

**YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF COMMERCE**

**SUPPLY CHAIN MANAGEMENT PRACTICES IN PULP
AND PAPER INDUSTRY
(A Case Study of Shwe Pyi Thar Industrial Zone, in
Yangon)**

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SUPPLY CHAIN MANAGEMENT PRACTICES IN PULP AND PAPER INDUSTRY

(A Case Study of Shwe Pyi Thar Industrial Zone, in Yangon)

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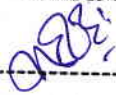
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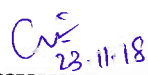
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ABSTRACT

The study has two objectives, to identify the supply chain management practices adopted by four major paper mills in Shwe Pyi Thar industrial zone, and to analyze the relationship between supply chain management practices and competitive advantage. This research only conceptualized and developed four dimensions of SCM practice (supplier relationship management, customer relationship management, manufacturing flow management, and order fulfillment). Data for the study was collected from 50 respondents of four major paper mills and the relationships proposed in the framework were tested using the rigorous statistical technique. Frequency, mean and standard deviation were used to analyze the objective one and Pearson correlation and regression analysis were used to test the relationship between supply chain management practices and competitive advantage. The findings are presented by the table and the major findings were that there is a positive relationship between supply chain management practices and competitive advantage explained by the four independent variables. This research is only on the case of pulp and paper industry in Shwe Pyi Thar industrial zone. Therefore, this study recommends further research on other firms that are not in the pulp and paper industry. This study has also recommended that future research expand on the domain of SCM practices and their relationships with an organizational performance by considering additional dimensions and also seek to utilize multiple respondents to enhance research finding.

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LIST OF ABBREVIATIONS

SCM	Supply Chain Management
SRM	Supplier Relationship Management
CRM	Customer Relationship Management
MFM	Manufacturing Flow Management
OF	Order Fulfillment
GSCF	Global Supply Chain Forum
CSCMP	Council of Supply Chain Management Professionals
PSA	Product and Service Agreements
IT	Information Technology

Chapter 1

Introduction

Effective and efficient supply chain management now has become a very valuable and important way to remain competitive in the market and to improve the organizational performance. It plays a very important role in staying competitive because the competition among the organizations is affected by the SCM. In early 1990 as the competition got intensity due to the global markets to deliver a product or service at a right place and at the right time. Due globalization now organizations are realizing that to be competitive in the global and local market they should have to do the work is to get better the efficiencies inside the organization to improve the entire supply chain also more effective and efficient than your competitor. The organizations have to understand the concepts and the practices of SCM for the intention of achieving competitiveness and for increasing profits (Childhouse & Towill, 2003; Moberg, Cutler, Gross, & Speh, 2002; Power, Sohal, & Rahman, 2001; Tan, Lyman, & Wisner, Supply Chain management: a strategic perspective, 2002).

While many firms in the automotive, consumer goods, and electronics industries have exploited the value creation potential of SCM, firms in the pulp and paper industry are just beginning to recognize the vast scope of the potential opportunities that exist. McLean (1999) argues that SCM is a critical business issue in the pulp and paper industry that offers tremendous potential for improving customer satisfaction, lowering operating costs, reducing inventory investments, and improving fixed asset utilization. He indicates that current SCM approaches and initiatives in the pulp and paper industry have significant gaps in the areas of demand planning, production planning, scheduling, inventory management, and transportation and distribution planning. However, rather than a comprehensive and systematic analysis of SCM, firms in the pulp and paper industry have reacted to competitive forces by pursuing actions that may be detrimental. For example, as a result of the fiercely competitive environment, significant pressure has been placed on suppliers to cut costs. In response, some suppliers are reducing their investments in research and development, equipment upgrades, and quality improvement initiatives. Needless to say, these supplier actions may have a devastating impact on the long-term performance of the pulp and paper industry.

The pulp and paper industry can be viewed as a large network of production units which gradually refines the wood and bamboo into consumer products. It is very rare that all the refinement is made in one single company. The production network is linked to a procurement network which starts in the forest. This network may contain several locations (wood yards or other storage points) where logs are just stored or transshipped before it goes to production units. The production network is also linked to a distribution network ending at merchants or retailers, which together with the final customers constitutes the sales network. As a matter of fact, there is actually a connection from the sales network back into the pulp and paper supply chain again. Almost half (47% in 2004, RISI 2005) of the paper that is consumed is recovered and used to produce paper again.

The supply chain in the Pulp and Paper industry consists of a lot of procedures, suppliers, middleman, and customers. Knowledge and physical product flow are important in this chain. The importance of competition is to be successful in competition among the supply chains which the firms are in, not the competition among firms. The ultimate person is the customer who forces this partnership of supply chain partners and wants to reach. Those who manage and build the management of the supply chain in an effective, economic and productive way to reach these goals will enjoy more market share.

The main aim of the supply chain is to maximize production value. The value which was produced by the supply chain is the difference between the value which the customer sets and the cost of the efforts of the supply chain to meet the needs of the customer. How big this difference becomes the more successful the supply chain will be. Supply chain management provides an important competitive advantage for the firms and is an important indicator of the work performance of the firm.

Today not only the firms but in fact, supply chains of these firms compete among themselves. To manage supply chain well means to provide in a fast way and with lowest cost products to the customers by providing both members of supply chain activities in themselves and connections among themselves in the most productive way. Supply chain, when used properly, is a management strategy which provides a new competitive advantage.

In Myanmar, especially the Pulp and Paper industry will benefit greatly from the improvement in the supply chain and hence create a positive effect on the national

economy. Competition is taking place not only among firms but most supply chains. Each partner in the supply chain is players in the position to try to optimize the value of the same team. Members of the supply chain however much they cooperate with each other, they can compete better with their rivals. This brings both different perspectives to the partnership and a wider approach to the firm

1.1 Rationale of the Study

The role of supply chain management in the pulp and paper industry is to facilitate the efficient movement of required materials, information as well as the transportation of the final product from factories to the markets close to the customers (Dharni & Rodrigue 2015). In this thesis work, supply chain models and management in different industries were studied. These methods were then compared to the methods used in the Paper industry. The result was to study as a case study of pulp and paper mills in Shwe Pyi Thar industrial zone.

As the pulp and paper industry in Myanmar continues to grow and increase in its complexity, so do the problems encountered in that industry. The industry has evolved into a highly competitive area where producers have placed themselves in the lowest cost position possible while capturing market shares. While companies cannot control market forces, improving operational efficiency is the lever that they can actively control. In highly competitive market companies that maximize the value of their assets, regardless of their age, will achieve a competitive advantage. This can positively impact production volumes or raw materials and utility consumption, which has a direct effect on the profit equation under all market conditions.

The budding packaging industry in Myanmar has a long way to go for their products to remain competitive against imported cardboard boxes that enter the market at cheaper prices. Local industrialists are faced with big issues – they are able to extend their businesses but market forces are keeping demand low, with buyers naturally favoring the cheaper, imported product. Big prospective customers like London cigarettes and Myanmar beer do not buy cartons from local suppliers. In all fairness, they want to, but their ever-conscious budgets are pointing them another way. Imported items meanwhile are mainly coming from Singapore. The answer is to protect and support local manufacturers and the Government can do many things like creating more favorable conditions for the local manufacturers to remain in business

despite stiff competition from their foreign counterparts who produce the same items on economies of scale.

Capacity at packaging factories is still relatively small. The biggest in Yangon, for instance, can only make 50,000 boxes of various sizes per day. By comparison, factories in Singapore or Hong Kong could be producing several million boxes a day. There are many reasons why the locally made product is highly priced, and so in some ways, there has an argument to put forward despite a global philosophy of removing tariffs and Government protection as part of a new world order.

Most of the raw materials for packaging have to be imported. It is perhaps the main reason. And local manufacturers are not well positioned to have mass production lines because of limited market demand. There is also room for improvement in infrastructures in industrial zones. Dealing with the situation with each manufacturer adds extra costs to production. It is normal practice for an industrial zone to provide it with efficient infrastructure and to have essential facilities installed before entrepreneurs are invited to invest in Myanmar.

Raw materials management plan and Energy management plan are the most important for the regular operation of pulp and paper mills. Due to the unstable supply of raw materials and energy, pulp & paper mills cannot operate regularly and economically. On the other hand, maintenance cost will also become higher and higher. That's why regular customers built a marketing system and get chance of the current market price for selling products cannot be achieved. The other one thing is the location of the mill which may be effective by the logistic cost of products.

The major negative effect of these problems is an unsatisfactory business performance which is exhibited through, among other things, declining competitiveness and low profits (Industrial Development Corporation 2017). The availability of these problems present the pulp and paper industry with the challenge to progress and improve in order to meet the needs of customers and the rapidly changing world of business. However, it is important that these problems be investigated through empirical research in order to develop a better understanding of the developments taking place within the industry, especially within the supply chain management context (Kumar & Bala 2013). This may be achieved by closely analyzing the different factors, from internal and external sources, that impact on the activities taking place in the supply chain (Resse 2011). The needs for this study

originates from the problems in the loss of raw materials, especially pulp materials from the flow without understanding where they have ended.

Moreover, the pulp and paper industry is an important economic segment, contributing to Myanmar in terms of employment creation and generating substantial revenue for the country. Given such importance to the Myanmar economy, continued research is warranted to generate updated information which can be used to solve various problems experienced in this industry and to make decisions necessary for its further growth and success.

1.2 Research Objectives

The study is guided by the following specific objectives;

1. To identify the supply chain management practices in the Pulp and Paper industry in Shwe Pyi Thar Industrial zone.
2. To analyze the relationships between supply chain management practices, and competitive advantage.

1.3 Method of the Study

Both quantitative and qualitative designs were used. Primary data and secondary data were collected. Operational measures for the constructs were developed and tested empirically, using data collected from respondents to a survey questionnaire. The data was collected through the structured questionnaires and analyzed by the descriptive method. Pearson correlation and regression analysis were used by providing empirical evidence of the significant relationship between supply chain management practices and an organization's competitive advantage, it is expected that this research will offer useful guidance for measuring and implementing.

1.4 Scope and Limitations of the Study

In the Pulp and Paper Industry, this paper focuses on four major paper manufactures of their supply chain management. The total population of employees working in these four major mills is 418. The data was collected from 50 respondents (10% of the total employees). This survey instrument utilized in this study aims at filling the gap in the literature on the effect of supply chain processes by empirically

testing the effect of the eight processes on competitive advantage. However, due to size limitations and time constraints, only four of the processes and their relationship with competitive advantage are fully examined in this study: supplier relationship management, customer relationship management, manufacturing flow management, and order fulfillment.

1.5 Organization of the Study

This study organized into five chapters. Chapter 1 included an introduction with the rationale of the study, Objectives of the study, Scope, and method of the study and Organization of the study. Chapter 2 presented the research framework, provided the definitions and theory underlying each dimension of SCM practices, discusses the concepts of competitive advantage and organizational performance, and develops the hypothesized relationships. Chapter 3 contained the profile of the industries and companies. Chapter 4 included the research methodology and analysis of results. Chapter 5 described as the conclusion of the whole study with findings, recommendations, and future research.

Chapter 2

Literature Review of the Study

The purpose of this section is to briefly introduce and provide a recent history of supply chain management (SCM) and supplier relationship management (SRM), customer relationship management (CRM), manufacturing flow management (MFM), order fulfillment (OF), and competitive advantage, as it relates to literature that has significantly contributed to the field of SCM. A review of the literature will provide the foundation for the research model developed and hypotheses evaluated in this thesis.

2.1 Supply Chain Management

SCM is a widely recognized and steadily growing multidisciplinary field. A wide variety of studies have developed and contributed to the evolving foundation of supply chain management continually over the last 20 years (Cavinato, 1991; Cooper & Ellram, 1993; Croxton et al., 2001; Lambert, Cooper, & Pagh, 1998; Lambert, 2008; Li, Rao, Ragu-Nathan, & Ragu-Nathan, 2005; Mentzer, DeWitt, Keebler, Min, Nix, Smith, & Zacharia, 2001). The theoretical and practical importance of the management of the supply chain has been widely recognized through numerous studies (Cavinato, 1991; Cooper & Ellram, 1993; Tan, Kannan, & Handfield, 1998).

"A supply chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer" (Mentzer et al., 2001: 4). Mentzer et al. (2001) investigated the numerous definitions and approaches to supply chain management throughout history and stated that, "it is important to realize that implicit with these definitions is the fact that supply chains exist whether they are managed or not".

