and information from point of origin to point of consumption through a set of directly linked organizations in the chain. Such activities include strategic supplier partnerships, customer relations, information sharing, information quality, and postponement (Li et al., 2006). The competitive advantage is the embodiment of firm performance, and the implementation of supply chain management can enhance a firm's competitive advantages and improve business performance. Therefore, the study from Jia and Wang (2019), SCM practices are positively related to competitive advantages.

Table 4.5: Results of Correlation Matrix between DV and MV

		CA	SCI
CA	Pearson Correlation	1	.588**
SCI	Pearson Correlation	.588**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Lastly, the linkages between moderating variable (competitive advantage) and supply chain innovation were established. Competitive advantage and supply chain innovation has strong positing relationship ($r = .5.88$, $p<0.01$). The result is shown in table 4.5 above. This result also supported with previous studies. Deshpandé and Farley (2004) pointed out that innovativeness can bring enterprises better performance, and help them to develop products, procedures and management mechanisms that are diversified, valuable, rare, differentiated and difficult to imitate. A differentiation strategy aims at gaining superior quality and image (even at considerable cost) in order to firm reach the competitive advantage, which a firm can generate a defensible position over its rivals (Ambulkar et al., 2015). Study from Chen (2018) competitive advantage is positively related to supply chain innovation.

Discussion and Conclusion

The data was analyzed to ensure research objective can be achieved. First research objective was to examine the level of supply chain management practices, competitive advantage, and supply chain innovation among manufacturing industry employees. With regards to the research objective and question (1), all dimensions of supply chain management practices; namely, strategic supplier partnership (SSP), customer relationship management (CRM), level of information sharing (LIS), quality of information sharing (QIS), lean practices (LP),

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postponement (POS), and supply chain integration (SCIn) had high scores with CRM with the highest mean score (M=4.2834, SD=.47702), followed by SCIn (M=4.2693, SD=.43670), QIS with score (M=4.2309, SD=.50188), nest SSP (M=4.2271, SD=.47702), LP with (M=4.1557, SD=.41516), LIS (M=4.1486, SD=.47727), and lastly, POS with (M=4.0629, SD=.49369).

The mediating variable of this study which was competitive advantage (CA), had a high score with (M=4.2871, SD=.48898). Lastly, with relations to dependent variable, it was found out that supply chain innovation (SCI) has the high score with (M=4.2376, SD=.43793).

In answering to the second research question, all of the supply chain management practices dimensions were found to be significant in predicting all the supply chain innovation variable. As for the supply chain innovation, the seven (7) dimensions of supply chain management practices which are customer relationship management (β=0.346, $p<0.01$), strategic supplier partnership (β=0.283, $p<0.01$), level of information sharing (β=0.135, $p<0.01$), quality of information sharing (β=0.044, $p<0.01$), supply chain integration (β=0.027, $p<0.01$), postponement (β=-0.065, $p<0.01$) and lean practices (β=-.-66, $p<0.01$), and are significant. While, as for the supply chain innovation with (β=0.240, $p<0.01$), and competitive advantage (β=0.229, $p<0.01$).

This a justification in answering question 2 and question 3 above. Supply chain management practices as a multi-dimensional construct that encompasses upstream and downstream sides of supply chain (Li et al., 2006). Donlon (1996) stated that outsourcing, supplier partnership, information sharing, cycle time, compression and continuous process flow, as a part of supply chain management practices. This research adopts the same supply chain management practices (supplier partnership, customer relationship and information sharing). While there are many other pitfalls of effective SCM, such as conflicting objectives and missions among supply chain members, inadequate definition of customer service, and separation of supply chain design from operational decisions (Lee & Billington 1992), this survey indicated that more than two-thirds of the respondents practiced some form of SCMPs. It clearly shows that SCMPs is a viable business strategy. In conclusion, the objectives of the study have been achieved successfully.

All parties are responsible to play various roles with the same goal of making supply chain are more competitive and innovative. Manufacturing industry in Malaysia are advised to improve their supply chain to attract more customer and investor. If customers are well -aware of supply chain management practices, there will be great demand which can make the organizations that are producing conventional product and possible to go global. Overall, the success of supply chain in an organization relies heavily on the coordination and collaboration of various parties.

Research Contributions

The contributions of this study were divided into three (3) categories; theoretical contribution, practical contribution, and policy contribution. Theoretical contribution related to the methodological and hypothetical aspects of this research which being used to improve the current knowledge on supply chain. The second part discussed on the practical outcomes that are provided to mitigate the issues faced by manufacturing firms in Malaysia. Last but not least, policy contribution was related to policy implemented by Government to boost economy by help manufacturing industry improve their supply chain.

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Theoretical Contributions

In essence, findings provide authentic support for the proposition that supply chain management practices which has a more effectual influence on supply chain innovation. Additionally, the study made an effort to adopt the theory of relational view which has relevance in supply chain research. Drawing from the results, it can therefore be put forward that the theory of relational view remains insufficient to ground alone some research within the supply chain literature. This study clarified the applicability of the resource-based-view theory (RBV). The result of this study has been helpful to better understand which dimensions of supply chain management practices can be recognized to be translated into supply chain innovation. The result of this study triggered and allowed others to conduct research on other dimensions, factors, or perhaps variables that would strengthen the relationship between supply chain management practices, competitive advantage, and supply chain innovation.

Practical Contributions

This research were likely aid practitioners and stakeholders of the industry by fostering a better understanding of the impact of supply chain management practices toward its supply chain innovation. First, it has been revealed empirical evidence that the right supply chain management practices led to better competitive advantage and subsequently enhance supply chain innovation. Secondly, manufacturers and supply chain practitioners were use the contributing factors of the innovation of supply chain management to identify the industrial critical success factors. As such, these critical success factors have been identified as the key result area (KRA) to formulate key performance indicator (KPI) to measure the effectiveness and efficiency of the organizational resources and supply chain in total.

