https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

Supply Chain Integration and Quality Management in Manufacturing Firms

[1]Isaac Kofi Yornu | [2]David Ackah (PhD)
[1]Accra Technical University | [2]Center for Excellent Training & Consultancy
Email: yornu2000@gmail.com | drdavidackah@ipmp.edu.gh

Abstract

One of the most significant changes in the paradigm of modern business management is that individual businesses no longer compete as solely autonomous entities, but rather as supply chains. In this emerging competitive environment, the ultimate success of the business will depend on management's ability to integrate the company's intricate network of business relationships. Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains. This research conceptualizes and develops three dimensions of SCM practice (supplier relationship management, manufacturing flow management, and product development and commercialization) and tests the relationships between these SCM practices, competitive advantage, and organizational performance. Data for the study was collected from prominent organizations and the relationships proposed in the framework were tested using rigorous statistical techniques. The results indicate that higher levels of SCM practice can lead to enhance competitive advantage and improved organizational performance. These results have value to both the academic and business worlds as they provide verification of the widely held belief of the value of effective supply chain management.

Keywords: supply chain management (SCM), Supply Chain Integration, Quality Management, Supplier Relationship Management, Manufacturing Flow Management, Product Development & Commercialization

1.0 INTRODUCTION

Quality has become an increasingly important issue in organizations and so it is crucial to develop sustained resource management and therefore logistics emerges as an activity that allows, in a near term, the achievement of a great efficiency and economic benefits, and, in long term, to obtain competitive advantages. Although the concept of logistics has been progressing in recent decades, one of the definitions reported by the Council of Supply Chain Management Professionals is that logistics concerns to the part of the management of the supply chain which plans, implements and controls the efficient flow and storage of raw materials, finished products and semi-finished materials, as well as related information between the origin point and the point of consumption, in order to meet customer requirements. Thus, it is critical to meet customer requirements at the time and quantity needed and with the right quality and appropriated cost of product and service.

The concept of how the areas of QM and SCM are related in a particular organization and their impact on organizational performance is still very limited (Ramos et al., 2007; Agus, 2011). Flynn and Flynn (2005) realized that the organizations that pursue both quality and supply chain goals achieve a competitive advantage. Also, other researchers found mixed results of the effect of quality management practice on supply chain performance, suggesting that more research is required in order to provide some guidance to both researchers and supply chain managers on how to distribute resources to issues that are critical for the integration of quality management to improve supply chain performance, and consequently analyse the impact of this in companies performance (Fynes et al., 2005; Flynn and Flynn, 2005; Min and Mentzer, 2000; Forker et al., 1997; Yeung, 2008).

Customer relationship management – provides the firm's face to the customer, including management of the PSAs, and provides a single source of customer information.

Supplier relationship management – provides the structure for how relationships with suppliers are developed and maintained, including the establishment of PSAs between the firm and its suppliers.

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

Customer service management- provides the firm's face to the customer, including management of the PSAs, and provides a single source of customer information.

Demand management- provides the structure for balancing the customers' requirements with the capabilities of the supply chain.

Order fulfillment- includes all activities necessary to define customer requirements, design the logistics network, and fill customer orders.

Manufacturing flow management- includes all activities necessary to move products through the plants and to obtain, implement, and manage manufacturing flexibility in the supply chain.

Product development and commercialization – provides the structure for developing and bringing to market new products jointly with customers and suppliers.

Returns management- includes all activities related to returns, reverse logistics, gatekeeping, and avoidance.

1.2 Problem Statement

The main aim of this paper is to analyse and discuss the main issues concerning the integration of these two crucial areas and to develop a conceptual model that brings new insights on their impact on organizational. Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives and these are often conflicting. Marketing's objective of high customer service and maximum sales dollars conflict with manufacturing and distribution goals. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities.

Purchasing contracts are often negotiated with very little information beyond historical buying patterns. The result of these factors is that there is not a single, integrated plan for the organization there were as many plans as businesses. Clearly, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through which such integration can be achieved. Supply chain management is typically viewed to lie between fully vertically integrated firms, where a single firm, and those own the entire material flow where each channel member operates independently. Therefore, coordination between the various players in the chain is key in its effective management. Cooper and Ellram [1993] compare supply chain management to a well-balanced and well-practiced relay team. Such a team is more competitive when each player knows how to be positioned for the hand-off. The relationships are the strongest between players who directly pass the baton, but the entire team needs to make a coordinated effort to win the race.

Functional integration of procurement, production, inventory, distribution, and inventory management. In modern supply chains, organizations are giving high emphasis on horizontal integration of supply chain components by breaking all the traditional functional barriers and organizational hierarchies that have existed since the concept was born. Modern supply chain agents integrate effectively by sharing timely and accurate information with everyone in very transparent manner. For example, if the supply chain has multiple inventory points (Stock Keeping Units), the procurement manager may have access to daily, or even hourly, updates of the inventory levels at all the points. Functional integration is evident even with suppliers and customers. The systems like automatic reordering by an IT enabled system at fixed pre-negotiated prices whenever inventory levels dip below the reorder points, continuous flow of consumption information upstream and shipping information downstream between the endpoints, supplier managed inventory at customer premises, exact and timely flow of actual demand information reducing the need for demand forecasting, strategic supplier agreements, framework agreements, sustainable procurements, etc. are emerging modern practices.

2.0 LITERATURE REVIEW

2.1 Supply Chain Management

Several authors have defined supply chain management. Simchi-Levi and Kaminsky (2000) define supply chain management as "the integration of key business processes among a network of interdependent suppliers, manufacturers, distribution centers, and retailers in order to improve the flow of goods, services, and information from original suppliers to final customers, with the objectives of

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

reducing system-wide costs while maintaining required service levels". The Council of Supply Chain Management Professionals (CSCMP) (2004) defines SCM as: "SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities, including coordination and collaboration with suppliers, intermediaries, third-party service providers, and customers". Cooper, Lambert, and Pagh (1997) define SCM as the management and integration of the entire set of business processes that provides products, services and information that add value for customers. Other definitions of supply chain management are offered in Table 1. Though these definitions differ slightly in wording, all communicate the importance of integration, communication and coordination between functions and organizations that will create value for the customer (Gillyard, 2003).

SCM is a discipline in the early stages of evolution (Gibson, Mentzer, & Cook, 2005). SCM gives a concrete form to the so called "business ecosystem idea" and provides a framework of processes for firms to engage in co-existence rather than competition (Bechtel & Jayaram, 1997). Consultants proposed the term and educators proposed the structure and theory for executing SCM. The term "supply chain management" first appeared in 1982 (Oliver & Webber). Around 1990, academics first described SCM from a theoretical point of view to clarify the difference from more traditional approaches and names (such as logistics), to managing material flow and the associated information flow (Cooper et al., 1997). The term supply chain management has grown in popularity over the past two decades, with much research being done on the topic (Ashish, 2007).

The concept of SCM has received increasing attention from academicians, consultants, and business manager's alike (Feldmann & Müller, 2003, Tan, Lyman & Wisner, 2002, Van Hoek, 1998). Many organizations have begun to recognize that SCM is the key to building sustainable competitive edge for their products and/or services in an increasingly crowded marketplace (Jones, 1998). The concept of SCM has been considered from different points of view in different bodies of literature (Croom et al., 2000) such as purchasing and supply management, logistics and transportation, operations management, marketing, organizational theory, and management information systems.

Tan, Kannan, Handfield & Ghosh (1999) attempted to link certain supply chain management practices with firm performance. In particular, they examined the effects of quality management; supply base management and customer relations practices on firm financial performance. They found that some aspects of quality management – use of performance data in quality management, management commitment to quality, involvement of quality department, and social responsibility of management -- all were positively related to firm performance (Gillyard, 2003). Managing the supply base was found to have a significant impact on firm growth but not on overall performance. The significance of supply chain management highlights the need for companies to actively manage their supply chain to maximize their performance. As Mentzer et al. (2001) said, a supply chain would exist whether a firm actively manages it or not. Boddy, Cahill, Charles, Fraser-Kraus, and Macbeth (1998) found that more than half of the respondents to their survey considered that their organizations had not been successful in implementing supply chain partnering; Spekman, Kamauff, and Myhr (1998), noted that 60% of supply chain alliances tended to fail. Deloitte Consulting survey reported that only 2% of North American manufacturers ranked their supply chains as world class although 91% of them ranked SCM as important to their firm's success (Thomas, 1999). It appears that while SCM is important to organizations; effective management of the supply chain does not yet appear to have been realized. Supplier relationship management

The Global Supply Chain Forum (GSCF), a group of non-competing firms and a team of academic researchers, defines supplier relationship management as "the supply chain management process that provides the structure for how relationships with suppliers are developed and maintained." A team manages the supplier relationship management process with members from other functions as well as representatives from other companies in the supply chain. In other words, management activities in the supplier relationship management process are coordinated with inputs from purchasing, operations, logistics, finance, R&D, sales, and marketing functions. Through the cross- functional coordination, information from both the suppliers and customers are provided to the supplier relationship management activities (Wang, 2007).

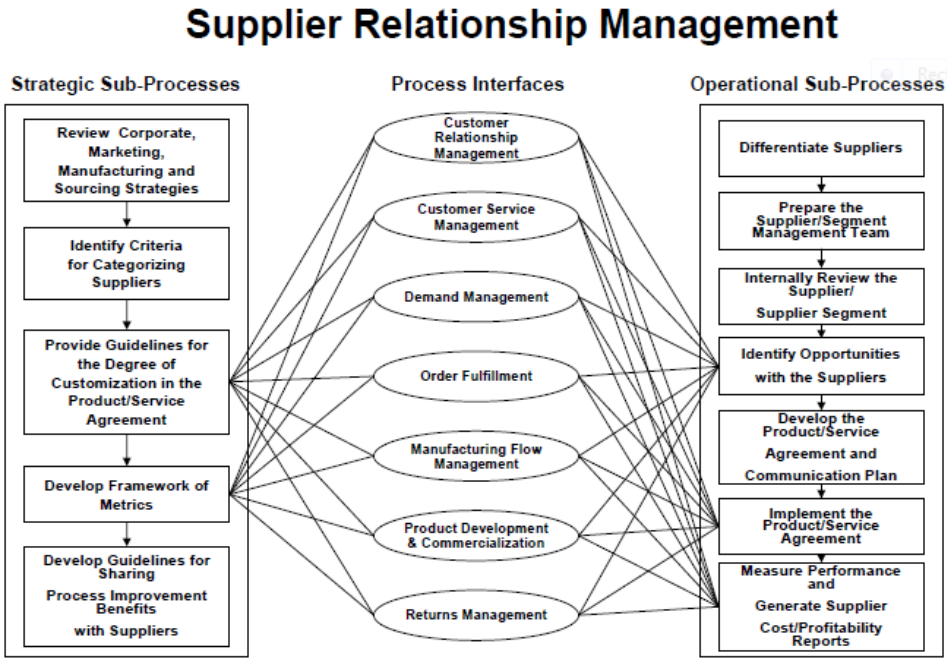
The cost of materials as a percentage of sales has been estimated at approximately 53% for all types of manufacturing in the United States. These costs range from a low of 27% for tobacco products to

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

a high of 83% for petroleum and coal products but most industries are in the 45 – 60% range (Stock, 2001). This amount of money spent represents a significant opportunity for companies to realize cost savings through better management of their supplier network. As part of the supplier relationship management process, close relationships are developed with a small set of key suppliers based on the value that they provide to the organization over time, and more traditional relationships are maintained with the others (Dyer, Dong & Wu, 1998).