SCM has often been associated with logistics. Associations include supply chain management as a subset of logistics, logistics as a subset of SCM, logistics, and SCM as interchangeable, and logistics and SCM partially overlapping (Larson, Poist, & Halldorsson, 2007). Larson et al. (2007) studied the confusion that stems from this distinction among business executives through a survey. Croxton et al. (2001) contend that there is an increasing understanding that SCM encompasses much more than logistics. Cooper et al. (1997) further addressed the notion that SCM has a much

larger scope than logistics and that logistics along with other business processes are subsumed by SCM. Cooper et al. (1997) emphasized this philosophy by stating, "logistics is never going to own the product development process or the customer for the matter". This research identified logistics as a business function identified by the Global Supply Chain Forum (GSCF) framework (Lambert, 2008).

Firms that are going to be successful already know or must quickly realize that in today's fast-paced and interconnected business environment infused with mass globalization a firm will not survive in isolation but rather a single entity of an integrated supply chain (Tan, Kannan, Handfield, & Ghosh, 1999). Researchers have consistently acknowledged that today's business environment is no longer reflective of firm versus firm but has progressed to that of supply chain versus supply chain (Cooper & Ellram, 1993; Cooper, Lambert & Pagh, 1997; Mentzer et al., 2001). Cooper and Ellram's (1993) study provided insight into the difficult transition from a traditional firm versus firm perspective to a supply chain versus supply chain perspective and provided comparisons between the more traditional approach and a supply chain philosophy.

Several conditions must be present for successful SCM adoption; "the single most important prerequisite is a change in the corporate cultures of all members of the supply chain" (Tan, Kannan, & Handfield, 1998: 4). Cooper and Ellram (1993) identified three reasons to form supply chains: "1) to reduce inventory investment in the chain, 2) to increase customer service, and 3) to help build a competitive advantage for the channel".

The implicit existence of supply chains highlights the need for firms to not only acknowledge upstream and downstream business entities but to also build sustainable and mutually beneficial relationships with their upstream and downstream partners (Frohlich & Westbrook, 2001; Lambert, Knemeyer, & Gardner, 2004). Frohlich and Westbrook (2001) found a positive relationship between a firm's rate of performance improvement and the level of integration between the firm and the firm's suppliers and customers. This leads to another significantly addressed theory from SCM literature; practitioners and academicians alike agree that supply chain management is a means to create and sustain a competitive advantage and enhance organizational performance for the firm and for the entire supply chain (Cooper, Lambert, & Pagh, 1997; Lambert, Knemeyer, & Gardner, 2004; Li et al., 2005; Menter

et al., 2001; Tan, Kannan & Handfield, 1998; Tan et al., 1999).

The field of SCM is continually being recognized as an essential field of study through academic research and by practitioners from a wide variety of disciplines and perspectives. The literature on supply chain management continues to grow as a result, but the definition of "supply chain management" is not consistent. SCM literature openly acknowledges the different definitions of "supply chain management" that exist (Chen & Paulraj, 2004; Croom, Romano, & Giannakis, 2000; Larson, Poist, & Halldorsson, 2007; Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Mentzer et al., 2001). "Although research interests in and the importance of SCM are growing, scholarly materials remain scattered and disjointed, and no research has been directed towards a systematic identification of the core initiatives and constructs involved in SCM " (Chen & Paulraj, 2004: 131). The literary and practical inconsistency in defining "supply chain management" may serve as an impediment to the advancement of the field of SCM (Mentzer et al., 2001). 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).

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 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 2.1. 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).

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 a 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.

A sample of the definitions of SCM used in the literature is provided in Table 2.1. This research used Lambert et al.’s (1998) definition of SCM: “supply chain management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.

Table 2.1 Supply Chain Management definitions

Authors	Definition
Tan et al (1998)	SCM encompasses materials/ supply management from the supply of basic raw materials to the final product (and possible recycling and reuse). SCM focuses on how firms utilize their suppliers’ processes, technology, and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimization and efficiency.

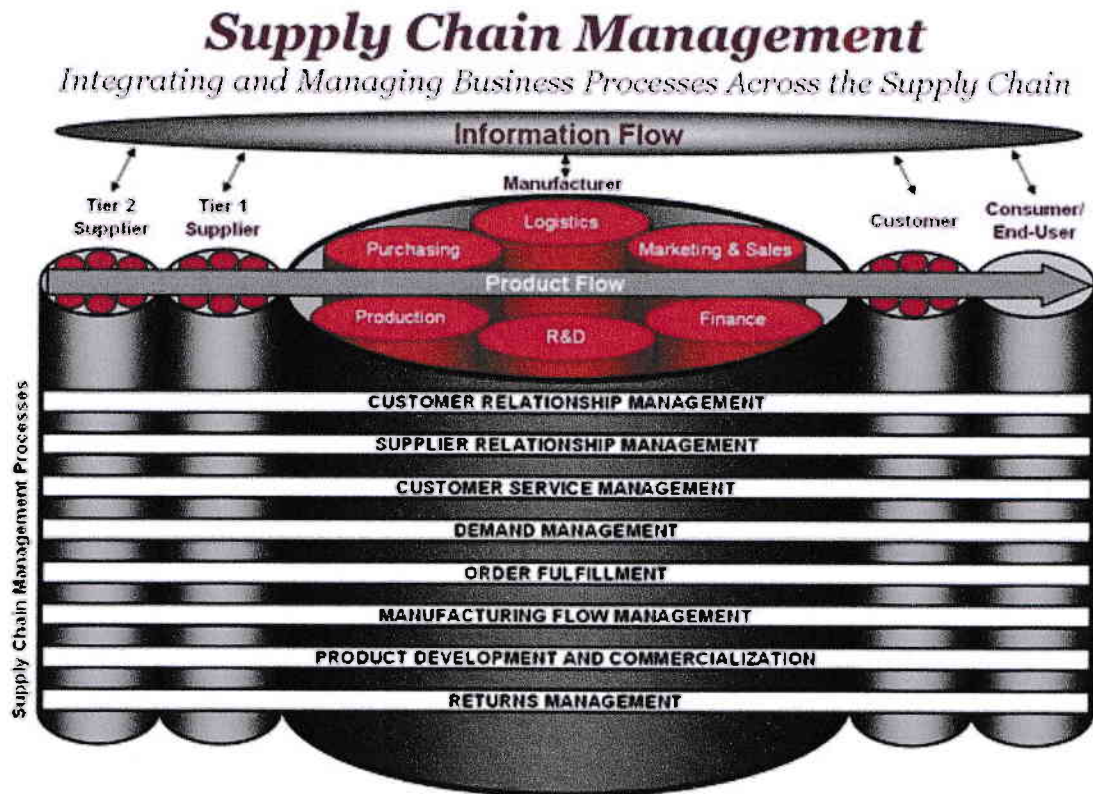
Berry et al (1994)	SCM aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to a particular OEM so as to release management resources for developing meaningful, long-term relationship.
Jones and Riley (1985)	An integrative approach to dealing with the planning and control of the materials flow from suppliers to end users.
Saunders (1995)	External Chain is the total chain of exchange from the original source of raw material, through the various firms involved in extracting and processing raw materials, manufacturing, assembling, distributing and retailing to ultimate end customers.
Ellram (1991)	A network of firms interacting to deliver product or service to the end customer, linking flows from a raw material supply to final-deliver.
Christopher (1992)	A network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer.
Lee and Billington (1992)	Networks of manufacturing and distribution site that procure raw materials, transform them into intermediate and finished products and distribute the finished products to customers.
Kopczak (1997)	The set of entities, including suppliers, logistics service providers, manufacturers, distributors and resellers, through which materials, products, and information flow.
Lee and Ng (1997)	A network of entities that starts with the suppliers' supplier and ends with the customers' custom production and delivery of goods and services.

Source: Croom, Romano, & Giannakis, 2000

The GSCF defines eight key SCM business processes. Fully implementing each of the eight processes at once may prove to be difficult and challenging but, may also be necessary for an attempt to avoid sub-optimization (Lambert, Garcia-Dastugue, & Croxton, 2005). This study will delve deeper into the implications of implementing four of the eight processes. The eight key processes identified and depicted in Figure 2.1 run along the entire supply chain, within and across firms, in

cooperation with the six functions: purchasing, logistics, marketing, production, research and development, and finance (Croxtton et al., 2001).

Figure 2.1 Supply Chain Management



Source: Lambert, 2008

Lambert lists and briefly describes each of the supply chain management processes:

- **Customer Relationship Management** – provides the structure for how relationships with customers are developed and maintained. Cross-functional customer teams tailor product and service agreements to meet the needs of key accounts, and segments of the other customers.
- **Supplier Relationship Management** – provides the structure for how relationships with suppliers are developed and maintained. Cross-functional teams tailor product and service agreements with key suppliers.
- **Customer Service Management** – provides the firm's face to the customer, a single source of customer information, and the key point of contact for administering the product service agreements.
- **Demand Management** – provides the structure for balancing the customers' requirements with supply chain capabilities, including reducing demand variability and increasing supply chain flexibility.

- **Order Fulfillment** – includes all activities necessary to define customer requirements, design a network, and enable the firm to meet customer requests while minimizing the total delivered cost.
- **Manufacturing Flow Management** – includes all activities necessary to obtain, implement and manage manufacturing flexibility and move products through the plants in the supply chain.
- **Product Development and Commercialization** – provides the structure for developing and bringing to market products jointly with customers and suppliers.
- **Returns Management** – includes all activities related to returns, reverse logistics, gatekeeping, and avoidance (Lambert, Garcia-Dastugue, & Croxton, 2005: 28).

This survey instrument utilized in this study aims at filling the gap in the literature on the effect of supply chain processes by empirically testing the relationship with the eight processes and competitive advantage. However, due to size limitations and time constraints, only four of the processes and their relationship with competitive advantage are fully examined in this study: supplier relationship management, customer relationship management, manufacturing flow management, and order fulfillment

2.2 Supplier Relationship Management (SRM)

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.” The supplier relationship management process is managed by a team 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, 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).

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).

Supplier relationship management is the business process that provides the structure for how relationships with suppliers are developed and maintained. Supplier relationship management has become a critical business process as a result of: competitive pressures; the need to consider sustainability and risk; 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 innovative new products and successfully bring them to market. Significant benefits are possible from better managing relationships with key suppliers. It has been shown that the integration of operations with suppliers can improve firm performance (Swink et al., 2007; Singh and Power, 2009; Flynn et al., 2010). An additional benefit of cross-functional, collaborative relationships with key suppliers is the ability to co-create value (Enz and Lambert, 2012).

Sharing information can promote integration with suppliers (So and Sun, 2010) and key metrics can be used to drive performance (Kim et al., 2010) and align perceptions (Giannakis, 2007). Higher levels of integration with suppliers result in improved performance (Frohlich and Westbrook, 2001; Rosenzweig et al., 2003). However, the appropriate level of supplier integration will depend on the relationship, and an effort should be made to identify a strategy tailored to each relationship (Lambert, 2004; Das et al., 2005). Also, integration of suppliers beyond the first tier

of the supply chain may increase firm performance (Lambert, 2008a, b; Kannan and Tan, 2010).

Just as close relationships need to be developed with key customers, management should forge close, cross-functional relationships with a small number of key suppliers, and maintain more traditional buyer and salesperson relationships with the others (Dryer et al., 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 (PSAs) to meet the organization's needs, as well as those of the selected suppliers. Standard PSAs are crafted for segments of other suppliers. 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 on the firm as well as the firm's impact on the profitability of suppliers (Lambert, 2004).

Supplier relationship management is often referred to in the literature as a strategic supplier partnership. Gunasekaran et al. (2001) assert that a strategic partnership emphasizes the long-term relationship between trading partners and "promotes mutual planning and problem-solving efforts". Strategic partnerships between organizations promote shared 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' based on a mutual commitment to long-term collaboration and shared success. 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 cost competitive; and, the need to achieve cost efficiency in order to 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 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 was 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). 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 completely. 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 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 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.