Policy Contributions

This study has benefitted to all practitioners, academician, researchers, policy makers, and government administration in Malaysia and globally. As for the government, a researcher embraced more the supply chain management practices and integrate effort to promote supply chain innovation among manufacturing industry in Malaysia. This is in line with the third Industrial Master Plan (IMP) (2006-2020) in Malaysia which to enhance the capabilities on supply chain and make Malaysia a competitive nation. It also aligns with Eleventh Malaysia Plan (2016-2020) that aims to foster innovation in supply chain. Subsequently, the outcome would support the target of IMP which expecting manufacturing industry to grow at 5.6% annually and contribute 28.5% to GDP in 2020.

This study has been an eye opener for the government and industry to help Malaysia's Education in promote more courses related to supply chain and logistics management to equip more professionals with the right supply chain knowledge, and continuously embraced new technologies to keep up with global demand. Having a workforce with strong supply chain knowledge gives an added advantage to Malaysia, and it would enhance Malaysia's reputation as the most ideal supply chain hub. However, SCM is pivotal in leapfrogging Malaysia's logistics to become world class, faster, cost effective and better requirements are the ingredients to successful supply chain.

Recommendations For Future Research

Since the result of this study showed that competitive advantage that acts as the mediating variable of this study is partially significant in strengthening the relationship between supply chain management practices and supply chain innovation, future research might want to

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consider other factors as mediating variables. To date, most of the organizations leverage on supply chain as the core metric to create competitive advantage. Future research may explore the model proposed in this study with other independent variables within the scope of supply chain and operation management.

Future research can also consider using the qualitative method to obtain the response from the respondents. Qualitative method is proven to provide certain justifications that are not addressed in the quantitative method, which can further be used to address the missing link of mediating variable in this study. This would certainly enhance or strengthen the relationship between supply chain management practices and supply chain innovation.

This study is based on a single context in which the study provides an insight to supply chain management practices, competitive advantage, and supply chain innovation among manufacturing firms in Malaysia. Future study could consider conducting the research in another sector such as agriculture or aviation industry to gauge their perception on supply chain especially when it comes to innovation. Another sector or other country might generate different outcomes pertaining to supply chain management practices and supply chain innovation.

Lastly, this study was conducted in a very niche market of supply chain, which creates a limitation in generalizing the result to other industries. Therefore, future research should consider different sectors that examine the role of supply chain management practices on supply chain innovation such as agriculture, aviation, or tourism industry. This would allow for a verification of the findings especially on supply chain innovation.

Conclusion

This research was underway between the companies of production, refining, and manufacturing that include chemical, manufacturing, plastics, pharmacy, manufacturing, clothing, fur, shoes, paper, pulp, metal, a material manufactured, electronics and communications, electrical, mechanical, vehicle, and automotive components, boat machinery, precision machinery, etc. The study was carried out. This study considers the scale more or less widespread in nature and applies to the industries in the above categories. As for the applicable scale of some industries, including food and beverage, perishable agricultural commodities, auto components, engineered, IT and telecommunications products, textiles, consumer goods, steel and steel products processing, petroleum, gas, and oil products processing and power generation and distribution, there are special requirements for these sectors with regard to safe and secure energy production.

The scale established in the latest examination should understand these factors to make the instrument relevant to the aforementioned industries. In addition, it is possible to create a different scale of SCM for the food and beverage industry or the refining of oil, gas, and oil goods, considering relevant industries. This can be used as an opportunity for potential investigation. As product markets continue to change rapidly, it is very important to both marketing and managers to seize the opportunity to optimize the available resources to create a very comprehensive and reliable supply chain strategy. The role of supply chain management practices in sustaining a business and position the organization in the global marketplace requires establishing an innovative supply chain. Overall, this study contributes to the knowledge of the role of supply chain management practices, supply chain innovation and

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competitive advantage of the firm in supply chain management field.

The research contributes to the success of SCMP's and SCI in the manufacturing sector by studying the measurement scales validity which helps management decision-makers to evaluate their organization's SCMPs and enhance competitive advantage. The research represented the consistency, authenticity, and implementation of SCMPs. Furthermore, the research serves in many cases as proof of the use of SCMPs. The recent invention to identify SCMPs and SCI output structures may be regarded. To date, relatively little research is available which has established a scale that considers the related buildings in SCM and SCMPs. The scale built in the current study incorporates both SCM and SCMPs and is intended to contribute significantly to the established SCM literature.

The measurements developed in this research can capture the different aspects of supply chain innovation, thus not only enabling use by practitioners to identify the immediate outcomes of it, but also to understand its impacts on organizational performance. The contribution of this study is derived from the resource-based view theory which measures the supply chain management practices, competitive advantage, and supply chain innovation from the view of the firms, which creates a new perspective to the supply chain. The framework of this study has been successful in examining the relationships among supply chain management practices, competitive advantage, and supply chain innovation among manufacturing firms in Malaysia. Overall, the unique contributions of this study have significantly improved the concept of supply chain innovation by supply chain management practices. This study has also produced an understanding of how organizations should include external factors in their decision-making process.

To sum up this research, supply chain is the secret weapon of most organizations. It is a fact that innovative supply chain helps organizations to identify and recognize the products and services. Besides, a good supply chain management strategy allows the organizations to connect with customers and suppliers emotionally. In line with this, supply chain management practices will assist the organizations to build trust with the target market, create brand loyalty among suppliers and most importantly, the organizations would be able to sustain and achieve competitive advantage.

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