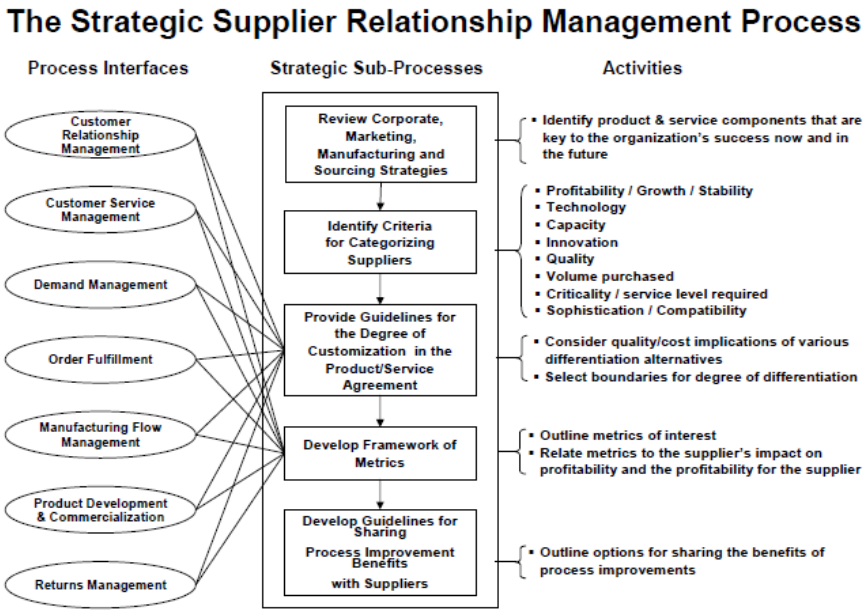
Management identifies those suppliers and supplier groups to be targeted as part of the firm's business mission. Supplier relationship management teams work with key suppliers to tailor product and service agreements (PSA) to meet the organization's needs, as well as those of the selected suppliers. Standard PSAs are crafted for segments of other suppliers. Supplier relationship management is about developing and managing the PSAs. Teams work with key suppliers to improve processes, and eliminate demand variability and non-value-added activities. The goal is to develop PSAs that address the major business drivers of both the organization and the supplier.

Performance reports are designed to measure the profit impact of individual suppliers as well as the firm's impact on the profitability of suppliers (Lambert, 2008). The supplier relationship management process has both strategic and operational elements. Croxton, Lambert, Rogers, and Garcia-Dastague (2001) have divided the process into two parts, the strategic process in which the firm establishes and strategically manages the process, and the operational process, which is the actualization of the process once it has been established.



(Croxton et al, 2001) Supplier relationship management strategic sub-processes at the strategic level, the supplier relationship management process provides the structure for how relationships with suppliers are managed. It is comprised of five sub- processes represented.

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7



The first strategic sub-process is: Review corporate, marketing, manufacturing And sourcing strategies. During this process the supplier relationship management team identifies supplier segments that are critical to the organization's success now and in the Future. By reviewing these strategies, management identifies the supplier types with whom the firm needs to develop long-term relationships (Lambert, 2008). The second strategic sub-process is: Identify criteria for segmenting suppliers. The purpose of this segmentation is to determine which suppliers should get specifically tailored PSAs and which should be grouped together and receive standard PSAs. Potential criteria include: profitability; growth and stability; the criticality of the service level necessary; the sophistication and compatibility of the supplier's process implementation; the supplier's technology capability and compatibility; the volume purchased from the supplier; the capacity available from the supplier; and the suppliers anticipated quality levels (Burt, 2003).

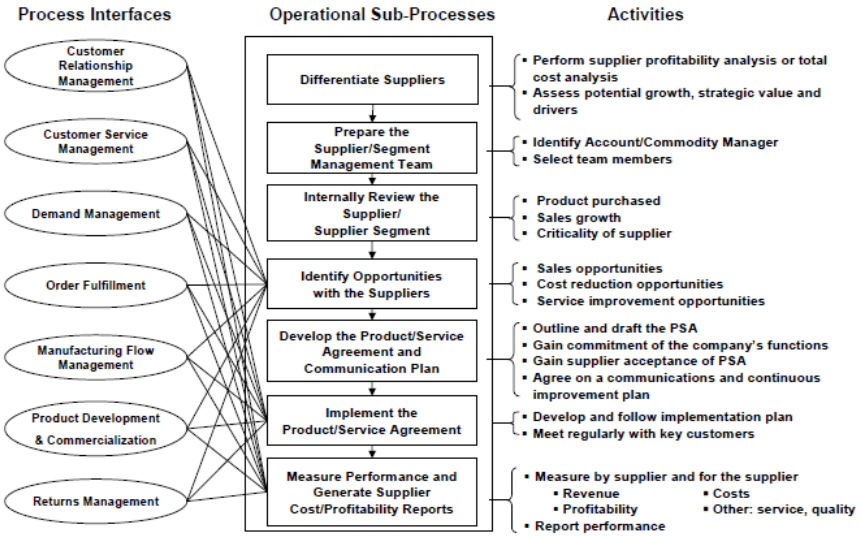
The third strategic sub-process is: Provide guidelines for the degree of customization in the product and service agreements. This involves developing the differentiation alternatives and considering the revenue and cost implications of each. To do this, the team considers the quality and cost implications of various differentiation alternatives, and selects the boundaries for the degree of customization (Lambert, 2008). The fourth strategic sub-process is: Develop framework of metrics. These metrics should reflect the supplier's impact on the firm's profitability and vice-versa. The supplier relationship team has the responsibility for assuring that the metrics used to measure supplier performance do not conflict with the metrics used in the other processes. Management needs to ensure that all internal and external measures are driving consistent and appropriate behaviour (Lambert, 2001).

The fifth and final sub-process is: Develop guidelines for sharing process improvement benefits with suppliers. The goal is to make these process improvements mutually beneficial for both parties involved. If the supplier does not gain from these improvements, it will be next to impossible to get their full commitment to achieving these goals. Supplier relationship management operational sub-processes at the operational level, the supplier relationship management process deals with developing and implementing the PSAs. This is It is comprised of seven sub-processes represented in figure 4.

Figure 4 Operational supplier relationship management sub-processes

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

The Operational Supplier Relationship Management Process



The first operational sub-process is: Differentiate suppliers. These suppliers are Segmented based on criteria developed in the strategic process. One of the new models 13 being widely adopted, that many companies have found useful in segmenting their suppliers, looks at two fundamental characteristics that practitioners believe should shape purchasers' decisions. These are: Substitutability and/or availability of comparable products; and strategic importance of the supplier's product (Rackham, 2008). The second operational sub-process is: Prepare the supplier/segment management team. The teams are cross-functional with representation from each of the functional areas. In the case of key suppliers, each team is dedicated to a specific supplier and meets regularly with a team from the supplier organization. In the case of supplier segments, a team manages a group of suppliers and develops and manages the standard PSA for the segment (Lambert, 2008). The third operational sub-process is: Internally review the supplier/ supplier segment. The teams review their suppliers or segment of suppliers to determine the role that the supplier or segment of suppliers plays in the supply chain. The teams work to identify improvement opportunities (Lambert, 2008).

The fourth operational sub-process is: Identify opportunities with the suppliers. The teams work with each supplier or segment of suppliers to develop improvement opportunities. These opportunities may arise from any of the supply chain management processes, so the supplier teams need to interface with each of the other process teams (Lambert, 2008). The fifth operational sub-process is: Develop the product and service agreements and communication plans. Each team develops the PSA for their supplier or segment of suppliers. For key suppliers, the team negotiates a mutually beneficial PSA, and then gains commitment from the supplier's internal function (Lambert, 2008).

The sixth operational sub-process is: Implement the product and service agreements. The team implements the PSA, which includes holding regular planning sessions with key suppliers. The supplier relationship management teams provide input to each of the other supply chain management process teams that are affected by the customizations that have been made in the PSAs. The teams must work with other process teams to assure that the PSAs are being implemented as determined (Lambert, 2008). The seventh and final operational sub-process is: Measure performance and generate supplier cost/profitability reports. The team captures and reports the process performance measures. Metrics from each of the other processes also are captured in order to generate the supplier cost/profitability reports. These reports provide information for measuring and selling the value of the relationship to each supplier and internally to upper management (Lambert, 2008). Supplier relationship management is often referred to in the literature as strategic supplier partnership. Gunasekaran et al. (2001) assert that a strategic partnership emphasizes long-term relationship between trading partners and "promotes mutual planning and problem-solving efforts". Strategic partnerships between organizations promote shared

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

benefits and ongoing collaboration in key strategic areas like technology, products, and markets (Yoshino & Rangan, 1995). Strategic partnerships with suppliers facilitate organizations to work closely and effectively with a few suppliers rather than many suppliers that have been selected solely on the basis of cost (Ashish, 2007). Some of the advantages of including suppliers early in the product-design process are: Suppliers can offer cost effective design alternatives, assist in selecting better components and technologies, and aid in design assessment (Tan et al., 2002). Global sourcing has forced companies to manage their supplier relationships more effectively. Mentzer (2001) suggests that the key to effective management in the global environment is to have closer relationships with suppliers. Firms are moving from the traditional approach of a one-time, cost-based relationship with many suppliers to long-term relationships with a few good suppliers (Kalwani & Narayandas, 2007).

Firms are beginning to use supplier relationship techniques as a way to gain competitive advantage (Ballou, Gilbert & Mukherjee, 2000). Supplier relationship management involves developing partnership relationships with key suppliers to reduce costs, innovate with new products and create value for both parties' bases on a mutual commitment to long term collaboration and shared success. For complex relationships between large companies such as Coca-Cola and Cargill, it may be necessary to coordinate multiple divisions spread across multiple geographic areas. Cargill is the largest ingredient and nutritional company in the world. It is also one of Coca Cola's main suppliers. As one can imagine the relationship between these companies is very detailed and complex.

As such, cross-functional teams from each of the companies meet on a regular basis to identify products that will create joint value in areas such as new markets, new products, productivity and sustainability. This vital relationship involves the CEOs of both companies (Lambert, 2008). Supplier relationship management has become a critical business process as a result of: competitive pressures; the need to achieve cost efficiency in order to be cost competitive; and, the need to achieve cost efficiency in order to be cost competitive; and, The need to develop closer relationships with key suppliers who can provide the expertise necessary to develop closer relationships with key suppliers who can provide the expertise necessary to develop innovative new products and successfully bring them to market (Lambert, 2008).