2.3 Customer Relationship Management (CRM)

In a business-to-business environment, customer relationship management is the business process that provides the structure for how relationships with customers are developed and maintained. Increasingly, customer relationship management (CRM) is being viewed as strategic (Lambert, 2004; Payne and Frow, 2005; Zablah et al., 2005), process-oriented (Lambert, 2004; Payne and Frow, 2005; Zablah et al., 2005), cross-functional (Lambert, 2004; Payne and Frow, 2005; 2006), value-creating for buyer and seller (Lambert, 2004; Boulding et al., 2005; Payne and Frow, 2005), and a means of achieving superior financial performance (Lambert, 2004; Boulding et al., 2005; Bohling et al., 2006; Payne and Frow, 2005).

Although, the management of customer relationships is widely recognized as an essential component of an organization because of the expected benefits likely to occur if done well and the likely detriments to arise if neglected, the determination of what exactly constitutes CRM and its implementation remains to be a prominent point of contention in CRM literature and in practice has proven to be nothing short of extremely difficult (Payne & Frow, 2005; Reinartz, Krafft, & Hoyer, 2004; Rigby, Reichheld, & Schefter, 2002; Sin, Tse, & Yim, 2005). The multiple definitions, frameworks, and concepts of CRM that have been presented throughout the years may exacerbate the difficulty in determining what truly comprises CRM and its implementation but also reinforce the notion of its strategic importance.

It is universally understood that a successful firm has customers. With a shift from a brand-centric marketing approach towards a customer-centric approach (Mithas, Krishnan, & Fornell, 2005; Reinartz, Krafft, & Hoyer, 2004), the realization of how important customers are to a firm's success and that customers are not created equally, in terms of economic value, nor should be treated as such has driven the importance of recognizing CRM at the strategic level (Lambert, 2010; Payne & Frow, 2005; Reinartz, Krafft, & Hoyer, 2004; Rigby, Reichheld, & Schefter, 2002; Sin, Tse, & Yim, 2005).

"All customers do not contribute equally to the firm's success and the goal is to identify those customers who desire and deserve special treatment so that offerings can be tailored to meet their needs while achieving the firm's profit goals for the customer" (Lambert, 2010: 12). Reinartz et al. (2004) make a clear argument that the number of relationships a firm chooses to develop with customers is much less

important than is the type of relationship the firm chooses to forge with selected customers and that these relationships can be expected to evolve and change over time. The desired type and profitability of customer relationships can vary across industries, companies, and between customers and if this is not considered firms may expend resources to build relationships with the wrong customers or build the wrong type of relationship with the right customer

(Reinartz, Krafft, & Hoyer, 2004; Rigby, Reichheld, & Scheffer, 2002).

"For a business to maximize its long-term performance in such aspects as customer satisfaction, trust, return on sales, and return on investment, it must build, maintain, and enhance long-term and mutually beneficial relationships with its target buyers" (Sin, Tse, & Yim, 2005: 1267). The idea of creating mutually beneficial relationships that create a win-win situation between the firm and the customer is a key factor of successful CRM (Boulding et al., 2005; Sin, Tse, and Yim, 2005; Lambert, 2010) and if this factor is abandoned than it may impede the likelihood of obtaining a customer's "full and sustained commitment" (Lambert, 2010: 11).

Another highly recognized factor of growing importance to successful CRM is the level of involvement of multiple business functions within the CRM process (Lambert, 2010; Payne & Frow, 2005; Reinartz, Krafft, & Hoyer, 2004; Sin, Tse, & Yim, 2005) even when a business function doesn't have direct contact with the customer it can still have a tremendous impact on the customer (Lambert, 2010).

CRM is regularly acknowledged as a vital business process that should be considered an integral part of an organization's strategy. The process of managing relationships serves as a benefit for the firm (Reinartz, Krafft, & Hoyer, 2004). According to Lambert (2010), "CRM has become a critical business process as a result of: competitive pressures; the need to achieve cost efficiency in order to be a low-cost, high-quality supplier; a recognition of the fact that customers are not equal in terms of their profitability; and, knowledge that customer retention can significantly affect profitability". Through collaboration, cooperation, and communication "firms can work with individual customers to offer customized solutions, create relationship value, enhanced customer loyalty, and reduce the cost of doing business" (Sin, Tse, & Yim, 2005: 1268). CRM provides a litany of reasons for organizations to ensure relationships with customer are established, defined, and managed and when organizations are successful additional benefits include: gathering data quickly, identifying valuable customers over time, increasing customer loyalty,

reductions in the cost of serving loyal customers, increasing the likelihood of acquiring profitable customers in the future, and eventually, increasing corporate profitability (Rigby, Reichheld, & Schefter, 2002).

Lambert (2008) provided a structure and method of implementation for the CRM process as identified and developed by the GSCF. The CRM definition used for this thesis was provided by Lambert et al. (2005) and is defined as the SCM process that “provides the structure for how relationships with customers are developed and maintained. Cross-functional customer teams tailor product and service agreements to meet the needs of key accounts, and segments of the other customers”. The organization’s business mission should entail identifying key customers and customer segments and working with those identified to “improve processes and eliminate demand variability and non-value added activities” (Croxtton et al., 2001: 15). For maximum results it is imperative the all of the business functions should be involved in the relationship to increase the amount of useful knowledge generated and to avoid failing to follow through and meet promises made to customers in a profitable manner because functions that may not have direct contact with the customer may well have an influence on the customer (Lambert, 2010). Product and service agreements (PSA) are referred to as a multitude of various names that may vary in the level of formality from company to company; however, it is advised that agreements be formally written documents to maximize results (Lambert, 2010).

A collection of definitions of CRM presented in CRM literature over the past several years is provided in Table 2.2.

Table 2.2 A sample of Customer Relationship Management Definitions

Customer Relationship Management Definitions	
Author	Definition
(Tan, Kannan, & Handfield, 1998: 109)	Comprises the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction.
(Rigby, Reichheld, & Schefter, 2002: 102)	CRM aligns business processes with customer strategies to build customer loyalty and increase profits over time.

(Reinartz, Krafft and Hoyer, 2004: 294)	A systematic process to manage customer relationship initiation, maintenance, and termination across all customer contact points to maximize the value of the relationship portfolio.
(Payne & Frow, 2005: 168)	CRM is a strategic approach that is concerned with creating improved shareholder value through the development of appropriate relationships with key customers and customer segments. CRM unites the potential of relationship marketing strategies and IT to create profitable, long-term relationships with customers and other key stakeholders. CRM provides enhanced opportunities to use data and information to both understand customers and co-create value with them. This requires a cross-functional integration of processes, people, operations, and marketing capabilities that are enabled through information, technology, and applications.
(Sin, Tse, & Yim, 2005: 1266)	A comprehensive strategy and process that enables an organization to identify, acquire, retain, and nurture profitable customers by building and maintaining long-term relationships with them.
(Reimann, Schilke, & Thomas, 2010: 329)	The firms' practices to systematically manage their customers to maximize value across the relationship lifecycle.

2.4 Manufacturing flow Management (MFM)

Manufacturing flow management includes all activities necessary to obtain, implement, and manage manufacturing flexibility in the supply chain and to move products through the plants. The ability to make a wide variety of products in a timely manner at the lowest possible cost is a reflection of this process, to achieve the desired manufacturing flexibility level, planning and execution must extend beyond the four walls of the manufacturer and out to the supply chain partners.

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 sync 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 21 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, has been estimated at \$ 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-Dastague, 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-Dastague, 2003). The process involves much more than 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.

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 them 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 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).

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 orders, 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 the duration of the product lifecycle, the complexity of the product, and profit margin of the product (Goldsby & Garcia-Dastugue, 2003).

Beyond the definition of manufacturing flexibility, there are many different types of manufacturing flexibility. However, there appears to be a general consensus

that there are two major types of manufacturing flexibility: organizational and production. For the purposes of this paper, Duclos, Vokurka, and Lummus neatly summarize the major types of manufacturing flexibility and provide the definition for each in Table 2.3.

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 commitment to quality of the product must be returned by the contracting firm.

Table 2.3 Types of Manufacturing Flexibility

Type of Flexibility	Definition
Organizational Flexibility	
Manufacturing or Operations	The ability of the organization to manage production resources and uncertainty to meet various customer requirements
Market	The ability to mass-customize and build close relationships with customers, including designing new products and modifying existing ones
Supply	The ability to reconfigure the supply chain (geographically) as sources of supply and customers change
Information Systems	The ability to align information systems with changing customer demands
Production Flexibility	
Mix	The ability to change over to a different product quickly and economically without changes in capacity
Volume	The ability to operate at various batch sizes and/or at

	different production volumes economically and effectively
Expansion	Modular building and expanding capacity
Material Handling	The ability to effectively transport different workpieces between various processing centers over multiple paths
Process *(routine)	The ability to process a given set of part types using multiple routes effectively
Machine	The ability of a machine to perform different operations economically and efficiently
Work-center (labor)	The ability of the workforce to perform a broad range of tasks economically and effectively

Source: Duclos, Vokurka, & Lummus, 2003

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.

2.5 Order Fulfillment (OF)

Order fulfillment is a key process in managing the supply chain. It is the customers' orders that put the supply chain in motion, and filling them efficiently and effectively is the first step in providing customer service. However, the order fulfillment process involves more than just filling orders. It is about designing a

network and a process that permits a firm to meet customer requests while minimizing the total delivered cost. This is more than a logistics function, and it needs to be implemented cross-functionally and with the coordination of key suppliers and customers. In this paper, the order fulfillment process is described in detail to show how it can be implemented within a company and managed across firms in the supply chain. The activities of each sub-process are examined; the interfaces with functional silos, processes and firms are evaluated; and, examples of successful implementations are provided.

OF has been researched and referred to by different names throughout history such as the OF process (Croxton, 2003; Lambert, 2008; Lin & Shaw, 1998), dyadic OF process (Forslund, 2006), and the order management cycle (Shapiro, Rangan, & Sviokla, 1992). Explicit definitions and activities that comprise the OF process vary slightly from author to author but generally speaking, the common thread amongst the different views of OF is that the process includes activities required to receive an order from a customer and deliver that order to the customer (Croxton, 2003; Forslund, 2006; Forslund, 2007; Lambert, 2008; Lin & Shaw, 1998; Shapiro, Rangan, & Sviokla, 1992). OF is consistently recognized as an essential process to a firm and successful OF requires the attention of the firm's management. The customer's order is the catalyst that starts the OF process and puts the supply chain in motion (Croxton, 2003; Forslund, 2007; Lambert, 2008).

The OF process may provide the only interaction between the customer and the firm and therefore, could ultimately be the dominant factor in determining the customer's overall experience and perception of the firm (Croxton, 2003; Lambert, 2008; Shapiro, Rangan, & Sviokla, 1992). Shapiro et al. (1992) stress the intimate connection between the order and the customer through the OF management cycle. "Every time the order is handled, the customer is handled" and "every time the order sits unattended, the customer sits unattended" (Shapiro, Rangan, & Sviokla, 1992). Shapiro et al. (1992) further contend that "customers want their orders handled quickly, accurately, and cost-effectively" and that the OF process is growing in the level of complexity required to successfully meld the connection between the customer and firm. Forslund's (2007) study focused on the impact and importance of the quality of information between the customer and firm within the OF process and how this can influence the supply chain. "In the order fulfillment process, the supplier

is dependent on both the customer's information and information internal to the supplier" (Forslund, 2007). Forslund (2007) introduces the notion that "the supplier is the information customer in the order fulfillment process". From this perspective, both parties are highly dependent on one another and each party serves as a customer and as a supplier for all transactions.

Lin and Shaw (1998) provide an argument as to why and a way ahead for how a firm can reap major benefits from re-engineering the OF process. The OF process is important and should be acknowledged as a process that can have a major impact on the entire supply chain because of the growing importance and dependence on outsourcing, activities of the OF take place within the entire supply chain, and variation of the OF process can determine the type of supply chain (Lin & Shaw, 1998). Lin and Shaw (1998) introduced the main objective of the OF process characterized by two dimensions: "(1) delivering qualified products to fulfill customer orders at the right time and right place, and (2) achieving agility to handle uncertainties from internal or external environments" (199). Components intrinsic to the OF process like order processing times, material lead times, assembly lead times, and distribution lead times are distributed across the supply chain and variation associated with these lead times can compound and cause a ripple effect throughout the entire supply chain if not controlled (Lin & Shaw, 1998).