Watts and Kahn (1993), surveyed members of the National Association for Purchasing Management (NAPM) representing a wide range of industry types, sizes, and purchasing departments to determine the extent of involvement in supplier relationship management programs. They found that supplier relationship programs were more prevalent than was expected and were called by different names depending on the emphasis of the program. Also, the majority of the firms had active programs of 6 months to over 4 years and had created permanent organizational units to handle supplier relationship programs (Sichinsambwe, 2011).

Watts and Kahn also found that most of the supplier development programs were initiated at the divisional or corporate levels with most functional areas of the business participating in the program with varying degrees of involvement. In particular, purchasing, quality control, and engineering were more involved in the program as compared to materials management and the production department who were less involved and marketing, research and development, and finance who were only occasionally involved. Despite the fact that many functional areas were involved in supplier development programs, the number of people involved was ten or less. Watts and Kahn also examined differences between firms that had implemented supplier development programs and those that had not implemented supplier development programs.

They found that firms with supplier development programs Tended to be larger firms in terms of annual gross sales, total employment and size of the purchasing department than firms without such programs (Sichinsambwe, 2011). Krause (1997) surveyed purchasing executive members of NAPM representing different industries to investigate outcomes of supplier development activities and whether companies were satisfied with the outcomes. The results showed that supplier performance had improved as a result of the supplier relationship management effort. Buyers reported that supplier management efforts with a single supplier had led to significant improvement in incoming defects, percent on time delivery, order cycle times and percent orders received complete. Further, buyers were generally satisfied with the outcomes from their supplier development efforts. Specifically, supplier management efforts had yielded reduced costs for the buyer's final product or service. Also, the results showed that

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

buyers perceived an improvement in the continuity of the relationship with their suppliers after the supplier relationship effort than before (Sichinsambwe, 2011).

Humphreys, Li, and Chan (2004) examined the role of supplier relationship management in the context of buyer–supplier performance from a buying firm 's perspective using a survey of 142 electronic manufacturing companies in Hong Kong. Overall, their findings were that transaction-specific supplier development and its infrastructure factors (supplier development strategic goals, top management support of purchasing management, effective buyer-supplier communication, buyer 's long-term commitment to the supplier, supplier evaluation, supplier strategic objectives, and trust in supplier) significantly correlated with the perceived buyer-supplier performance outcomes. Specifically, they found that transaction-specific supplier development, Supplier strategic objectives and trust significantly contributed to the prediction of supplier performance improvement. Also, the study found that transaction-specific supplier development, supplier strategic objectives and trust contributed to the prediction of buyer 's competitive advantage improvement. Similarly, regarding the prediction of buyer-supplier relationship improvement, transaction-specific supplier development and infrastructure factors of supplier strategic objectives and trust contributed to the prediction of buyer-supplier relationship improvement.

Krause and Ellram (1997) surveyed 527 high-level purchasing executives who were members of the NAPM to determine whether buying firms' success in their supplier relationship efforts varied, and if so, to identify factors contributing to perceived success or failure. They found that success in supplier development did indeed vary and they split the respondents into two groups representing those firms that had successfully implemented supplier development programs and those that had received less success. The successful group had experienced a superior increase in supplier performance as a result of the supplier development compared to the less successful group. Specifically, the successful group experienced significantly higher improvements in incoming defects and percentage orders received complete; however, the two groups appeared to have experienced roughly the same increases in on-time delivery and order cycle time reduction (Sichinsambwe, 2011).

Krause, Handfield, and Scannell (1998) conducted a survey to compare the supplier relationship management practices of manufacturing and service firms. The authors compared the two groups on the satisfaction derived from supplier relationship management efforts using performance goals comprising increased financial strength, Supply base reduction, increased management capability, and improved technical capability; and performance goals, which included quality, cost, delivery performance, and service/ responsiveness. Both groups placed moderate levels of importance for the strategic goals but rated performance goals much higher than strategic goals.

The manufacturing firms placed more emphasis on quality than did the service firms, while service firms placed more emphasis on cost, delivery performance, and service/responsiveness than manufacturing firms. The only strategic goal that differentiated the two groups was financial strength where service firms placed a higher degree of importance on improving the financial strength of suppliers than did the manufacturing firms. Based on the results of the studies presented, the first two hypotheses are:

H1. Supplier relationship management practices will be positively related to competitive advantage within an organization.

H2: Supplier relationship management practices will be positively related to organizational performance. Manufacturing flow management Firms that perform the manufacturing activities in a supply chain face several challenges, one of which is to produce products in varieties and quantities that are in synch with the marketplace.

However, the production function is known for its traditional ways of performing activities. This appears to be changing given the interest in innovative management techniques such as total quality management, just-in-time operations, and continuous improvement (Goldsby & Garcia-Dastague, 2003). Properly connecting production to actual demand represents a huge money-saving opportunity for manufacturing companies and their supply chains. For example, the potential savings from Efficient Consumer Response, an effort to connect production management with the market in the food industry, have been estimated at

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

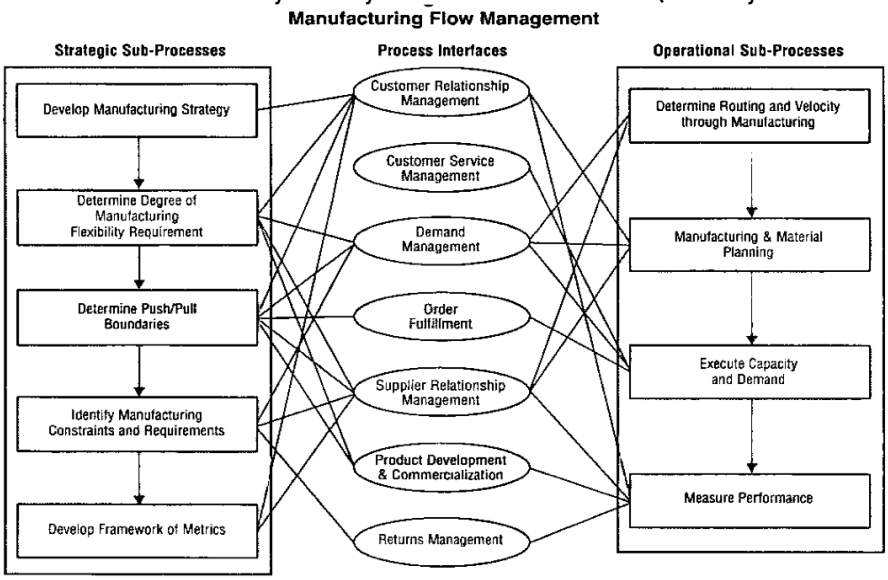
$ 30 billion (Poirier, 1996). Firms that integrate procurement, manufacturing and logistics activities might achieve cost reductions of between three and seven percent of revenues (Hoover, Eero Eleranta & Huttunen, 2001).

Manufacturing flow management is the supply chain management process that includes all activities necessary to obtain, implement, and manage manufacturing flexibility in the supply chain and to move products through the plants (Goldsby & Garcia-Dastugue, 2003). This process deals with making the products and establishing the manufacturing flexibility needed to serve the target markets. Manufacturing flexibility reflects the ability to make a variety of products in a timely manner at the lowest possible cost and respond to changes in demand.

To achieve a high level of manufacturing flexibility, planning and execution must extend beyond the individual organization towards other members of the supply chain. Manufacturing flow management should be implemented across the members of the supply chain that participate in the flow of products, as well as across those that have an effect on, or are affected by, the degree of manufacturing flexibility achieved by the supply chain as a whole (Goldsby & Garcia-Dastugue, 2003). The process involves much more that the production function within the firm and spans beyond the manufacturer in the supply chain. In fact, it is up to the entire supply chain to make the product flow as smooth as possible, as well to ensure that the desired flexibility is achieved.

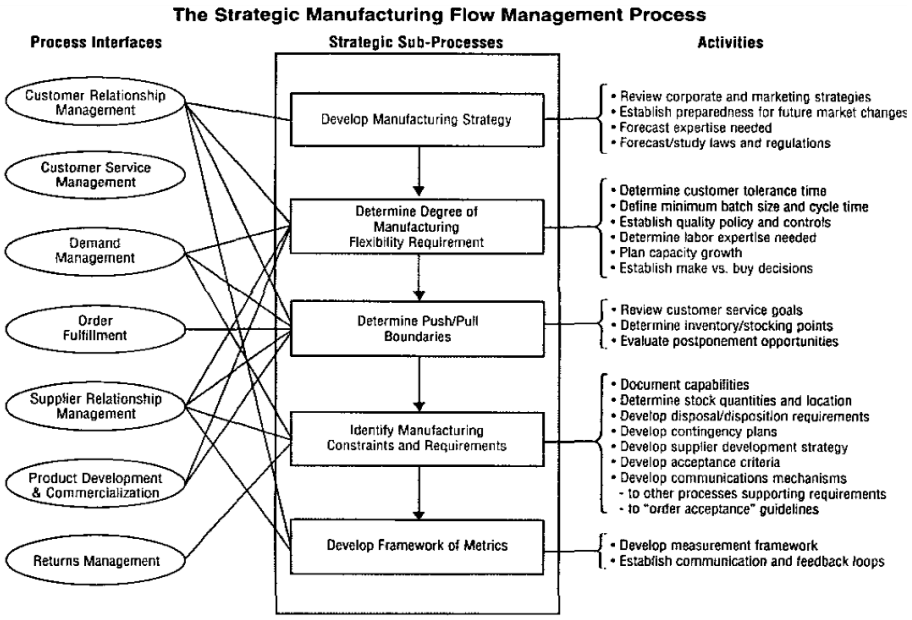
The manufacturing flow management process team coordinates all activities necessary to obtain, implement, and manage manufacturing flexibility in the supply chain and to move products through the plants (Lambert, 2008). This process incorporates more than just simply production. For example, efficient product flow through a plant depends on the reliability of the inbound/receiving activity as well as the suppliers' ability to deliver complete orders on time. Therefore, receiving and procurement functions should work closely with production to ensure efficient product flow during the manufacturing process. Suppliers also need to be involved in these discussions to ensure that potentially costly delays and miscommunications can be avoided.

The manufacturing flow management process has both strategic and operational elements, as shown in Figure 5. The strategic portion of manufacturing flow management provides the structure for managing the process within the firm and across key supply chain members. The operational portion of the process represents the actualization of manufacturing flow management. Developing the strategic process is a necessary first step toward integrating the firm with other members of the supply chain, and it is at the operational level that the day-to-day activities are executed (Goldsby& Garcia-Dastugue, 2003).



https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

The strategic portion of manufacturing flow management consists of five sub- processes that collectively represent the decision-making infrastructure for the process. This infrastructure embodies the development of the manufacturing plan, the means of execution, limits to execution, and the appropriate measures of performance. Each of the five sub-processes is addressed in order as depicted in figure 6. This figure includes the activities within each of the sub-processes as well as the interfaces between manufacturing flow management and the other supply chain management processes.



The first strategic sub-process that the manufacturing flow management team Develops is the manufacturing strategy. The manufacturing strategy dictates the priorities of the production function and the roles of its suppliers and supporting service providers (Demeter, 2003). In this sub-process, the strategy starts to be translated into required capabilities and deliverables. Typically, the team will review corporate and marketing strategies to determine the manufacturing strategy that best accommodates customer demand. This marks an important shift in mentality from "We sell what we make" to "We make what we sell" (Goldsby & Garcia-Dastague, 2003). This is an important distinction that must be understood as it leads to the production of products that satisfy the needs of an increasingly diverse marketplace.

The second strategic sub-process that the manufacturing flow management team develops is determining the degree of manufacturing flexibility required. Manufacturing flexibility ensures the company's ability to manage resources and uncertainty to meet various customer requests (Lambert, 2008). As a general rule more flexibility is preferred over less. However, as with any other advantage in business there is a cost associated with developing manufacturing flexibility. Therefore, the targeted type and degree of flexibility should fit the overall business strategy (Gaimon & Singhal, 1992). Key customers may receive a higher degree of flexibility in order to keep that customer satisfied.

However, managers must be confident that these customers for providing greatened amounts of manufacturing flexibility will reward the firm. If this flexibility is determined to be of little or no value to the customer than the managers may reduce this flexibility in or to contain costs. The customer relationship management team is vital in determining the amount of flexibility required in order to satisfy the customer. By evaluating their input, management should be able to determine the desired degree of manufacturing flexibility that is desired.

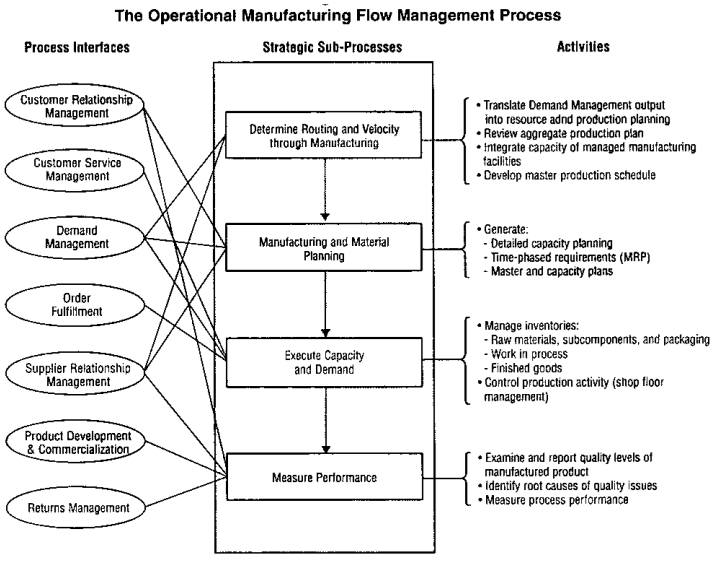
The third strategic sub-process that the manufacturing flow management team develops is determining push/pull boundaries. Push/pull boundaries refer to the positioning of a decoupling point in the supply chain – up to which supply is pushed forward as make-to-stock but beyond which demand drives make-to-order execution (Graves & Williams, 2000). This of course is a conceptual simplification; it is doubtful that a single decoupling point is evident in a diverse supply chain. It is more likely that more than one decoupling point is needed in a modern supply chain. The key to determining a push/pull

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

boundary is recognizing the stage of value-added processing in which differentiation from a standard configuration takes place (Goldsby et al., 2003). In a buy-to-order arrangement, manufacturing flexibility is at a premium and the primary decoupling point is upstream from the manufacturer given that raw materials are unique to the individual finished good. At the other extreme, ship-to-stock strategies generate a standardized product, allowing the decoupling point inventories to reside in the manufacturer's distribution channel (Naylor, Naim & Berry 1999).

The fourth strategic sub-process that the manufacturing flow management team develops is identifying manufacturing constraints and determining capabilities. During this sub-process management must address the roles and responsibilities of the supply chain members to identify manufacturing constraints and requirements for desired performance. Recognizing bottlenecks in the manufacturing process is critical in achieving this objective (Lambert, 2008). Among the more common constraints are labor and equipment resources. Ensuring that existing resources meet current and future demand ranks among the greatest difficulties for manufacturers (Goldsby et al., 2003). Manufacturing constraints and requirements will lead to the development of in the inventory policy for each facility in the supply chain network structure. The inventory policy will include how much inventory is to be held in the form of raw materials, subcomponents, work-in-progress, and finished goods, and how often inventory will be replenished. Finally, the inventory policy will determine the appropriate actions in the event of a stock out, which will be coordinated with demand management and, eventually, Incorporated with contingency plans (Croxton, Lambert, Rogers & Garcia-Dastague, 2002).

The fifth and final strategic sub-process that the manufacturing flow management team develops is developing the framework of metrics. These metrics should be used to measure and improve the performance of the process. A uniform approach should be used throughout the firm to develop these metrics (Lambert& Pohlen, 2001). The team should start by understanding how the manufacturing flow management process can directly affect the firm's financial performance, as measured by economic value added (EVA) (Bennett, 1999). The ultimate test of the process worth is found in the value it creates. Manufacturing flow management operational sub-processes the operational portion of manufacturing flow management is the realization of the process developed at the strategic level (Lambert, 2008). Goldsby (2011) refers to operational sub-processes as the "just do it side" of the manufacturing flows management process. Despite the apparent similarities between the operational sub-processes and the planning and scheduling activities of the production function internal to most manufacturers, key differences exist. These differences include the guidance provided by the infrastructure developed at the strategic level and the interfaces that link the operational sub-processes in a structured way to the other seven supply chain management processes (Goldsby & Garcia-Dastugue, 2003). Four sub-processes represent this operational flow. Each process is depicted in figure 7 and described in succeeding paragraphs.



https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

Determining the routing and velocity of materials and goods through Manufacturing is the first operational sub-process. During this process the execution of the plan set forth in the strategic portion is implemented. This plan is bases on historical demand, marketing and sales strategies, and general market intelligence and is developed at the product family or group level (Lambert, 2008). After reviewing the production plan, management assesses manufacturing capacity and allocates production volume to each plant. Each plant then develops its own master production schedule (MPS) that specifies what to produce and in what quantities. This MPS reflects the manufacturing priorities set forth at the strategic level. Factors such as capacity limitations, manufacturing constraints, production setup time and costs, and inventory-carrying costs are considered when developing the MPS (Krajewski, 2004). Communication with the supplier base is vital to ensure accommodation of these manufacturing priorities.

The second operational sub-process is: Plan manufacturing and material flow. In this process attention shifts to the detailed planning of capacity and inbound materials necessary to "feed" the production schedule (Goldsby & Garcia-Dastugue, 2003). This material requirements plan (MRP) identifies the quantities and timing of all subassemblies, components, and raw materials needed to support production of the end- items (Krajewski, 2004). Along with the MPS, product-specific bills of materials and on- hand inventories drive the MRP explosion that yields the desired quantities of input materials required at any given time to support product flow (Lambert, 2008).

The third operational sub-process is: Execute capacity and demand plans. This sub-process involves frequent interface with the demand management and order fulfilment process teams to maintain efficient flow of materials, work-in-process, and finished goods (Goldsby & Garcia-Dastugue, 2003). Synchronizing available capacity and demand is a continuous process that strives to ensure adequate, timely supply with minimal inventory, delivering a high-quality product. Success in these plans depends on flexible, well-developed plans. Quality programs such as Six Sigma can be used to ensure high quality products with little product variance. To the extent that processing time can be lessened and the variance minimized, the manufacturer can better meet customers' changing needs with less disruption and lower costs (George, 2002).

The final operational sub-process is: Measuring performance. The manufacturing flow management process, like all of the other supply chain management processes, Spans beyond the four walls of the company. The manufacturing flow management team must therefore not only measure performance within the firm's manufacturing plants but must also relate this performance to the broader supply chain (Lambert, 2008). Metrics tracked in this process must be shared with the customer relationship management and supplier relationship management teams. By utilizing these available metrics, the customer and supplier relationship teams can generate cost and profitability reports. These reports are valuable when negotiating services with key material and service providers, and when determining rewards for customers and suppliers who have positively influenced the performance of the manufacturing flow management process (Lambert & Pohlen, 2001).

Manufacturers have become increasingly reliant on outsourced production activities. Contract manufacturing services provided about 10 percent of all global output in the electronics industry in 1998, totalling approximately $60 billion. It is forecasted by the year 2018; the figure will reach $1.3 trillion – a 2,167% increase (Meeks, 2004). In large part, outsourced manufacturing is growing as a result of the need for manufacturing flexibility (Panchuk, 1998). In reviewing the prevailing literature, it is apparent that the term "manufacturing flow management" is not commonly used. However, the term "manufacturing flexibility" is used quite often. According to Goldsby (2011), "manufacturing flexibility" is a nearly interchangeable term for "manufacturing flow management" in current literature. In manufacturing literature, there are many definitions of what constitutes manufacturing flexibility. Sehti and Sehti (1990) point out that there are no fewer than 50 combined flexibility types and dimensions described in the literature, and that the Definitions "are not always precise and are, at times even for identical terms, not in agreement with one another.

In 1998, Shewchuk and Moodie found a combined 80 flexible types and dimension in their literature review. Beech (2000) sums up this lack of a universal definition from a "system level": "Without an agreement on issues as what the constituent elements of manufacturing flexibility are, the effects of interrelationships which exist between then and the extent of the role of the enablers of flexibility, when viewed at the system level, is likely to continue to appear inconsistent and confusing". It appears there is

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

only endless debate concerning the definition of manufacturing flexibility. For the purposes of this paper Goldsby's popular (often cited) definition will be utilized: Manufacturing flexibility reflects the ability to make a variety of products in a timely manner at the lowest possible cost and respond to changes in demand (Goldsby & Garcia-Dastugue, 2003). Beyond the definition of manufacturing flexibility there are many different types of manufacturing flexibility. However, there appears to be general consensus that there are two major types of manufacturing flexibility: organizational and production.