Croxton (2003) provides a structure and method of implementation of the OF process. "Order fulfillment is a key process in managing the supply chain. The order fulfillment process involves more than just filling orders. It is about designing a network and a process that permits a firm to meet customer requests while minimizing the total delivered cost" (Croxtion, 2003: 19). "Order fulfillment spans the boundaries among internal functions, suppliers, and customers, creating value by leveraging the operational and informational resources of a variety of partners in a supply chain network to ultimately meet end-customer requirements in a cost-effective manner" (Davis-Sramek, Germain, & Stank, 2010: 217). The OF definition used for this thesis was provided by Croxtion (2003) and is defined as the SCM process that "includes all activities necessary to define customer requirements, design the logistics network, and fill customer orders" (20).

Once a customer makes an order it is critical that the supplier (focal firm) deliver the product and/or service as promised to and expected by the customer or risk

forfeiting future business to that customer (Davis-Sramek, Germain, & Stank, 2010). The OF process also provides an opportunity for the firm to solidify and improve the current and future relationship with a customer. Croxton (2003) affirms that real opportunities are actualized when a firm extends the OF process to supply chain partners which can lead to true process improvement. The OF process should warrant the attention of a firm's strategic management and be recognized as a key business process (Croxton, 2003). Establishing the structure to be implemented is the key focus of the strategic level of OF and implementation of the established structure is the primary focus at the operational level (Croxton, 2003).

Order fulfillment involves generating, filling, delivering and servicing customer orders. In some cases, it is only through this process that the customer interacts with the firm, and therefore, the order fulfillment process can determine the customer's experience [1]. To accomplish these tasks, management must design a network and a fulfillment process that permits a firm to meet customer requests while minimizing the total delivered cost. This requires the integration of logistics, marketing, finance, purchasing, research and development, and production within the firm, and coordination with key suppliers and customers. At the operational level, the order fulfillment process focuses on transactions, while at the strategic level, management can focus on making critical improvements to the process that influence the financial performance of the firm, its customers and its suppliers. For instance, order fulfillment directly affects product availability which influences total sales volume. An optimized network minimizes total delivered costs, including sourcing costs.

A streamlined process reduces the order-to-cash cycle which frees up capital and reduces the delivery lead-time which allows for reduced inventory levels. Thus, order fulfillment can affect the financial performance of the focal-firm, as well as other members of the supply chain. Another important component of the process is to have a responsive system in place for when demand exceeds supply and some orders cannot be filled. Assuring that this system still manages to meet at least the minimum needs of customers is critical to achieving good customer service even in the face of adversity. The other very important strategic piece comes in designing the metrics. There are numerous examples of bad metrics driving misguided behavior. The process team needs to examine the effects of order fulfillment on the financial performance of

the firm and assure that the metrics used are consistent with improving the financial performance of the entire supply chain.

While the order fulfillment process is often viewed as a logistics activity, the process cannot be designed without input from other functional areas including marketing, finance, purchasing, and production, as well as support groups like information technology. Therefore, it is important that the process team be cross-functional. To achieve a strong performance, the requirements of all functional areas must be met.

Although it is possible to implement many portions of the order fulfillment process without going outside the four walls of the firm, the real opportunities come when a firm reaches out to other members of the supply chain. Integrating key customers and suppliers can help streamline and improve the order fulfillment process. Whether it is through idea sharing or information sharing, the role of the other supply chain members takes the order fulfillment activities from a single-firm process to a supply chain management process.

2.6 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 four dimensions of competitive advantage most applicable to this study are:

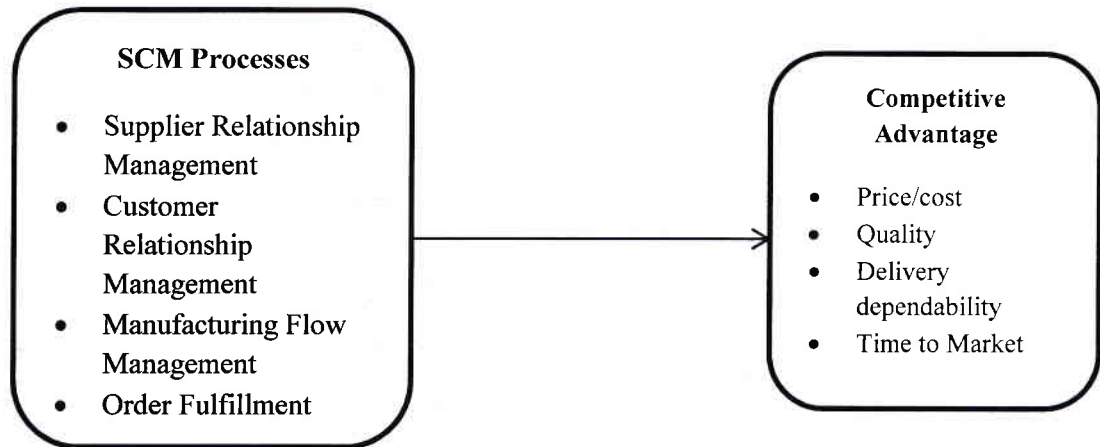
1. Price/Cost - "The ability of an organization to compete against major competitors based on low price" (Li et al., 2006).
2. Quality- "The ability of an organization to offer product quality and performance that creates higher value for customers" (Koufteros, 1995).
3. Delivery Dependability- "The ability of an organization to provide on time, the type and volume of product required by customer(s)" (Li et al., 2006).
4. Time to Market- "The ability of an organization to introduce new products faster than major competitors" (Li et al., 2006).

2.7 Summary

This chapter briefly introduced and provided a synopsis of the literature specific to SCM and SRM, CRM, MFM, OF and competitive advantage as it relates to the field of SCM. Based on the literature reviewed, this thesis sought to compose

and evaluate four hypotheses. Figure 2.2 presents the conceptual framework that was developed and analyzed for this study.

Figure 2.2 Conceptual Framework of the Study



Source: Own Compilation based on Lambert (2008)

According to above conceptual diagram or this study seeks to fill the gap by investigating the effect of four supply chain management processes on competitive advantage and their relationship. The four supply chain management processes are supplier relationship management, customer relationship management, manufacturing flow management and order fulfillment. The four dimensions of competitive advantage are price/cost, quality, delivery dependability and time to market.

This research will attempt to address the following hypotheses:

H1: Supplier Relationship Management practices will be positively related to competitive advantage within an organization.

H2: Customer Relationship Management practices will be positively related to competitive advantage within an organization.

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

H4: Order Fulfillment practices will be positively related to competitive advantage within an organization.

Chapter 3

Supply Chain Management Practices in Paper Mills

3.1 Historical origin of pulp and paper

The pulp and paper industry can be divided into four main segments: pulp, recovered paper, graphic paper, and packaging. The pulp is produced from wood, and it is the cellulose fibers recovered from the tree. The pulp is the primary ingredient in most types of paper. Recovered paper is the waste or scraps leftover in the papermaking process, whether the scraps are paper or paperboard. Recovered paper can be recycled to create other types of paper. The graphic paper is the paper most people think of; it is used for writing and printing. Packaging is the paper used to create packages for products. In addition to these four segments, paper products also include paper plates, napkins, paper towels, bath and toilet tissue, and similar products. Despite humankind's concerns about the environment—paper mills have a history of being leading polluters and deforesting the environment—and the increased usage of computers and the Internet, paper products are still everywhere in our world.

Before pulp-derived paper was manufactured, the ancient Egyptians wrote on a paper-like material made by cutting papyrus reeds into strips, arranging them in perpendicular crisscross patterns, and pounding them into sheets. The pressure released a glue-like sap that bound the strips together. In 105 A.D., Ts'ai Lun of China invented pulp-derived paper using fiber from mulberry trees. This proved to be much cheaper and easier to produce than the silk and wood that had been used for a vast number of official documents during the Han dynasty. In spite of his discovery, however, wood was not used in the making of paper for the next 2,000 years. Instead, materials such as old fishing nets, rags, and hemp rope were used.

During the golden age of Islamic culture in the eighth century, the Arabs took a great interest in the paper, establishing a mill in 795. The use of paper traveled slowly to the Western world. During the years when the Chinese and the Arabs were developing paper and books, most Europeans were illiterate, with the exception of the clergy. Therefore, most of the books produced were religious works, created by monks. They painstakingly produced beautifully handwritten and illustrated bibles on vellum, which is skin from an unborn calf. This process of book production dominated Europe throughout the Middle Ages, so, while the European traders and

crusaders had been exposed to paper much earlier, the first mills did not appear until the 14th century.

It was not until the invention of the printing press by Johannes Gutenberg in the mid-1400s that paper became an essential product for Europeans. Paper manufacturers at that time used a combination of rags and wood to make the pulp needed to produce durable paper. Paper was made one sheet at a time, by dipping a screen into a basin of pulp. The screen was then lifted, and as the water dripped through, the remaining pulp settled evenly on the screen. After sufficient drainage, the settled pulp was lifted from the screen, pressed, and dried. Thus, the size of the sheet was limited to the size of the screen.

There were very few improvements or changes in papermaking until the early 1800s when Nicolas-Louis Robert invented a moving screen belt that enabled paper manufacturers to produce paper in one continuous sheet. In England, the Fourdrinier brothers improved the technique only a decade later, and the process they developed still bears their name. In addition, in the mid to late 1800s, producers began using wood fiber, such as groundwood and sulfite pulp, to make paper.

While the technology for paper production has improved over the years, the basic process has not changed. The pulp is created by either grinding the wood (today steel refining disks are used rather than the original stone grinding wheels) or, for the higher grades, cooking the chips under pressure with various chemicals to free the cellulose fibers. The pulp is filtered through screens and cleaned, then sluiced onto an endless wire screen in a one-half percent concentration, where the paper is formed. The paper is then pressed, dried on a series of steam-heated drums, and wound on huge rolls. The entire process is controlled by a sophisticated computerized control system, usually known as a distributed control system.

The pulp and paper industry today manufactures a wide variety of paper products. The commercial printing industry uses tons of paper daily for books, newspapers, magazines, advertising promotion pieces, manuals, and catalogs. Businesses also use large volumes of paper for their computers, copying machines, and fax machines, along with more traditional uses in record keeping, communication, and billing.

Paper and paperboard for packaging and shipping containers constitute the largest tonnage sector of the paper industry. Shipping containers also called fiber

boxes, require millions of tons of paper and paperboard annually. Paperboard cartons of all types are also used to package almost all of the prepared foods, soap products, cosmetics, and similar products used in daily life.

Paper and paperboard are used to package items as light as needles, as heavy as refrigerators, as fragile as eggs, and as massive as motors. Infinitely thin or indestructibly strong, water repellent or water resistant, tissue-soft or cardboard-tough, disposable or permanent, paper and paperboard have an essential daily role in the shipping, wrapping, marketing, selling, and delivery of products that make up every phase of the daily economy of the United States.

Since the beginning of the 21st century, the paper industry has shrunk in size, primarily due to an increase in the use of the Internet for publishing and direct marketing. Concerns about the environment have also led to an increased use of recycling and decreased paper use. The industry has responded by reforestation processes and addressing pollution issues.

The pulp and paper industry can be divided into four main segments: pulp, recovered paper, graphic paper, and packaging. The process of paper production depends on many factors, such as the materials used, the grade of pulp refinement, the type of machine used to make the paper, and the finishing treatment applied after the paper is formed.

3.2 Historical Background of Pulp and Paper Industry in Myanmar

The major types of fibrous raw material resources available for the pulp and paper industry are bamboos, tropical hardwoods, and agriculture residues. Bamboos in Rakhine and Tanintharyi present huge potentials for the pulp and paper industries. Kayin-was (*Mellocanna bambusoides*) in Rakhine has an estimated growing stock of 21 million metric tons capable of producing around 830,000 tons of pulp annually while pure bamboo stands in Tanintharyi having a growing stock of 6 million tons could provide an annual pulp yield of 244,000 tons, if the bamboo forests are worked in a 10-year cutting cycle. Tropical hardwoods are another major resource for the pulp and paper industry. Typically, the tropical hardwood forests in Myanmar are made up of a large variety of species growing in the mixture. Out of (300) species recorded only (30) species are extracted for timber production and the remaining species are available for the promotion of pulp and paper industry. Apart from bamboo and

hardwood resources, there are some agriculture residues which are in hand as available raw materials for the establishment of small-scale pulp and paper mills and cottage industries.