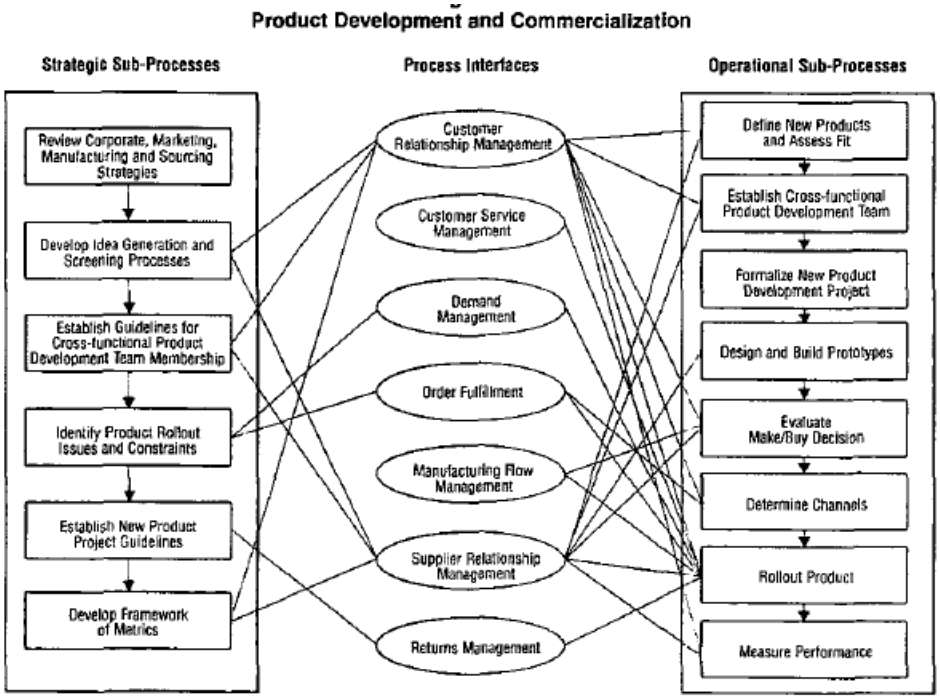
Although there are several factors that drive the need for manufacturing Flexibility, demand is most assuredly the most important factor. Demand volume, variation, and predictability of the variation are at the top of the list of considerations (Lambert, 2008). Also important to consider is the customer's tolerance for waiting and reaction to an out-of-stock situation by either switching to a substitute product, back- ordering, delaying the purchase, or getting the item from an alternative supplier/store (Zinn & Liu, 2001). Characteristics associated with the product itself include the variety (i.e., the level of standardization or differentiation), stage and expected duration of the product life cycle, complexity of the product, and profit margin of the product (Goldsby & Garcia-Dastugue, 2003). Manufacturing flexibility enables greater responsiveness to changes in customers' preferences and quantities demanded (Christopher & Towill, 2002). Determining the right degree of flexibility is important to virtually any company involved in the supply, production, distribution or sales of goods, and is at the center of the manufacturing flow management process (Goldsby& Garcia-Dastugue, 2003). Although the manufacturing process may be outsourced, the contracting firm must return the commitment to quality of the product. Manufacturing flow management should be implemented across the members of the supply chain that participate in the flow of products, as well as across those that have an effect on, or are affected by, the supply chain as a whole. Through the manufacturing flow management process, management coordinates all activities necessary to move products through the plants, and to obtain, implement, and manage manufacturing flexibility in the supply chain (Goldsby & Garcia-Dastugue, 2003). However, it is the responsibility of each and every member of the supply chain to make the product flow as efficient as possible while allowing for the desired amount of manufacturing flexibility Extensive reviews of the literature on manufacturing flexibility are provided by Hyun and Ahn (1992), Sethi (1990), and Suarez, Cusumano, and Fine (1991). They all seem to have come to one general conclusion: the achievement of flexibility in manufacturing is a critical source of competitive advantage for manufacturing firms. CEOs know this, managers know it, and shop floor operators know it (Upton, 1994). Based on the results of the studies presented, the next two hypotheses are:

H3. Manufacturing flow management practices will be positively related to competitive advantage within an organization.

H4: Manufacturing flow management practices will be positively related to organizational performance. Product development and commercialization Successful new products and services are critical for many organizations, since product development is one important way that firms can implement strategic intentions into real business operations (Brown & Eisenhardt, 1995). Developing products rapidly and moving them into the marketplace efficiently is important for long-term corporate success (Cooper & Kleinschmidt, 1987). In many markets, 40 percent or more of revenues come from products introduced in the prior year (Handfield & Nichols, 2002). While the creation of successful products is a multidisciplinary process (Olson, 2001), product development and commercialization from a supply chain management perspective integrates both customers (Karkkainen & Piippo, 2001) and suppliers (Schilling & Hill, 1998) into the process in order to reduce time to market (Rogers, 2004). The ability to reduce time to market is key to innovation success and profitability (Droge, Jayaram & Vickery, 2000) as well as the most critical objective of the process (Schilling & Hill, 1998). Product development and commercialization is the supply chain management process that provides structure for developing and bringing to market new products jointly with customers and suppliers (Rogers, Lambert, & Knemeyer, 2004). Effective implementation of the process not only enables management to coordinate the efficient flow of new products across the supply chain, but also assists supply chain members with the ramp-up of manufacturing, logistics, marketing and other related activities to support the commercialization of the product (Lambert, 2008). This process requires effective planning and execution throughout the supply chain, and if managed correctly should provide a competitive advantage. In many markets, 40 percent or more of revenues come from products introduced in the prior year (Handfield & Nichols, 2002). The

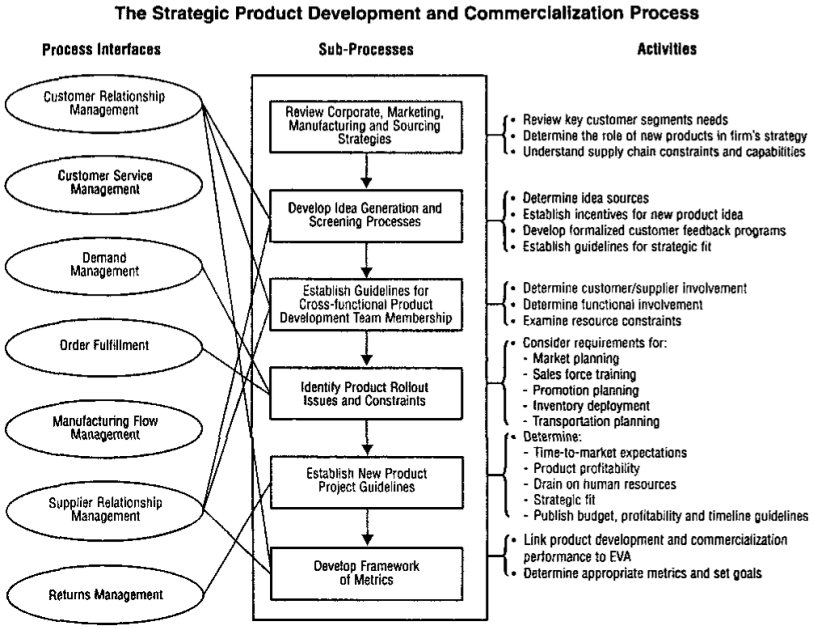
https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

creation of successful products from a SCM perspective must integrate both customers and suppliers into the process in order to reduce time to market. This ability to reduce time to market is key to innovation success and profitability as well as the most critical objective of the process (Schilling et al., 1998). The product development and commercialization process have both strategic and operational elements, as shown in Figure 8. The strategic portion of the product development and commercialization process establishes a structure for developing a product and moving it to market. The operational portion is the realization of the process that has been established at the strategic level. Developing the strategic process is a necessary first step toward integrating the firm with other members of the supply chain, and it is at the operational level that the day-to-day activities are executed (Rogers et al., 2004).



The objective of the strategic portion of the product development and commercialization process is to construct a formalized structure through which management executes the operational process (Lambert, 2008). This process provides a guide for implementation and is composed of six sub-processes, as shown in figure 9.

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

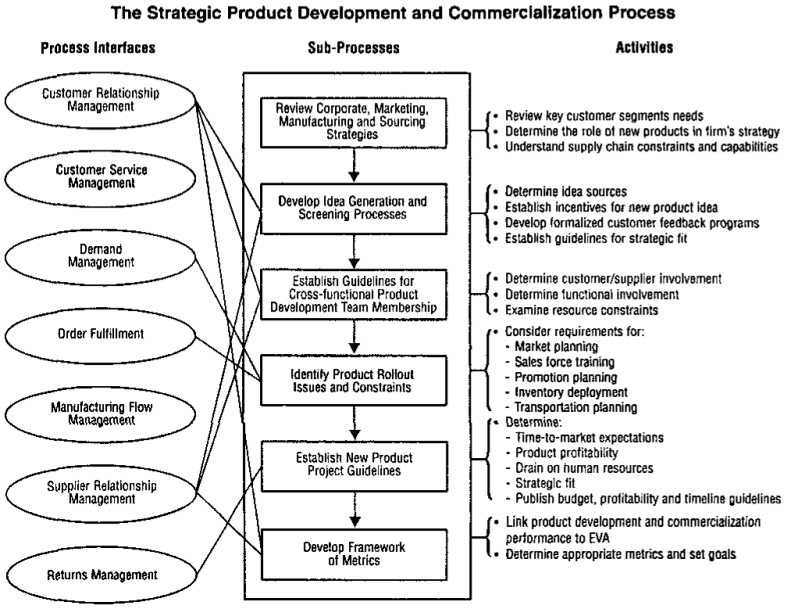


The first strategic sub- process is to review the corporate, marketing, Manufacturing and sourcing strategies to determine their impact on products sold. The product development and commercialization team review the sourcing, manufacturing and marketing strategies in order to assess the fit of the objectives with current capabilities. The team then provides feedback of future development requirements to the sourcing, manufacturing and marketing functional areas. The second strategic sub-process is: Develop idea generation and screening processes. The outputs of the first sub-process are objectives that will drive the idea generation and screening procedures. This can include determining sources for ideas, considering incentives for developing products for: the focal firm, suppliers, and customers. In addition, this sub-process will begin to develop formalized customer feedback programs (Rodgers et al., 2004).

The third strategic sub-process is: Establish guidelines for cross-functional product development team membership. It is critical to include the right people from internal functions as well as key customers and suppliers. Partnerships might be formed with customers and suppliers to complement internal knowledge as well as to learn about new markets and technologies, and reduce overall risk (McDermott, 1999). The fourth strategic sub-process is: Identify product rollout issues and constraints. This process includes considerations of transportation and capacity planning, deployment planning, inventory, sales force training and promotion planning (Lambert, 2008). It is critical to discover potential problems at this stage before they become major problems down the road.

The fifth strategic sub-process is: Establish new product project guidelines. During this process product profitability scenarios are developed and the implications for human resources resulting from new product projects are determined. The guidelines for evaluating the strategic fit of new products are established (Rogers et al., 2004). The sixth and final strategic sub-process is: Develop framework of metrics. Typical process metrics might include cycle time, time to market, and projected sales and profitability (Griffin, 1993). These metrics must be coordinated with other process teams in order to assure they do not conflict with other company metrics. Product development and commercialization operational sub-processes the operational portion of the product and commercialization process is the implementation of the structure developed at the strategic level. It serves as a guide for the implementation of the product and commercialization activities and consists of eight sub-processes, as shown in figure:

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7



The first operational sub-process is: Define new products and assess fit. In this Process new product ideas are generated and screened. A market assessment is completed, key customers and suppliers are consulted, and the fit with existing channels, manufacturing and logistics are determined. This sub-process involves interfaces with customer and supplier relationship management processes, as well as with the business function of the firm (Lambert, 2008). The second operational sub-process is: Establish cross-functional product development team. These teams are formed using the guidelines developed at the strategic level. External parties whose input is valuable should be included as early in the project as feasible. This requires a culture permeating each organization that encourages and values collaboration (McIvor & Humphries, 2004). These teams are responsible for finalizing plans for new product. The third operational sub-process is: Formalize new product development project. The cross-functional product development teams examine the strategic fit of the new product within the organization's current product portfolio. The team works with key suppliers to formalize time to market expectations, product profitability goals, and budget requirements (Lambert, 2008). The formation of budget and resource needs is particularly relevant given that 75 percent of new product development programs fail commercially (Griffin & Page, 1996).

The fourth operational sub-process is: Design, build and test prototypes. In this phase, teams work with suppliers and perform a value analysis to determine what portions of the product design and rollout process truly add value. Then, they source prototype materials and manufacturing product samples. The final step of this sub- process is to test the product (Rogers et al., 2004). The fifth operational sub-process is: Evaluate make/buy decision. Team members must determine how much of the product should be made in-house and how much by their supply chain partners in the supply base. In many firms, management has a short- Term perspective. These decisions might have strategic implications for the firm and should be formulated from a strategic perspective with senior management involvement (Humphries et al., 2002). The sixth operational sub-process is: Determine channels. Team members determine the marketing and distribution channels for the new product. The customer relationship management and order fulfillment teams provide input at this stage. Then, the market plan for the product is developed, and initial inventory planning is performed (Lambert, 2008).

The seventh operational sub-process is: Rollout product. In this process materials need to be source, inbound materials positioned, and products manufactured and/or assembled. The market plan is implemented, the sales force is trained on the new product offering, and the promotion plan is executed. It is important that all of the other processes are involved in planning and executing the product rollout (Rogers et al., 2004). The eighth and final sub-process is: Measure performance. Performance is measured using the metrics developed at the strategic level, and communicated to the appropriate

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

individuals both within the organization and across the supply chain. Communications with other members of the supply chain are coordinated through the customer relationship management and supplier relationship management processes (Lambert, 2008).

There is, accordingly, a large and growing literature on product development at the level of both specific projects (e.g. Cooper, 1996) and the firm as a whole (e.g. Wheelwright & Clark, 1992). Researchers have identified various characteristics that relate to new product success, such as market orientation (Day, 1990) or innovative product features (Van de Veen, 1986) among others. There is significant disagreement in the literature concerning the stages of the product development and commercialization process. In addition to the process presented in this paper, Ulrich & Eppinger (1995), separate the product development process into five stages that describe product development from the initial idea to production. These stages consist of: Concept development, system-level design· detail design, testing and refinement & production ramp-up. Booz, Allen and Hamilton (1982) present the basic stages of product development as: identifying new product strategy, exploration, screening, business analysis, development, testing, and commercialization.

There are at least four common perspectives in the product development research community: marketing, organizations, engineering design, and operations management as illustrated in table 3. In addition to the dimensions highlighted in this table, these perspectives often differ in the level of abstraction at which they study product development. For instance, the organizational perspective is focused at a relatively aggregate level on the determinants of project success. On the other hand, much of the engineering and marketing literature is at a more detailed level of abstraction, with the focus being the individual product engineer or market researcher and the issues confronting them. Finger and Dixon (1989) provide an excellent review of the engineering design literature; while a number of survey papers have been published reviewing the marketing perspective (Green & Srinivasan, 1990, Mahajan & Winn, 1992, Shocker & Srinivasan, 1979).

Several articles have been published in recent years reflecting the operations perspective, and some of them even serve to bridge two or more perspectives (Krishnan & Ulrich, 2001). Some of the earliest work of product development that emphasized the importance of market issues over purely technical ones was written by Myers et al. (1969). They studied 567 successful products in over 100 firms and 5 industries. They concluded that market pull, i.e. identifying and understanding customer needs, was substantially more important to new product success than technology push. In addition, they identified cross-functional integration as the key factor for product development success (Blum, 2003). Issues in new product development practices were investigated in the aggregate by Booz et al. (1968). The effort was repeated in 1982. The 1968 report, based on knowledge accrued from over 800 client assignments and data obtained from just over 49 firms, reported that almost a third of all product development projects commercialized by firms were failures, with this rate essentially independent of industry. Most of the commercialization failures occurred because the idea or its timing was wrong. This report presented the product development mortality curve, which showed that, on average, 58 ideas were considered for every successful new product commercialized (Griffin, 1997).

Subsequent research sharpened the emergent emphases on product advantages, market attractiveness, and product development organization. Particularly important were several studies of Cooper and Kleinschmidt (1979, 1987). The 1979 study, called NewProd, examined 102 successful and 93 failed products within 103 industrial firms in Canada. The 1987 study investigated 203 products in 125 manufacturing firms, including 123 successes and 80 failures. Project organization was also found to be important. Particularly important was pre-development planning. This included a well-defined target market, product specifications, clear product concept, and extensive preliminary market and technical assessments. More recently, Cooper and Kleinschmidt (1995) conducted another study of product development efforts by 161 business units in the chemical industry. The authors replicated some of their earlier findings. Most notably, this time they highlighted that product development organization was most strongly associated with new product success. They recommended a "high quality product development process" as a major determinant of new product success.

Contrary to their earlier studies, the authors found in this study that market competitiveness had no relationship with new product success (Blum, 2003). Other studies focused not on sole projects or products but on sequences of products. Little (2001), for example, noted that many organizations still have

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

difficulty with sustained product development success, or managing a number of product development efforts over time. Sustained new product success has been found particularly difficult for organizations with long histories of stable operations (Blum, 2003). A thorough review of all these studies indicates that product development and commercialization is a vital component to organizational success. Based on the results of the studies presented, the final two hypotheses are:

H5. Product development and commercialization practices will be positively related to competitive advantage within an organization.

H6: Product development and commercialization practices will be positively related to organizational performance.

Competitive Advantage

Competitive advantage is defined as the "capability of an organization to create a defensible position over its competitors" (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006). Tracey, Vonderembse, and Lim (1999) argue that competitive advantage comprises distinctive competencies that set an organization apart from competitors, thus giving them an edge in the marketplace. They further add that it is an outcome of critical management decisions. Competition is now considered a "war of movement" that depends on anticipating and quickly responding to changing market needs (Stalk, Evans & Schulman, 1992). Competitive advantage emerges from the creation of superior competencies that are leveraged to create customer value and achieve cost and/or differentiation advantages, resulting in market share and profitability performance (Barney, 1991; Day & Wensley, 1988). Sustaining competitive advantage requires that firms set up barriers that make imitation difficult through continual investment to improve the advantage, making this a long-run cyclical process (Day & Wensley, 1988). Porter's approach to competitive advantage centers on a firm's ability to be a low-cost producer in its industry, or to be unique in its industry in some aspects that are popularly valued by customers (Porter, 1991).

Most managers agree that cost and quality will continue to remain the competitive advantage dimensions of a firm (D' Souza, 2002). Wheelwright (1978) suggests cost, quality, dependability and speed of delivery as some of the critical competitive priorities for manufacturing. There is widespread acceptance of time to market as a source of competitive advantage (Holweg, 2005). Price/cost, quality, delivery dependability, and time to market have been consistently identified as important competitive capabilities (Fawcett & Smith, 1995; Vokurka, Zank & Lund 2002; Tracey, Vonderembse & Lim 1999). 'Time' has been argued to be a dimension of competitive advantage in other research contributions (Stalk, 1988; Vesey, 1991; Handfield & Pannesi; 1995). In a research framework, Koufteros, Vonderembse and Doll (1997) describe the following five dimensions of competitive capabilities: competitive pricing, premium pricing, value- to-customer quality, dependable delivery, and product innovation. These dimensions were further described and utilized in other contributions as well (Koufteros Vonderembse & Doll, 2002, Li et al. 2006; Safizadeh, Ritzman, Sharma & Wood 1996; Vickery, Calantone & Droge, 1999). Based on these studies, the five dimensions of competitive advantage most applicable to this study are:

- Price/Cost - "The ability of an organization to compete against major competitors based on low-price"(Lietal.,2006).

- Quality- "The ability of an organization to offer product quality and performance that creates highervalueforcustomers"(Koufteros,1995).

- Delivery Dependability- "The ability of an organization to provide on time, the type and volumeofproductrequiredbycustomer(s)"(Lietal.,2006).
  4. Product Innovation. "The ability of an organization to introduce new products and features in the-marketplace" (Koufteros,1995).

- Time to Market. "The ability of an organization to introduce new products faster than major competitors" (Li et al., 2006). Organizational performance refers to the financial aspect of organizational performance as a final economic goal of firms (Venkatraman & Ramanujam, 1986).

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

The potential indicators of organizational performance include profits, return on investment, return on assets, return on equity, and stock-market performance (Garcia, 2005; Tharenou, Saks & Moore, 2007). Regarding the classification of organizational performance, several researchers (Davis & Pett, 2002; Hubbard, 2009; Ostroff & Schmidt, 1993) have suggested their perspectives on the classification of organizational performance, but there is little consensus about this issue. The short-term objectives of SCM are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Tan, 1998). Financial metrics have served as a tool for comparing organizations and evaluating an organization's behavior over time (Holmberg, 2000). Li et al. (2006) proposes that any organizational initiative, including supply chain management, should ultimately lead to enhanced organizational performance. Hubbard (2009) proposed the Sustainable Balanced Scorecard (SBSC) conceptual framework as an appropriate measure of organizational performance.

SBSC includes social and environmental issues in the existing Balanced Scorecard (BSC) by integrating the Triple Bottom Line. In the SBSC framework, the Triple Bottom Line refers to a broader perspective of the stakeholders, and the BSC performance measurement incorporates financial, customer/market, short-term efficiency, and long-term learning and development factors as internal processes of the performance measurement. Additionally, Ford and Schellenberg (1982) addressed that the assessment of organizational performance could be classified into behavioral consequences (e.g., turnover, satisfaction) or non-behavioral consequences (e.g., profit) or intended consequences (e.g., product quality) or unintended consequences (e.g., turnover) (Park, 2009).

Several researchers (Davis & Pett, 2002; Ford & Schellenberg, 1982; Ostroff & Schmitt, 1993) have advocated dimensions of both efficiency and effectiveness for measuring organizational performance. Ford and Schellenberg (1982) asserted that organizations could acquire higher return when concepts of efficiency and effectiveness are concentrated. Furthermore, Davis and Pett, (2002) proposed a typology of performance consisting of organizational efficiency and effectiveness and provided indicators of both dimensions. The measures of organizational efficiency include after-tax return on total sales and return on total assets. As for organizational effectiveness, the firm's total sales growth and total employment growth are considered. Another perspective on measuring organizational performance is financial performance versus non-financial performance. Regarding this viewpoint, the conceptual framework presented by Venkatraman and Ramanujam (1986) sheds light on the dimensions of performance in an organization.

Venkatraman and Ramanujam (1986) argued that business performance consisted of financial performance and business performance, including both financial performance and non-financial performance. They included both financial performance and business performance in a broader domain of organizational effectiveness. In their conceptualization of organizational performance, they indicated financial performance as a narrower concept relative to business performance. Financial performance highlights the use of outcome-based financial indicators, so that it assumes that organization's ultimate goal is to achieve economic benefits. Typical indicators for financial performance are sales growth, profitability (ratios such as return on investment, return on sales, and return on equity), earnings per share, and so on (Venkatraman & Ramanujam, 1986).