The Myanmar Paper and Chemical Industries (MPCI) is the main organization responsible for producing pulp and paper in the country. There are 5 pulp and paper mills, namely: the No.1 pulp and paper mill (Sittoung) with a capacity of 60 ton/day producing mixed pulp from bamboo and hardwood, No.2 mill (Yeni) producing 10 ton/day of paper with pulp from the No.1 mill and 30 ton/day of bamboo kraft sack paper, No.3 mill (Ma-U-bin) with a designed capacity of 6 ton/day of jute board from jute stick, the Wrapping Paper Mill (Kanbe) producing 3 ton/day of wrapping paper from waste paper, and the pulp and paper Pilot Plant (Hmawbi) producing toilet paper. In the private sector, there are more than 300 small cottage paper factories using recycled waste paper with capacity ranging from $\frac{1}{4}$ to $\frac{1}{2}$ ton/day.

The pulp and paper Industry in Myanmar is still in its infancy and has maintained a modest rate of development. Despite the huge potential of resources, the present production of pulp, paper, and paperboard has not reached the demand of the country and considerable tonnage of different grades of paper and paperboard still have to be imported resulting in considerable drainage of FE, for example, US\$ 7.9 million in 1994-95. The projection of the paper requirement of major grades is shown in the appendix(III). MPCI, however, has gained considerable experience in producing pulp and paper from bamboo and tropical hardwoods supported by research and development works of the Pulp and Paper Research Department at the Myanmar Scientific and Technological Research Department (MSTRD). A memorandum of understanding between the Government of Myanmar and Grasim Industries Limited of India for the establishment of a Rayon grade pulp plant was entered into in 1994 and the feasibility of establishing such a plant is now under study in the Rakhine State.

In Myanmar, paper consumption, including recycled paper, is over 100,000 tons a year and the use of recycled paper constitutes 70 percent of total consumption. The prices of recycled paper of various qualities fell by 10 percent because the circulation of some magazines, journals and books decreased, and the printing and binding of school exercise books and textbooks had almost finished. The paper market mainly relies on the production of school exercise books, however, a bonus

was the appearance of many weekly journals focusing on international news. But with the closure of many of these opportunistic publications and the sluggish market for exercise books, over 100 paper shops in Yangon are faced with a cool business environment. Of the thousand or so paper mills in Myanmar, many have scaled back or temporarily stopped production because the sale of paper at the shops is almost non-existent.

All recycled paper mills in Yangon rely on used exercise books and old newspapers from around the country. Paper trimmings from binding and printing houses are also used as raw materials for making recycled paper, but these sources cannot fill the needs of over 1000 paper mills in Yangon.

Myanmar produced 17,839 tons of all sorts of paper in the first ten months of 2001, 24.96 percent more than the same period of 2000, the latest data of the country's Central Statistical Organization show. During the period, Myanmar imported 59.79 million U.S. dollars' worth of paper goods, an increase of 40.48 percent compared with the corresponding period of 2000, to meet its domestic demand. In 2000, the country produced 16,894 tons of paper and imported 48.1 million dollars' worth of paper manufactures.

There are three state-run paper plants in Myanmar under the Ministry of Industry No.1 respectively located in the country's Mon state, Bago and Yangon divisions. They are producing stationery and print paper, exercise books, brown paper, packing paper, and tissue paper. A new newsprint paper factory in Mandalay division, set up in April 2001 with the assistance of the Tianjin Machinery Import and Export Corporation of China, will produce 7,500 tons of paper annually.

Besides, Myanmar is also building a 200-ton-daily-capacity bleached bamboo pulp factory in Ayeyawaddy division's Thabaung township, buying machinery from China. When completed, the plant will produce 60,000 tons of the pulp yearly. Meanwhile, Myanmar plans to add more paper and pulp mills of 50 to 500 tons daily capacity in different states and divisions during the five-year-plan period from 2001-02 to 2005-06. Myanmar's per capita consumption of paper is 2.6 kilograms and its total domestic paper demand in the present fiscal year of 2001-02 ending March is 117,600 tons.

3.3 Profiles of Four Major Paper Mills in Shwe Pyi Thar Industrial Zone

In the pulp and paper industry in Shwe Pyi Thar Industrial Zone, there are four major paper mills- Min Lwin, Aung, Myint Moh, and Daw Wai Wai paper mills. The profiles of these paper mills are summarized as followed.

3.3.1 Min Lwin Paper Mill

Min Lwin Paper mill was established in 1997 and is a producer of writing, printing, newsprint paper, and tissue paper rolls. The mill has a daily production capacity of 30 tons. The mill is located at No.42/17, 18 Kanaung 2nd street, Shwe Pyi Thar Industrial Zone (1). There is a total employee of 109.

All high-quality paper grades are produced from the highest virgin pulp grade sourced. Since its inception, the mill has built a reputation for producing high-class paper from the highest-grade virgin pulp. The mill also houses one of the most advanced de-inking plants that is engaged in converting waste paper into commercial/industrial high-quality tissue paper.

Min Lwin Paper uses paper making process which is completely through the recycled process using waste paper as the primary raw material through world class technology. Hence the company is committed towards the global vision of saving trees and creates a greener earth and better future for coming generations.

Reduce dependency of Myanmar consumers on Imports by giving a value product in timely deliveries at better costs. The mill's products are actively marketed in Yangon and its surrounding region. Min Lwin paper mill products have made a significant mark in the local market.

3.3.2 Aung Paper Mill

Aung Paper Mill manufactures and supplies writing and printing papers, and newsprint papers. It is one of the paper mills in the country using recyclable paper waste. It produces writing and printing paper from 100 percent de-inked pulp. The manufactured paper products are distributed all over the country through a network of dealers.

The company was incorporated in 1996. It is located at No.42/247 Kanaung 4th street, Shwe Pyi Thar Industrial Zone (1). Labor employment of Aung Paper Mill is about 90 people. The company has expanded its capacity to 20 tons per day. Aung

Paper Mill annually produces writing printing paper, and newsprint utilizing recycled fiber. Its paper products are used for the production of notebooks, textbooks, novels, examination material, envelopes, computer stationery, journals, etc. The newsprint papers are used for printing newspapers, flyers, and other printed material for mass distribution.

3.3.3 Myint Moh Paper Mill

Myint Moh paper mill is in the business of production and marketing of wood free writing and printing paper, thereby giving a right replacement of wood-based paper while conserving precious resources & protecting the environment.

The mill was established in 1996 and is located at No. 42/195 Kanaung 6th street, Shwe Pyi Thar industrial zone (1), with an aim to utilize recycle paper to make a writing and printing paper. The mill employs 60 people. The products are extensively used in the printing of books, trade directories, newsprint, diaries, calendar, and computer stationery. The products are also used extensively in the manufacturing of notebooks & other stationery items meant for domestic sales.

The company is considered one of the best producers of premium quality papers in the country. For a long time, their products have offered credibility to the organization name. They ride with the aim of catering to the finest quality products to their clients. Moreover, they have also adopted a constant approach towards delivering quality products to the clients.

Myint Moh paper mill is supported by highly advanced machinery and a team of well experienced and competent team members. They have been toiling hard to provide the company with a highly prominent name in the market; thereby further building a reputation for the organization. Their quality goal is to offer a perfect range of paper products to the clients. The paper products are made using high-quality raw material and tested to ensure that these are in compliance with the standards.

3.3.4 Daw Wai Wai Paper Mill

Daw Wai Wai paper mill was established in 2007, the family-owned Daw Wai Wai Pulp and Paper is one of the paper manufacturers in Myanmar. Nearly 170 employees are guided by Market Based Management principles, which are based on integrity and compliance. These principles challenge them to achieve world-class

excellence by constantly finding new and better ways to manufacture products and support the needs of their customers.

The paper mill is located at no.119/122, the corner of Than Chat Win U Nyunt street and Banmaw Atwin Win street, Shwe Pyi Thar Industrial zone (2). Daw Wai Wai Paper Mill has 162 total employees. The company's paperboards are used to make various items, including folding cartons for cosmetics and pharmaceutical packaging requirements; and advertising displays, electrical insulators, and coasters. The company has its own power generation plant. The manufacturing process is based on the recycling of scrap paper

The company is managed by a competent team of professionals in all the relevant fields like Process, Pulp Technology, Engineering, Finance, Business Management, and Human Resource. The Company assigns great importance to its Human Capital Development and has been managing the Training of its professionals by sending them to Training Programs / Exhibitions / Courses.

When accuracy is the trademark of their product, quality is central to their culture. For them, quality extends beyond accuracy and into every facet of our business. Quality is being focused on their clients' needs and undertaking a constant critical appraisal of their processes. Their efforts are to have the best quality for their products and services to always, without fail, meet their clients' specified needs and expectations for accuracy, value, timely delivery, and communications.

Daw Wai Wai paper mill is committed to operating in an ecologically sustainable manner, delivering environmental best practice, and providing continual improvement of their environmental performance by setting objectives, measuring progress and communicating results.

They aim to deliver environmental best practices in their work and operate in an ecologically sustainable manner. Their environmental performance, like all of our processes, undergoes continuous improvement. They have regularly updated objectives; they measure their progress against those objectives and communicate the results.

Any of their activities that have an environmental impact and are within their control are managed to conserve resources, reduce waste and eliminate or minimize adverse environmental effects and risks. They comply with applicable National and State environmental legislation and regulations, other statutory obligations, and

relevant codes of practice. They identify, promote, and strive to achieve, best practice in environmental management. They also provide an environmentally sound workplace and work to increase our range of environmentally sound work practices.

3.4 Supply Chain Management processes of four major Paper Mills

Manufacturing paper is a capital-intensive business, and the scales of operations are large. Paper machines generally run 24 hours a day, 365 days a year, shutting down only for routine maintenance. The supply chain of the pulp and paper industry can be segmented into the following four sub-chains: 1) raw material procurement which includes all the activities that are required to deliver waste paper to a pulp and paper mill; 2) pulp and paper manufacturing; 3) customer order fulfillment which spans order taking, production, and delivering of products to customers.

In order to understand the paper industry supply chain, it is necessary to understand how pulp and paper are manufactured. Fundamentally a paper machine converts cellulose fibers into the paper. Equipment in the paper mill takes different pulp streams with different properties and blends them in varying proportions to produce a mix of pulp, known as furnish. This furnish is supplied to the paper machine, which sprays it onto a wide mesh (or in between two wide meshes) to form a sheet of paper. From here on the paper machine removes water from the paper sheet. Water is drained out of the paper in the former section, squeezed out in the press section, and then evaporated in the dryer section. The paper is then smoothed by passing it through high-pressure rollers in the calendar stack. It is then taken off the paper machine in large jumbo reels and wound onto solid cores to the width and diameter required by the customer.

In some sectors of the industry, like Tissue, all these steps can be found at one single location and the products are then directly packaged for distribution to the consumers through merchants and/or retailers. In other sectors, the products are delivered to printers or additional converting plants before entering the sales network.

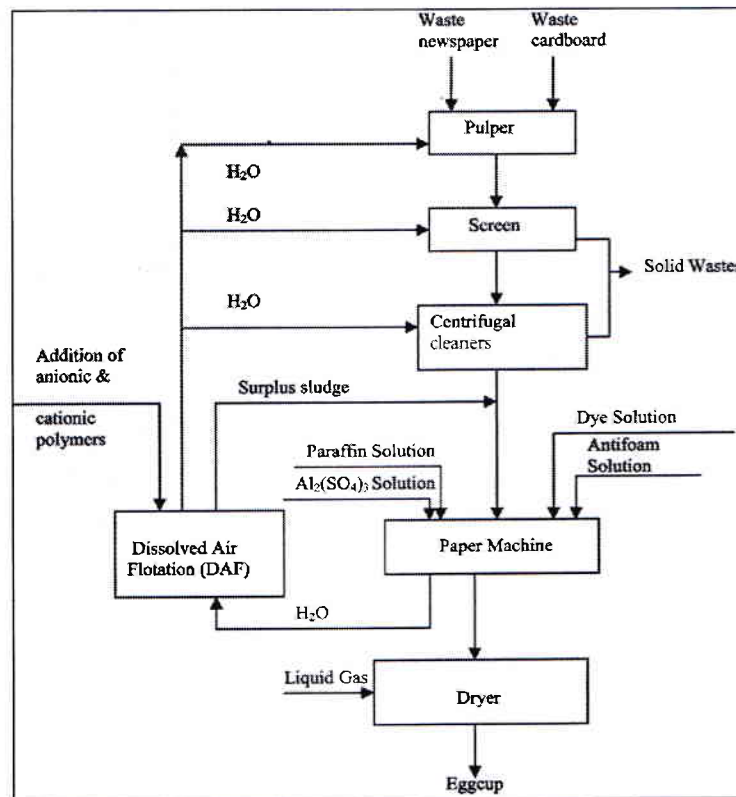
All these four mills have many similarities, and all produce similar paper products. However, each mill uses different pulping processes. A result is a number of raw material supply option. Waste paper collections for these four mills are required such as old magazines and newspapers, old paperboards etc.