Based on the above discussion, business performance is regarded as the broadest concept of organizational performance because business performance includes both financial performance and non-financial performance as operational performance (Park, 2009). Indicators of organizational efficiency such as after-tax return on total sales, return on total assets, and organizational effectiveness such as sales growth are also included in the domain of financial performance (Venkatraman & Ramanujam, 1986). However, due to the limited scope of the survey used in this study, organizational performance measures will be limited to widely accepted financial measures such as: return on investment, market share, and profit margin. To sum up, this chapter discussed the theoretical foundation of various constructs used in this research: supplier relationship management, manufacturing flow management, product development and commercialization, competitive advantage, and organizational performance. In the next chapter, we present the research framework that describes the relationships between these constructs along with the development of research hypotheses

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

3.0 RESEARCH METHODOLOGY

The research methodology adopted for this paper combines three different methodologies. Firstly, to define the basic model, it involves the use of Discovery Oriented Approach (Kohli & Jaworski 1990; Menon et al. 1999) to create a preliminary methodology and to complement the literature investigation with discussions in small groups of professionals from academy and industry, directly involved with the area. Secondly, it is complemented with an additional step that involves pre-testing the methodology by submitting it to a group of potential respondents and integrating the obtained knowledge to the preliminary methodology (FORZA, 2002). Finally, it is also supported by Lewis (1998) iterative triangulation. It employs systematic iterations between literature review, case evidence and intuition based on the researcher experience and judgement. Therefore, according to the research methodology adopted for this study, three stages were necessary for the development of the evaluating methodology;

- Stage 1: development of the preliminary methodology based on an extensive review of diverse, relevant literature (Preliminary Methodology);

- Stage 2: development of the adjusted methodology from academy and industry perspectives (Adjusted Methodology), and

- Stage 3: development of the methodology for evaluating companies' adherence degree to a conceptual model of SCM by integrating knowledge obtained from the illustration application (Evaluating Methodology). The methodology is better detailed during the development of each stage, in next section.

3.1 Development of the Evaluating Methodology

In this section are detailed all the necessary stages for constructing the methodology for evaluating companies' adherence degree to a conceptual model of SCM.

2.1.1 Development of the Preliminary Methodology

Based on The Global Supply Chain Forum SCM definition, on conceptual model of Supply Chain Management and basic SCM initiatives & practices, the methodology establishes eleven-analysis referential axis. The first nine analysis referential axes are related to key business processes and it should identify weather the company manages and integrates them within first tier key customers and first tier key suppliers. Key business processes proposed by Cooper et al. (1997); Lambert et al. (1998 a); Croxton, et al. (2001), are:

- Customer Relationship Management;
- Customer Service Management;
- Demand Management;
- Order Fulfilment
- Manufacturing Flow Management;
- Supplier Relationship Management;
- Product Development and Commercialization, and Returns Management;

In order to eliminate a possible source of confusion Returns Management process was separated in Returns Management from customers and Returns Management to suppliers. The tenth analysis referential axis is related to horizontal supply chain structure and should identify weather the company monitors the management of key business processes beyond first tier of key suppliers and first tier of key customers. The eleventh analysis referential axis is related to SCM initiatives & practices and should identify weather the company uses or intend to use these initiatives & practices to support business processes management. A defined number of requirements were associated to each analysis referential axis. From the analysis of each requirement in each one of the referential axis it is possible to establish the company's adherence degree to the conceptual model of SCM. It is important to note that the core of the methodology is related to the integration of key business processes. Requirements associated to the

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

analysis referential axis related to key business processes Key business processes definitions, objectives and strategic and operational sub-processes stated in literature (Croxton et al. 2001, Lambert 2004, Bowersox & Closs 2001, Christopher 2001 and Lambert et al.1998b) were detailed, analyzed, and translated into evaluating parameters or requirements using the language of industrial environment. One hundred requirements were identified for key business processes. These requirements were submitted to a selected group of constituted

3.2 Preliminary Methodology

This research will use the Internet as the main setting for the research. The Internet provides advantages over traditional settings since it enables researcher to access a respondent pool beyond their physical reach. This research will use tools freely available on the Internet such as Google forms and email to gather sufficient information for the study. Participants in this research will be chosen randomly from a pool of qualified candidates. The research will focus on managers of operations. The research sample size will be 100 respondents. This sample size is sufficient for the purposes of this research. The respondents will need to agree to participate voluntarily before the commencement of the study.

3.3 Adjusted Methodology

This research use interviews and surveys to collect data from the 100 respondents. The interview is used in the pilot study to fine-tune the questions, while surveys will also be used to collect data on the actual research exercise. Surveys are effective ways of collecting information from remote respondents since their approach is simple to understand. The survey involves a number of questions that are geared towards collecting the important information. The use of surveys is limited by the lack of contact with the respondent and thus increasing the risk of poor responses since clarification is not available. To remedy this limitation, the research will contact each of the respondents in the middle of the research exercise to ask whether there are any clarifications needed. The questions selected for the survey are guided by the variables described above. These variables are instrumental to the quantitative nature of the research. They present an adequate guide to the research intended approach to resolving the problem.

4.0 DATA ANALYSIS

4.1 Requirement Analysis

The goal of this research project was to determine if three dimensions of SC practices (supplier relationship management (SRM), manufacturing flow management (MFM), and product development and Commercialization (PDAC)) are related to competitive advantage and organizational performance. This chapter summarizes the findings of a survey sent out to members of the Global Supply Chain Forum. The six-hypothesis presented earlier in this research project are evaluated using bivariate correlation analysis.

4.2 Data

100 surveys were distributed and 10 surveys were returned and of those 10 surveys 8 were deemed usable (n = 8) for a 1% response rate. Parameters (mean and standard deviation) for each variable (SRM, MFM, PDAC, competitive advantage, and organizational performance) were estimated using the response data sample (n = 8). This data was then utilized to generate a larger data sample (n = 400) utilizing the random number generator and normal distribution inverse function in Microsoft Excel. All generated data was analyzed using the SPSS software package. Both the response sample data (n = 8) and the generated data set (n = 400) were analyzed in evaluating the hypotheses.

In order to measure relationships between each of the three SC practices to competitive advantage and organizational performance, a Pearson correlation coefficient was calculated. Pearson correlation is a measure of the correlation (linear dependence) between two variables X and Y, giving a value between +1 and −1 inclusive (Nunnally, 1978). The larger the absolute value of the correlation coefficient, the stronger the relationship. Hypothesis One: The first hypothesis is: supplier relationship management practices will be positively related to competitive advantage within an organization. The SRM measure was comprised of 14 items and utilized a 5-point Likert type response scale and the CA measure was comprised of 14 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006).

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

The resulting Pearson correlation coefficient for the response data sample (n = 8) was .08 (p >.05), which failed to support hypothesis 1. The resulting Pearson correlation coefficient for the generated data set (n = 400) was .95 (p < .01), which supported hypothesis 1. In sum, hypothesis 1 was not supported when utilizing the response data sample (n = 8), but was supported when utilizing the generated data set (n = 400).

Hypothesis Two: The second hypothesis is: supplier relationship management practices will be positively related to organizational performance. The organizational performance measure was comprised of 7 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006). The resulting Pearson correlation coefficient for the response data sample (n = 8) was .05 (p > .05), which failed to support hypothesis 2. The resulting Pearson correlation coefficient for the generated data set (n = 400) was .90 (p < .01), which supported hypothesis 2. In sum, hypothesis 2 was not supported when utilizing the response data sample (n = 8), but was supported when utilizing the generated data set (n = 400).

Hypothesis Three: The third hypothesis is: manufacturing flow management practices will be positively related to competitive advantage within an organization. The MFM measure was comprised of 18 items and utilized a 5-point Likert type response scale. The resulting Pearson correlation coefficient for the response data sample (n = 8) was .40 (p > .05), which failed to support hypothesis 3. The resulting Pearson correlation coefficient for the generated data set (n = 400) was .69 (p < .01), which supported hypothesis 3. In sum, hypothesis 3 was not supported when utilizing the response data sample (n = 8), but was supported when utilizing the generated data set (n = 400).

Hypothesis Four: The fourth hypothesis is: manufacturing flow management practices will be positively related to organizational performance within an organization. The resulting Pearson correlation coefficient for the response data sample (n = 8) was .78 (p < .05), which supported hypothesis 4. The resulting Pearson correlation coefficient for the generated data set (n = 400) was .44 (p < .01), which supported hypothesis 4. In sum, hypothesis 4 was supported when utilizing both the response data sample (n = 8) and the generated data set (n = 400).

Hypothesis Five: The fifth hypothesis is: Product development and commercialization practices will be positively related to competitive advantage within an organization. The PDAC measure was comprised of 18 items and utilized a 5-point Likert type response scale. The resulting Pearson correlation coefficient for the response data sample (n = 8) was .54 (p > .05), which failed to support hypothesis 5. The resulting Pearson correlation Coefficient for the generated data set (n = 400) was .94 (p < .01), which supported hypothesis 5. In sum, hypothesis 5 was not supported when utilizing the response data sample (n = 8), but was supported when utilizing the generated data set (n = 400).

Hypothesis Six: The sixth hypothesis is: product development and commercialization practices will be positively related to organizational performance within an organization. The resulting Pearson correlation coefficient for the response data sample (n = 8) was .27 (p > .05), which failed to support hypothesis 6. The resulting Pearson correlation coefficient for the generated data set (n = 400) was .86 (p < .01), which supported hypothesis 6. In sum, hypothesis 6 was not supported when utilizing the response data sample (n = 8), but was supported when utilizing the generated data set (n = 400). In summary, hypothesis 4 was the only hypothesis that was supported when utilizing the response data sample (n = 8). The remaining Pearson correlation coefficients calculated were not statistically significant (p > .05) and failed to support the hypotheses when utilizing the response data sample. All hypotheses were supported when utilizing the generated data (n = 400) to calculate the correlation coefficient specific to the evaluation of each relationship. The resulting correlation coefficient suggests highly positive relationships that are statistically significant (p < .01). A correlation coefficient summary using the original data (n=8) is listed in table 4, while a summary using the generated data (n=8) is listed in table 5. Correlation is significant at the 0.05 level (2-tailed).

Table 4 Pearson Correlation Coefficient Summary (Original Data, n = 8)

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

Correlations

		SRM	MFM	PDAC	CA	OP
SRM	Pearson Correlation	1	-.055	.700	.079	.047
	Sig. (2-tailed)		.889	.053	.839	.905
	N	8	8	8	8	8
MFM	Pearson Correlation	-.055	1	-.139	.399	.780*
	Sig. (2-tailed)	.889		.743	.287	.013
	N	8	8	8	8	8
PDAC	Pearson Correlation	.700	-.139	1	.516	.272
	Sig. (2-tailed)	.053	.743		.191	.514
	N	8	8	8	8	8
CA	Pearson Correlation	.079	.399	.516	1	.795*
	Sig. (2-tailed)	.839	.287	.191		.010
	N	8	8	8	8	8
OP	Pearson Correlation	.047	.780*	.272	.795*	1
	Sig. (2-tailed)	.905	.013	.514	.010	
	N	8	8	8	8	8

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5 Pearson Correlation Coefficient Summary (Generated Data, n = 400)

Correlations[a]

		SRM	MFM	PDAC	CA	OP
SRM_Variable	Pearson Correlation	1	.709**	.966**	.946**	.896**
	Sig. (2-tailed)		.000	.000	.000	.000
MFM_Variable	Pearson Correlation	.709**	1	.802**	.692**	.443**
	Sig. (2-tailed)	.000		.000	.000	.000
PDAC_Variable	Pearson Correlation	.966**	.802**	1	.944**	.864**
	Sig. (2-tailed)	.000	.000		.000	.000
CA_Variable	Pearson Correlation	.946**	.692**	.944**	1	.916**
	Sig. (2-tailed)	.000	.000	.000		.000
OP_Variable	Pearson Correlation	.896**	.443**	.864**	.916**	1
	Sig. (2-tailed)	.000	.000	.000	.000	

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

a. Listwise N=400

Correlation is significant at the 0.01 level (2-tailed). a. List wise N=400

5.0 CONCLUSIONS

5.1 Introduction

This chapter presents summary of findings, conclusions and recommendations. It is organized as follows: first it presents the summary of findings organized as per research objectives, then the conclusions drawn from those findings and finally both policy recommendations and suggestions for further study.

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

5.2 Summary of Findings

The findings of this study and the influences to this research are presented. Future research possibilities are suggested based on the findings and limitations experienced in this research effort. A thorough review of prevalent SCM literature indicates that improving competitive advantage and organizational performance is one of the main objectives of SCM (Croxton et al., 2001, Cooper et al., 1997, Lambert, 2001, Li et al, 2005, Simchi-Levi, 2000). This study evaluated whether three dimensions of SCM practice (supplier relationship management, manufacturing flow management, and product development and commercialization) have an effect on competitive advantage and organizational performance.

A survey instrument based on Lambert's (2008) supply chain assessment tool was developed and send distributed to leading executives throughout industry. The results of this study support the hypotheses that SRM, MFM, and PDAC have a positive effect on competitive advantage and organizational performance. The primary findings of this study based on generated data suggest that (SRM, MFM, and PDAC) have a positive effect on competitive advantage and organizational performance. In that study, every SCM dimension studied appeared to have a positive effect on competitive advantage. These findings are also consistent the relationships strongly suggested throughout prevalent SCM literature (Tan et al., 1999; Mentzer et al., 2001, Lambert, 2008).

These findings highly suggest that organizations should embrace and actively promote high levels of these SCM practices. In a survey conducted by Davis et al. (2002) 36% of the respondents indicated that their firm has not embarked upon a program aimed specially at implementing supply chain management. Of the remaining 64% of the respondents, 55% indicated that their firm has embarked on a supply chain management program for just three years or less. The findings of this research should assure industry that SCM is an effective way of competing, and the implementation of SCM practices does have a positive impact on competitive advantage and organizational performance.

5.3 Limitations

As is the case with any research effort, this study is not without limitations. First, this study relied on self-report measures. Although self-reports are used prominently in organizational and management research, there are problems associated with their use (Podsakoff & Organ, 1986). Social desirability and response acquiescence are two tendencies that influence self-report responses (Schwab, 2005). These phenomena may prompt responses that will present the person or organization in a favorable light. This could skew the effectiveness of any self-response survey. In order to negate these tendencies as much as possible, the importance of this research was emphasized in the cover letter that was sent to all survey participants. Participants were also ensured of survey confidentiality in order to decrease the instances of social desirability.

Secondly, common methods variance may affect this study. Common methods variance is the impact of collecting data from one source at one time (Podsakoff & Organ, 1986). The only data collection method used was surveys. Respondents answering the questions on the survey may have negative or positive opinions of surveys that result in overly positive or negative responses to the survey questions. The data was collected only once and at one point in time. Respondents taking the survey may have encountered an event on the day of taking the survey that caused them to respond overly positive or negative to the questions asked on the survey. Separation of measurements within the survey was used to decrease the impacts of common method variance. Scale re-ordering was also used to decrease the impacts of common method variance.

Using different scaling and reverse scoring kept respondents from falling into to a constant answer without regard to their true feelings and opinions about the questions asked. Third, due to size and time restraints, this research analyzed the effect of only three of the eight supply chain management processes identified by the Global Supply Chain Forum. Although the other five processes were analyzed in other theses, a comprehensive research product would have resulted in a more unified final product. Perhaps the most serious limitation of this research is the use of simulated data. Due to the poor response rate of 1% (n=8), a sample data set (n=400) based on those responses was generated. The parameters of this simulation were based on the response data sample, and the normal distribution was found to be the most representative distribution to be used in the data generation. All generated data was assumed to be fairly representative of the target population of this research study. However, due to the small sample

https://damaacademia.com/ajplscm/ July 2021 Pages: 01-26 Volume 3 | Issue 7

size on which it is based, there is a very real possibility that the generated data may not be reflective of the population it was intended to represent.

5.4 Recommendation

The research institutions should strengthen their supply chain management by putting greater effort to the implementation of some key best practices. Specifically, the following practices should be improved on Provision of dependable Services, Quality outsourced services, Reduction of fuel consumption, Sharing of Information through Information Technology, Reduction of pollutant emissions, Prequalification of Suppliers that are aware of Environmental Issues, Formal partnerships with Suppliers, Setting up a SC data base, Operating with Lean supply base, Green Supply Chain Management Practices, Supplier Development, Preparation of specifications with Suppliers, development of an Outsourcing policy, Procurement of recyclable Material, Reverse logistics and Involvement of key suppliers in planning. The research institutions should create awareness forums to educate users on applicable laws and regulations such as the PPDA. The research institutions should enhance their technological capacity so as to accommodate greater collaboration and information sharing between the institution and suppliers as well as internally.

5.5 Conclusion

The results of this study seem to indicate that SRM, MFM, and PDAC processes have a positive impact on competitive advantage and organizational performance. Therefore, business organizations should take an active role in managing all facets of their supply chain. In today's increasingly competitive global markets, organizations that do not practice sound supply chain management techniques may find themselves unable to compete with their business competitors.

Reference

Ackah, D., Obiri-Yeboah, H., & Agboyi, A., R., (2015). "An econometrics analysis of the determinants of inflation in Namibia", World Wide Journal of Multidisciplinary Research and Development (WWJMRD) Volume 1, Issue 4, pp. 1-9

Ackah, D., Kondegri-Pangka, M., & Agboyi, A., R., (2015). "The Role and Impact of Rural Banking on SME's (Small Medium Enterprise)", Global Journal of Management Studies and Researches (GJMSR), Volume 1, Number 5, pp. 311 – 323

Ackah, D., Obiri-Yeboah, H., & Agboyi, A., R., (2015). "Effectiveness of revenue mobilization in the district assemblies", World Wide Journal of Multidisciplinary Research and Development (WWJMRD) Volume 1, Issue 4, pp. 31 – 39.

Ackah, D., Obiri-Yeboah, H., & Agboyi, A., R., (2015). "An online Sales Management System for a Cosmetic Shop", International Journal of Management, Accounting & Economics (IJMAE), Volume 2, Number 8, pp. 489 – 532

Ackah, D., Adu-Gyamfi, L., & Agboyi, M., R., (2015). "The Impact of Trade Liberalisation on Import Composition," Global Journal of Management Studies and Researches (GJMSR), Volume 1, Number 5, pp. 273 – 290

Ashish, A.T. (2007) Competitive advantage of a firm through supply chain responsiveness and scm practices (Doctoral dissertation) Retrieved from Dissertations and Thesis database (toledo1176401773)

Ballou, R.H., Gilbert, S.M. and Mukherjee, A. (2000), New managerial challenges from supply chain opportunities, Industrial Marketing Management, Vol. 29 No. 1, pp. 7-18.

Bechtel, C. & Jayaram, J. (1997), Supply chain management: a strategic perspective, International Journal of Logistics Management, Vol. 8 No. 1, pp. 15–34.

Bennett, S.G. (1999) The quest for value: a guide for managers, New York: Harper Collins

Blum, M. (2003) Product development as dynamic capability (Doctoral dissertation) Retrieved from Dissertations and Thesis database (ubm 972116109)

Boddy, D., Cahill, D., Charles, M., Fraser-Kraus, H., & Macbeth, D. (1998), Success and failure in implementing partnering, European Journal of Purchasing and Supply Management, Vol 4 No. 2, pp. 143-151

Booz, Allen & Hamilton. Management of new products. New York: Booz, Allen and Hamilton, 1968.
Brown, S. L., & Eisenhardt, K. M. (1995), Product development: past research, present findings, and future directions, Academy of Management Review, Vol. 20 No.2, pp. 343

Burt, D.N., Dobler, D.W., & Starling, S.L. (2003) World class supply management, New York, NY: McGraw-Hill/Irwin

Carr, A.S. & Person, J.N. (1999) Strategically managed buyers-seller relationships and performance outcomes Journal of Operations Management Vol. 17 No. 5 pp. 497- 519

Childhouse, P. T. (2003) Simplified material flow holds the key to supply chain integration OMEGA 2003; Vol. 31 pp. 17-27

Christopher M. & Towill, T.R. (2002) Developing marketing specific supply chain strategies, The International Journal of Logistics Management, Vol. 13 No. 1, pp. 1-14

Cooper, M. C., Lambert, D. M., and Pagh, J. D. (1997), Supply chain management: more than a new name for logistics, The International Journal of Logistics Management, Vol. 8 No.1, pp. 1-14

Cooper, R. (1979), Identifying industrial new product success: project newprod, Industrial Marketing Review, Vol. 8, pp. 124-135

Cooper, R. G., Kleinschmidt, E. J. (1987), New products: what separates winners from losers, Journal of Product Innovation Management, Vol. 4, pp. 169-184

Cooper, R. G., Kleinschmidt, E. J. (1995), Benchmarking the firm's critical success factors in new product development, Journal of Product Innovation Management, Vol. 12, pp. 374-391.

Cooper, R. G. (1996), Overhauling the new product process, Industrial Marketing Management, Vol. 25, pp. 465-482.

Cooper, R. G., Edgett, S.J., Kleinschmidt, E. J. (1998) Portfolio management for new products, Reading, MA: Perseus Books

Council of Supply Chain Management Professionals, retrieved January 5, 2012 from: www.cscmp.org
Croom, S., Romano P. & Giannakis M., (2000) Supply chain management: an analytical framework for critical literature review, European Journal of Purchasing and Supply Management, Vol. 6, pp. 67-83.

Croxton, K.L., Lambert, D.M., Rogers, D.S. & Garcia-Dastague, S.J. (2001) The supply chain management processes, The International Journal of Logistics
Management, Vol 12, No. 2, pp.15
Croxton, K.L., Lambert, D.M., Rogers, D.S. & Garcia-Dastague, S.J. (2002) The returns management process, The International Journal of Logistics Management, Vol. 13, No. 2, pp.51-66