Finished paper is transported by truck, rail, or ship, or some combination of these. The mode of transport is dependent on the location of the mill and customer. Each mill can theoretically supply paper to any customer, but obviously, mills located closer to customers than others will have lower freight costs. Considerable freight savings are attained if the same truck which brings waste paper to mills is used to transport finished paper back to customers from the same city.

Not only do the four mills have different raw materials and pulp production costs, but each of the paper machines has different manufacturing costs for different grades. There are variations in capacity between the paper machines, which result from variations in machine width and speed. Also, some machines are more efficient at manufacturing certain grades of paper than other machines, due to a number of design differences.

A further complication is an effect of manufacturing a variety of paper grades on one paper machine. Every time the machine changes the grade, there are losses of finished product and increases in manufacturing cost. These effects on machine capacity and manufacturing costs vary by machine and also vary with the additional grades required.

Figure (3.1) Paper Supply Chain



Source: A. Zabaniotou (2003)

3.4.1 Supplier Relationship Management

Four major mills choose the suppliers according to their quality. These four mills don't go with a traditional supplier relationship management that uses short-term contracts based primarily on price. Firms switch between traditional suppliers more frequently in search of the best price and may have an arm's length, adversarial relationship with them. Preferred suppliers meet the firm's expectations for quality, delivery or price and are able to respond to unexpected changes. They initiate discussions with the firm on ways to improve products and processes.

They deal with certified suppliers who integrate their quality control system with the purchasing firm, helping to reduce total costs by eliminating duplication in inspection and quality control activities. Prequalified suppliers are those the firm has placed on a list of approved suppliers. Suppliers earn this status after a rigorous and in-depth analysis of their capabilities, costs and a number of other factors. Therefore, these four mills choose the suppliers to rely on mutual trust and support, sharing of information and teaming for continuous improvement. Both partnerships and strategic alliances are marked by long-term arrangements, large volume commitments, and joint product development and planning efforts.

3.4.2 Customer Relationship Management

CRM can help them overcome a problem that is endemic to the industry: lack of customer orientation. CRM is a holistic approach to achieving a sustainable competitive advantage through superior understanding of customers and more effective relationships with them. That understanding and those relationships are precisely what the paper industry needs.

The four mills provide the customer with on-time delivery, product availability, product quality, and effective customer service—higher than price. The company had offered application support to all its customers that they had gladly accepted this assistance, very few had been willing to pay for it.

They are able to help their customers realize savings by offering new logistics services and combining previously separate deliveries. They have an understanding of service offerings include problem-solving, system solutions, after-sales service, inventory carrying, performance guarantees, and uptime responsibility, financing, and training.

3.4.3 Manufacturing Flow Management

The mills review and implement changes in regulations, customer demands, and other rules and procedures. Communicate changes within the organization. The final products are tested according to the Industry Guideline or other relevant regulatory measures. The mill has a documented procedure which defines which tests to carry out and the testing protocols to be used.

Their quality assurance system contains guidelines for the determination of testing frequency for requirements contained in the regulatory measures. There must be a system in place to monitor and record the implementation and achievement of GMP. The system must also identify measures to correct any failure and to monitor the effectiveness of those measures. The system should cover also cases of non-conformity with regulatory, internal and customer specifications.

All raw materials and additives used in the production had been assessed to ensure accordance with current regulatory requirements. By keeping records of all raw material deliveries so that conformity with regulatory requirements can be checked. Recipes of the end product, showing raw materials and additives used along the process, are being compiled and retained. Without this check, the operation will be unable to allocate responsibility to a supplier in the case of defective raw material.

3.4.4 Order Fulfillment

Step from the paper mill profitability point of view is to minimize underproduction as well as overproduction. To achieve the best result and to avoid misunderstandings at the production and the production planning, all users should be monitoring the same balance data with the same definitions and basis.

The four mills determine their efficiency of the process by Profitability and productivity, Service quality, Capacity or quantity of output, Manufacturing time, The number of rejects, and The quantity of waste. These mills have the ability that one order can be delivered in multiple delivery lots depending on the customers' wishes, the sales contract, the order type, and the delivery dates. That one order can contain several order item lines and order item lines can contain several schedule lines.

They normally have the production planner to schedule the patterns for one run as follows:

1. The urgent orders will be fulfilled first, and

2. The other orders are added in to provide the optimal pattern widths for the production.

They develop the production planner to plan a certain amount of paper for each order. The planned quantity for one order depends on the ordered quantity, order basis, order tolerance and order roll width compatibility with the other roll widths in the same run. In addition to the production quantities, the order basis and the tolerances the production operators have the master of following list factors concerning the order fulfillment:

- the paper grade,
- the roll width, diameter, and core,
- the possible compound of rolls in the same wrapping,
- the mill ready, and
- the customer specified requirements (paper machine wire side, maximum roll weight, splice count per roll and winder edge roll denial).

Their order fulfillment priority sequence is normally based on mill ready date. However, the production planner can also modify trim group priorities as desired. They prevent production planning from the most influential matters concerning order fulfillment such as inaccurate target quantities for the scheduled run, the communication between the paper mill production and the paper mill production planning, and defective training and ignorance of the production line characteristics.

Chapter (4)

Research Methodology

This section of research describes instrumentation, formulating the models and method used for sampling. The purpose of this thesis was to determine if the strategic development of key business processes (supplier relationship management (SRM), customer relationship management (CRM), manufacturing flow management (MFM), and order fulfillment (OF)), were positively related to competitive advantage. This chapter summarizes the findings of an analysis conducted on data collected. The four hypotheses were evaluated using inferential analysis.

4.1 Research Design

This research design used was a cross sectional survey of the four paper mills operating in Shwe Pyi Thar Industrial Zone. The study adopted a descriptive approach in trying to focus on four major paper manufactures. The population of the study in this research consisted of 418 employees who are working in paper mills in Shwe Pyi Thar Industrial Zone. This area was chosen because it is giving a big population where a proportionate sample was to be derived. According to Mugenda and Mugenda (2003) observed that where a study is dealing with a heterogeneous population, a minimum target of 10% is required. The study therefore involved 50 respondents.

Data was collected through questionnaires in the month of July 2018, 50 questionnaires were distributed among the people of the four organizations which are expected to have the best knowledge about the supply chain operations and competitive advantage, all of them responded positively. The respondents were given a statement either agree or disagree by using a five point Likert scale.

Respondents were also asked to refer to their key supplier for the relevant questions. First part is comprised of the supplier relationship management; describing the relationship with the supplier of the company, and how they affect the competitive advantage, using 5 points Likert scale enabling the respondents to answer the questions. The second part consists of the gathering of many performance measurements; customer relationship; consisted on how the customer is satisfied and up to what extent their complaints are being handled in order to keep the customer

loyal to the organization, about meeting the expectations of the customers, as if they are satisfied they how it would affect financially for managing such an operations in the organization. And the third part is manufacturing flow management and the fourth part is the order fulfillment management, and finally competitive advantage (price/cost, delivery dependability, and time to market).

Before processing the responses, the completed questionnaires were edited for completeness and consistency. Objective one was analyzed using descriptive statistics where mean and standard deviation were used. Inferential statistics was used to analyze objective two. Specifically a dimension level analysis will be performed using regression analysis which was instrumental in indicating whether the independent variables-SCM practices significantly predict the dependent variable competitive advantage.

4.1.1 Demographic Profiles of the Respondents

The first part of the questionnaire contained general information regarding two sections: individual profile and company profile. The individual profile section included three items. The items were: (1) male or female; (2) educational background and (3) how many years have you been in your current organization. The company profile section included three items. The items included: (1) company name; (2) Address and (3) number of employees.

This study finds out that majority (32%) of the respondents are from Daw Wai Wai Paper Mill, (30%) of respondents from Min Lwin Paper Mill, and (20%) of respondents from Aung Paper Mill. The least (18%) of the respondent is from Myint Moh Paper Mill.

The gender of respondents is classified into two groups; male and female. In this study out of the 50 respondents, 80% (40) were male and 20% (10) were female as shown in the table (4.1). This indicates that generally there were more male respondents for the study than females indicating the wide disparity between male and females working in paper mills in Shwe Pyi Thar Industrial zone.

The educational level of respondents can be divided into three groups; Master degree, Bachelor degree, and High school. The majority (60%) of respondents had a high school level while those with bachelor level accounted for (40%). There is no respondent who had a master level.

The service years of each employee can be divided into three groups; less than

2 years, between 2-5 years and over 5 years. The most (54%) of respondents have the service years of experience between 2-5 years. Those service years of experience over 5 years are (24%). And the least (22%) of the respondents have service years of experience under 2 years.

Table 4.1 Demographic Profiles of Respondents

Gender	No. of Respondent	Percentage
Male	40	80%
Female	10	20%
Educational Background	No. of Respondent	Percentage
High School	30	60%
Bachelor Degree	20	40%
Master Degree	-	-
Working Experience	No. of Respondent	Percentage
Under 2 years	11	22%
2 – 5 years	27	54%
Over 5 years	12	24%

4.2 Analyzing the Supply Chain Management Practices and Competitive Advantage

The survey was designed to measure five dimensions as well as individual and organizational characteristics. The five dimensions included SRM, CRM, MFM, OF, and competitive advantage.

Table 4.2 The rule of thumb for Cronbach's alpha coefficient value

Alpha Coefficient Range	Strength of Association
Less than 0.60	Poor
0.60 to less than 0.70	Moderate
0.70 to less than 0.80	Good
0.80 to less than 0.90	Very Good
0.90 and above	Excellent

Source: Hair, J. F., Babin, B. Jr., Money, A. H., &Samouel, P. (2003). Essential of business research methods. United States of America: John Wiley& Sons.

Table 4.3 Summary of Reliability Statistics

Variables	Number of Items	Cronbach's Alpha
Supplier Relationship	6	.695
Customer Relationship	5	.676
Manufacturing Flow	5	.644
Order Fulfillment	4	.982
Competitive Advantage	10	.700

Source: SPSS Output

The research instrument was tested for reliability using the Cronbach's coefficient as reported in Table 4.3. The Cronbach's alpha for all dimensions are exceeding the minimum alpha value of 0.60 (Hair et al., 1998), thus the construct measures are deemed reliable and all items in the construct measures are retained.

Supplier Relationship Management (SRM)

The SRM measure was used to determine the extent to which an organization developed a business process that provides the structure for how relationships with suppliers of that organization will be developed and managed. This measure was adopted from Lambert's (2008) assessment tool for the SRM process. This measure was assessed using 6 items. These 6 items were answered on a 5-point Likert-type response scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) to assess the extent to which an organization strategically developed their SRM process. The reported Cronbach's alpha for this measure was .695. Supplier relationship management has the moderate strength of association.

This study established that overall; the respondents were agreed on the supplier relationship management process as evidenced by mean value 3.85. According to the table (4.4), paper mills in Shwe Pyi Thar industrial zone have a well-developed supplier relationship management process.

Table 4.4 Supplier Relationship Management

No.	Item	Mean	Standard Deviation
1	Quality is the best one criterion in selecting the suppliers	4.74	.565
2	Problems are solved by a joint effort with the suppliers	3.92	.900
3	Information is provided to the suppliers for improving their products quality	3.96	.755
4	Having the continuous focus on the improvement programs which is done in with the help of our main suppliers	3.66	.688
5	Key suppliers are involved in the planning processes and in goal-setting activities of the organization	3.68	.741
6	Main suppliers are regularly involved in the process of developing new product	3.16	1.076
Overall Mean		3.85	

Source: Survey Results 2018, SPSS Output

Customer Relationship Management (CRM)

The CRM measure was used to determine the extent to which an organization developed a business process that provides the structure for how relationships with customers of that organization will be developed and managed. This measure was adopted from Lambert's (2008) assessment tool for the CRM process. The reported Cronbach's alpha for this measure was .676. Customer relationship management has the moderate strength of association.

Table (4.5) reveals that that customer relationship management practice such as interaction with customers, measuring and evaluating customer satisfaction, determining the future customers' expectations, facilitating the customers to get assistance, evaluating the relationship with the customers is used to achieve a competitive advantage as evidenced by mean value 4.38. Therefore, paper mills in

Shwe Pyi Thar industrial zone are practically developed the customer relationship management process.

Table 4.5 Customer Relationship Management

No.	Item	Mean	Standard Deviation
1	Having frequent interaction with customers to achieve reliability, the responsiveness, and improving some basic standards for the organization	4.62	.567
2	Measuring and evaluating the customer satisfaction on the products	4.48	.646
3	Regularly determine the future customer expectations about the products	4.28	.809
4	Facilitate the customers to get assistance about products from the organization	4.20	.670
5	Periodically evaluate the importance of the relationship with customers	4.30	.789
Overall Mean		4.38	

Source: Survey Results 2018, SPSS Output

Manufacturing Flow Management (MFM)

The MFM measure was used to determine the extent to which an organization developed a business process that includes the activities necessary to define customer requirements, design the logistics network, and fill customer orders. This measure was adopted from Lambert's (2008) assessment tool for the MFM process. The reported Cronbach's alpha for this measure was .644. Manufacturing flow management has the moderate strength of association.

Table (4.6) reveals that manufacturing flow management practice such as manufacturing flexibility, planning for capacity growth, a modular assembly designed, is used to achieve a competitive advantage as evidenced by the mean value 4.20. Therefore, paper mills in Shwe Pyi Thar industrial zone have well-developed

manufacturing flow management process.

Table 4.6 Manufacturing Flow Management

No.	Item	Mean	Standard Deviation
1	Having a formal process for evaluating the expertise that will be needed to use future technologies or fulfill future market needs	4.60	.571
2	Different degrees of manufacturing flexibility are offered to different customers	4.34	.772
3	Planning for capacity growth for the future	4.20	.728
4	Products are designed for modular assembly	4.84	.422
5	Delay the final product assembly activities until customer orders have actually received	3.04	1.106
Overall Mean		4.20	

Source: Survey Results 2018, SPSS Output

Order Fulfillment (OF)

The OF measure was used to determine the extent to which an organization developed a business process that includes the activities necessary to define customer requirements, design the logistics network, and fill customer orders. This measure was adopted from Lambert's (2008) assessment tool for the OF process. The reported Cronbach's alpha for this measure was .982. Order fulfillment management has the excellent strength of association.

This study established that the overall; the respondent was agreed on the order fulfillment practice such as understanding the order fulfillment, improving the logistics network, order fulfillment goals, as evidenced by the mean value of 4.22. Therefore, paper mills in Shwe Pyi Thar industrial zone are practically implemented the order fulfillment process.

Table 4.7 Order Fulfillment

No.	Item	Mean	Standard Deviation
1	Working with customers to understand their order fulfillment	4.28	.970
2	Regularly improve the structure of logistics network	4.46	.646
3	Having performance goals that are related to order fulfillment	4.10	.505
4	Understand the importance of the order fulfillment process	4.04	1.029
Overall Mean		4.22	

Source: Survey Results 2018, SPSS Output

Competitive Advantage

This measure was used to determine “the extent to which an organization is able to create a defensible position over its competitors” (Li et al., 2006: 111). The competitive advantage measure was adopted from Li et al. (2006). This measure was assessed using 10 items. The 10 items assess five sub-scales of competitive advantage. The five sub-scales were combined to create an overall measure of competitive advantage. These 10 items were answered on a 5-point Likert-type response scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) to assess the extent to which an organization was able to create a defensible position over its competitors. The reported Cronbach’s alpha for this measure was .700. Competitive advantage has the good strength of association.

Table 4.8 Competitive Advantage

No.	Item	Mean	Standard Deviation
1	Offering competitive prices	3.78	1.298
2	Offering prices as low or lower than competitors	3.06	1.132
3	Competition based on quality	4.70	.505
4	Offering products that are highly reliable	4.74	.443
5	Offering products that are very durable	4.78	.545
6	Offering high-quality products to our customer	4.60	.606
7	Delivering the customer orders on time	4.32	.891
8	Providing dependable delivery	4.64	.631
9	First in the market in introducing new products	2.50	1.129
10	Having fast product development	3.54	.706
Overall Mean		4.07	

Source: Survey Results 2018, SPSS Output

4.3 Analyzing the relationship between Supply Chain Management Processes and Competitive advantage

The goal of this research project was to determine if four dimensions of SC practices (supplier relationship management (SRM), customer relationship management, manufacturing flow management (MFM), and order fulfillment management (OFM)) are positively related to competitive advantage. The four hypothesis presented earlier in this research project are evaluated using inferential analysis. The inferential analysis is used to test the hypotheses developed for the research by investigating the relationships between the four independent variables (supplier relationship management, customer relationship management, manufacturing flow management, order fulfillment management) and competitive advantage. The inferential analyses included are the Pearson Correlation and Multiple Linear Regression

4.3.1 Pearson Correlation

In order to measure relationships between each of the four SC practices to competitive advantage and organizational performance, a Pearson correlation coefficient was calculated. Pearson correlation is a statistical test that assesses the strength of the relationship between two numerical data variables. Therefore, the relationship between independent variables and the dependent variable is measured via Pearson Correlation. The hypotheses only can be accepted if the significant p-value is less than 0.05. The larger the value of correlation coefficient, the stronger the relationship.

Table 4.9 Summary of Pearson Correlation Analysis

Variables		Competitive Advantage (DV)
Supplier Relationship	Pearson Correlation	.397**
	Sig. (2-tailed)	.004
Customer Relationship	Pearson Correlation	.676**
	Sig. (2-tailed)	.000
Manufacturing Flow	Pearson Correlation	.703**
	Sig. (2-tailed)	.000
Order Fulfillment	Pearson Correlation	.531**
	Sig. (2-tailed)	.000

Source: Survey Results, 2018 (SPSS Output)

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

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

According to Table 4.9, all the independent variables have a positive association with the dependent variable. Manufacturing flow management has the strongest relationship with a competitive advantage ($r=0.7$), followed by the customer relationship management ($r=0.7$) and order fulfillment ($r=0.5$). On the other hand, supplier relationship has the weakest correlation with a competitive advantage ($r=0.3$). All hypotheses of this study are accepted as the p-values are less than 0.01.

4.3.1(a) 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 6 items and utilized a 5-point Likert type response scale and the CA measure was comprised of 10 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006). The resulting Pearson correlation coefficient for the generated dataset ($n = 50$) was .4 ($p < .05$), which supported hypothesis 1. This result revealed that supplier relationship management practice such as improving the supplier performance has a major impact on the competitive advantage.

4.3.1(b) Hypothesis Two

The second hypothesis is: customer relationship management practices will be positively related to competitive advantage within an organization. The CRM measure was comprised of 5 items and utilized a 5-point Likert type response scale and the CA measure was comprised of 10 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006). The resulting Pearson correlation coefficient for the generated dataset ($n = 50$) was .7 ($p < .01$) which supported hypothesis 2. According to the result, customer relationship management practice such as interaction with customers, measuring and evaluating customer satisfaction, determining the future customers' expectations, facilitating the customers to get assistance, evaluating the relationship with the customers has positive relationship and significant contribution to the competitive advantage.

4.3.1(c) 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 5 items and utilized a 5-point Likert type response scale and the CA measure was comprised of 10 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006). The resulting Pearson correlation coefficient for the generated dataset ($n = 50$) was .7 ($p < .01$), which supported hypothesis 3. Therefore, manufacturing flow management practice such as manufacturing flexibility, planning for capacity growth, a modular assembly designed, positively and significantly contribute to the competitive advantage.

4.3.1(d) Hypothesis Four

The fourth hypothesis is: order fulfillment management practices will be positively related to competitive advantage within an organization. The OF measure was comprised of 4 items and utilized a 5-point Likert type response scale and the CA measure was comprised of 10 items and utilized a 5-point Likert type response scale adopted from Li et al. (2006). The resulting Pearson correlation coefficient for the generated dataset (n = 50) was .5 (p < .01), which supported hypothesis 4. This result established that the order fulfillment practice such as understanding the order fulfillment, improving the logistics network, order fulfillment goals, contributes significantly and positively to the competitive advantage.

4.3.2 Multiple Linear Regressions

Multiple regressions analysis is conducted to determine the relationship between two or more independent variables and one dependent variable by calculating the coefficient of multiple determination and regression equation. Practically, multiple regression analysis provides an understanding on whether there is a relationship exists between the independent variables and the dependent variable.

The strength of the relationship between independent variables and dependents is determined by the coefficient of determination (R square) as it measures the proportion of the variation in a dependent variable that can be explained by the independent variables. In another word, how well the competitive advantage can be explained by supply chain management practices in the Pulp and Paper industry in Shwe Pyi Thar Industrial zone.

ANOVA is a hypothesis-technique that used by the researchers to test whether there is significant variance in means occurs between three or more groups. In other words, it evaluates if there is a difference between the means of the groups. This test must have a dependent variable in metric which is a competitive advantage in this case. The following formula is known as F-test which is used to determine the degree of variability in the scores of one sample to the scores of another sample.

$$F = \frac{\text{Between Sample Variance}}{\text{Within Sample Variance}}$$

The following equation is formed to determine the statistical significance of each independent variable on the dependent variable. The multiple linear regression

model of the relationship between SCM practices and competitive advantage is following Table (13).

Table 4.10 Multiple Regression Analysis of SCM practices and competitive advantage

	Unstandardized Coefficient		Standardized Coefficient	t value	p value
	Beta	Standard Error	Beta		
Constant	2.744	.233		6.097	.001
Supplier Relationship	.614	.206	.237	2.934	.003
Customer Relationship	.403	.124	.428	3.244	.002
Manufacturing Flow	.502	.112	.484	4.465	.000
Order Fulfillment	.110	.033	.130	3.364	.001
R square	.637				
Adjusted R square	.605				
F value	19.766 (P value= .000)				

Dependent Variable: Competitive Advantage

Table 4.10 shows a multiple regression results that predict the competitive advantage of paper mills in Shwe Pyi Thar Industrial Zone from supply chain management practices; supplier relationship management, customer relationship management, manufacturing flow management and order fulfillment. The p-values for supplier relationship, customer relationship and order fulfillment are less than 0.05 and the p-value for manufacturing flow is less than 0.01. It can be said that they are statistically significant. The results of the linear regression indicate that there is a strong linear relationship between supply chain management practices and the competitive advantage. Since the estimated coefficient values are positive, there is a positive relationship between supply chain management practices and competitive advantage.

4.4 Summary

This chapter described the study participants and also detailed the research design and methodology used to determine whether the key business processes (SRM, CRM, MFM, and OF) were positively related to competitive advantage. The measures

were discussed and their reliabilities were presented. This chapter summarized the results from the Leading Edge Supply Chain Study Survey and the relationships established between the variables, as measured by the Pearson correlation coefficient used to evaluate the four hypotheses this thesis sought to assess. All hypotheses were supported when utilizing the data ($n = 50$) to calculate the correlation coefficient specific to the evaluation of each relationship. The resulting correlation coefficient appeared to suggest highly positive relationships that were statistically significant ($p < .01$).

Chapter (5)

Conclusions

This final chapter presents the conclusions from this research study. Findings of this study and the influences discussions to the findings are presented. Recommendations are suggested based on the findings and discussions experienced in this research effort. The chapter further summarizes and gives suggestions for further research in the field of Supply Chain management.

5.1 Findings and Discussions

Consistent throughout supply chain management (SCM) literature is the notion that SCM is the means to creating and sustaining a competitive advantage for the firm and for the entire supply chain (Cooper, Lambert, & Pagh, 1997; Lambert, Knemeyer, & Gardner, 2004; Li et al., 2005; Mentzer et al., 2001; Tan, Kannan, & Handfield, 1998; Tan et al., 1999). With growing emphasis and almost universal recognition of the importance of SCM amongst academicians and practitioners, this research took a deeper look into SCM processes as defined by the Global Supply Chain Forum (GSCF) (Croxtton et al., 2001) and their individual relationships to competitive advantage.

This research specifically focused on the strategic development of four of the eight key business processes which included supplier relationship management (SCM), customer relationship management (CRM), manufacturing flow management (MFM), and order fulfillment (OF) and each of their relationships with a competitive advantage. An instrument was also developed in order to measure the level of development of each of the key business processes. The results of this study supported the literature in that SRM, CRM, MFM, and OF appeared to have a positive relationship with a competitive advantage.

The specific objective of the study was; to identify the supply chain management practices in Pulp and Paper industry in Shwe Pyi Thar Industrial zone and to analyze the relationships between SCM practices, and competitive advantage. The outcomes of the findings can be summarized based on the following research objectives. The primary findings of this study based on generated data suggest that (SRM, CRM MFM, and OF) have a positive effect on competitive advantage.

These findings highly suggest that organizations should embrace and actively promote high levels of these SCM practices. Further, this study also provides supporting evidence to the literature on the relationships between SCM practices and competitive advantage. The results demonstrate that a higher level of SCM practices will lead to a higher level of competitive advantage for a firm. The empirical results of this study gave researchers an insight about the specific SCM practices that positively impact the competitive advantage of a firm. The results show that 'manufacturing flow management' practices were most influential in increasing competitive advantage on an aggregate basis. However, the study did not find any relationship among supplier relationship management, order fulfillment, and competitive advantage.

The study found out that supplier relationship management practice contributes significantly to the competitive advantage of the pulp and paper industry in Shwe Pyi Thar Industrial Zone. Regression analysis results show that there is a positive relationship between supplier relationship management and competitive advantage in pulp and paper industry in Shwe Pyi Thar Industrial zone. Correlation analysis results show that there is a significant and a moderate positive correlation between supplier relationship management practice and competitive advantage in pulp and paper industry in Shwe Pyi Thar industrial zone. Supplier relationship management practice attributed to the fact that firms have realized that supply chain can compete by involving their suppliers and other partners in the running of the organization.

The findings of the study indicate that customer relationship management practice contributes significantly to the competitive advantage in the pulp and paper industry in Shwe Pyi Thar industrial zone. Regression analysis results support the findings. Correlation analysis results also indicate that there is a significant and a moderate positive correlation between Customer Relationship Management (CRM) practice and competitive advantage in pulp and paper industry in Shwe Pyi Thar industrial zone. The results revealed that customer relationship management allows product differentiation from competitors, help sustain customer satisfaction, enhance loyalty and elevate the value the company provides to the customer. The results also supported that customer relationship management is an internal component of an

organization's marketing strategy assists the organization to increase competitive advantage.

The study found out that manufacturing flow management practice contributes significantly to the competitive advantage of the pulp and paper industry in Shwe Pyi Thar Industrial Zone. Regression analysis results support the finding. Correlation analysis results show that there is a significant and a moderate positive correlation between manufacturing flow management practice and competitive advantage in pulp and paper industry in Shwe Pyi Thar industrial zone. Manufacturing flow management not only helps to increase the flexibility in SCM but also help to increase competitive advantage.

The study found out that order fulfillment practice contributes significantly to the competitive advantage of pulp and paper industry in Shwe Pyi Thar Industrial Zone. Regression analysis results show that there is a positive relationship between order fulfillment and competitive advantage in the pulp and paper industry in Shwe Pyi Thar Industrial zone. Correlation analysis results show that there is a significant and an excellent positive correlation between order fulfillment practice and competitive advantage in pulp and paper industry in Shwe Pyi Thar industrial zone. Order fulfillment practice has shown that a prominent improvement in the competitive advantage can be increased by the rapid and higher rate of fulfilling the orders of the customers, and shortening the time of order cycle.

Further understanding and development of SCM will require additional research and participation from academicians from various fields and practitioners with diverse backgrounds representing a wide variety of industries. The results presented in this study contribute to the expanding pool of SCM knowledge. It appears that the development of an SRM, CRM, MFM and OF process have positive implications on a firm's competitive position and performance. When the hypotheses were tested in the regression model, the independent variables were found to have a significant relationship with the competitive advantage of paper mills in Shwe Pyi Thar industrial zone. This implies that it may be in the best interest of organizations to take a proactive role in the management of their supply chain. The strategic development of key business processes should be of interest to business leaders in organizations in pursuit of establishing a defensible position over its competitors and achieving its market and financial goals. 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.

5.2 Recommendations

The study is a justification that the company that incorporates Supply chain management practices which include supplier relationship management, customer relationship management, manufacturing flow management, and order fulfillment has a positive and significant contributions on the competitive advantage of pulp and paper industry in Shwe Pyi Thar industrial zone. The results of this research effort suggested that an organization's strategic development of the SRM, CRM, MFM and OF process are associated with an increased competitive advantage. In today's competitive business environment that continues to expand beyond more fixed boundaries, it continues to be clear that the supply chain exists (Mentzer et al., 2001), and it is up to the organization to take an active role and manage it. This research further indicates that it may be in the best interest of organizations to actively acknowledge the benefits associated with SCM.

The paper mills in Shwe Pyi Thar industrial zone should ensure the high supplier relationship management that will contribute significantly to their competition. The company should create extensive coordination with the involvement of suppliers in joint planning, involving them in the product development process and having a clear policy on managing the relationship. The company should standardize means of communication by creating an environment that improves effective information and resource sharing among trading partners. This can only be realized when the paper mills ensure a strong relationship with suppliers based on mutual understanding and mutual goals.

Incorporation of customer relationship management practice such as establishing documented procedures to deal with customer complaints, offering after sales service to clients, soliciting customer inputs in product design, developing accounts for key customers, training customer and using customer satisfaction criterion to evaluate the performance of the company can significantly help in enhancing the competitive advantage of pulp and paper industry in Shwe Pyi Thar industrial zone. This can be achieved when the paper mills invest heavily in information technology customer data storage and retrieval.

Paper mills in Shwe Pyi Thar industrial zone should adopt manufacturing flow management practice by ensuring the use of inputs with relatively low environmental impacts in the production processes so that the company not only realize cost savings but also achieves highly efficient outputs with little or no wastage or pollution. The empirical results reveal that the ability of the manufacturing system of a firm to rapidly respond to changes in product volume demanded by customers is the single most important measure of 'manufacturing flow management' that increases the competitive advantage of a firm based on an aggregate basis. The paper mills should optimize their packaging processes and this will help them to minimize waste in terms of space and easy transportation. They should develop a policy on manufacturing flow management practices to guide the mills. There should be a clear system to monitor the products that are designed for modular assembly.

Managers for paper mills in Shwe Pyi Thar industrial zone should encourage the order fulfillment practice with their supply chain members and this can only be realized when they accept to link the company's information systems with their clients. Through linkage of information systems, the company can share the production, delivery schedules and performance metrics of the company across the company's supply chain and they can track the order fulfillment and shipment status of the company across the supply chain. This will ensure that the company gets timely, reliable quality information from supply chain members that will assist the company in quick decision making that will ensure improved visibility and an enhanced competitive advantage to the customer needs. The ability of a firm's major suppliers to effectively expedite the firm's emergency orders is the single most important measure that directly leads to higher levels of the overall competitive advantage of a firm.

5.3 Future Research

Results from this research appear to support the prevailing belief in the literature that SRM, CRM, MFM, and OF are positively related to competitive. However, research was limited by the small data sample utilized. Future research should attempt to sample from a larger sample population size in order to obtain statistically defensible results without having to rely on simulated data. A larger and more diverse sample will enable future research to integrate a greater number of

statistical analysis techniques, improve the reliability and validity of the instrument, and generate more significant findings.

As noted in the limitations section this research analyzed the effect of only four of the eight supply chain management processes. Multiple linear regression analysis on a sufficient sample size is taken across the spectrum of all eight processes would generate results that would be of real value to academics and practitioners alike. Future research should attempt to collect data on each of the key SCM processes in an attempt to determine the relationship each of the processes has with a competitive advantage and organizational performance. Collecting data on each of the processes will also allow for adequate multiple linear regression analysis which takes a comprehensive SCM perspective and seeks to identify the extent to which each of the processes appears to be associated with a competitive advantage while controlling for appropriate variables. This will provide vital insight into which processes appear to be most significant to creating and improving organizational value and whether this appears to vary between industries. This would be of great value to academics and practitioners. Another important area of future research is to include the measure of organizational performance. This will enable to assess the relationship between supply chain management practices and organizational performance.

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APPENDIXES

APPENDIX A

Research Questionnaires

Company Profile

Company name:

Address:

Number of employee:

1. Individual Profile

Male ()

Female ()

Educational Background

High School ()

Bachelor Degree ()

Master Degree ()

How many years have you been in the organizations?

Under 2years ()

2-5 years ()

over 5 years ()

2. Supply Chain Practices

2.1 Supplier relationship Management

With regard to SCM practice, please circle the number that accurately reflects your firm's present conditions. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

No.		Please circle the number that accurately reflects your firm's present conditions				
1.	We think quality is our best one criterion in selecting the suppliers.	1	2	3	4	5
2.	We continuously solve problems by joint effort with the suppliers.	1	2	3	4	5
3.	We have provided information to the suppliers for improving their products quality.	1	2	3	4	5
4.	We have made continuous focus on the improvement programs which is done in with the help of our main suppliers.	1	2	3	4	5
5.	We involve our key suppliers in the planning processes and in goal-setting activities of our organization.	1	2	3	4	5
6.	We regularly involve our main suppliers in the process of development new product.	1	2	3	4	5

2.2 Customer Relationship Management

With regard to SCM practice, please circle the number that accurately reflects your firm's present conditions. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

NO.		Please circle the number that accurately reflects your firm's present conditions				
1.	We have frequent interaction with our customers to achieve reliability, the responsiveness, and improving some basic standards for our organization.	1	2	3	4	5
2.	We focus on measuring and evaluating customer satisfaction for our products.	1	2	3	4	5
3.	We are regularly determining the future customer expectations about our products.	1	2	3	4	5
4.	We are facilitating our customers to get assistance about products from us.	1	2	3	4	5
5.	We are evaluating periodically the importance of the relationship to our customers.	1	2	3	4	5

2.3 Manufacturing Flow Management

With regard to SCM practice, please circle the number that accurately reflects your firm's present conditions. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

No.		Please circle the number that accurately reflects your firm's present conditions				
1.	We have a formal process for evaluation the expertise that will be needed to use future technologies or fulfill future market needs.	1	2	3	4	5
2.	We can offer different degrees of manufacturing flexibility to different customers.	1	2	3	4	5
3.	We plan for capacity growth for the future.	1	2	3	4	5
4.	Our products are designed for modular assembly.	1	2	3	4	5
5.	We delay final product assembly activities until customer orders have actually received.	1	2	3	4	5

2.4 Order Fulfillment Management

With regard to SCM practice, please circle the number that accurately reflects your firm's present conditions. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

No.		Please circle the number that accurately reflects your firm's present conditions				
1.	We work with customers to understand their order fulfillment requirements.	1	2	3	4	5
2.	We regularly improve the structure of our logistics network	1	2	3	4	5
3.	We have performance goals that are related to order fulfillment.	1	2	3	4	5
4.	We understand the importance of order fulfillment process.	1	2	3	4	5

2.5 Competitive Advantage

With regard to competitive advantage, please circle the number that accurately reflects your firm's present conditions. The item scales are five-point Likert type scales with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

No		Please circle the number that accurately reflects your firm's present conditions.				
	Price/cost					
1.	We offer competitive prices.	1	2	3	4	5
2.	We are able to offer prices as low or lower than our competitors.	1	2	3	4	5
	Quality					
3.	We are able to compete based on quality.	1	2	3	4	5
4.	We offer products that are highly reliable.	1	2	3	4	5
5.	We offer products that are very durable.	1	2	3	4	5
6.	We offer high quality products to our customer.	1	2	3	4	5
	Delivery dependability					
7.	We deliver customer order on time.	1	2	3	4	5
8.	We provide dependable delivery.	1	2	3	4	5
	Time to market					
9.	We are first in the market in introducing new products.	1	2	3	4	5
10.	We have fast product development.	1	2	3	4	5

APPENDIX B

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798 ^a	.637	.605	.27427

a. Predictors: (Constant), Order Fulfillment Management, Supplier Relationship Management, Manufacturing Flow Management, Customer Relationship Management

ANOVA^a

Model		Sum of Squares	df	Mean Square	F.	Sig
1	Regression	5.947	4	1.487	19.766	.000 ^b
	Residual	3.385	45	.075		
	Total	9.332	49			

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), Order Fulfillment Management, Supplier Relationship Management, Manufacturing Flow Management, Customer Relationship Management