Determining supply chain management trends in the pharmaceutical industry

ME Tsoku

23269367

Mini-dissertation submitted in partial fulfilment of the requirements for the degree *Magister* in *Business Administration* at the Potchefstroom Campus of the North-West University

Supervisor: Dr HM Lotz

May 2014

Determining supply chain management trends in the pharmaceutical industry

ME Tsoku

23269367

Mini-dissertation submitted in partial fulfilment of the requirements for the degree *Magister* in *Business Administration* at the Potchefstroom Campus of the North-West University

Supervisor: Dr HM Lotz

May 2014

DECLARATION

I, Makgokong Elizabeth Tsoku, hereby declare that:

- the work in this document is my original work;
- all sources used or referred to have been documented and recognized; and
- this document has not been previously submitted in partial or full fulfillment of the requirements at any other recognized educational institution.

Makgokong Elizabeth Tsoku **Date**

DEDICATION

- First of all, I would like to thank The Lord Almighty ,who made it possible for me to register and complete my MBA studies
- my husband, Richard, for assistance, encouragement, patience and enduring hours of loneliness during the study; and
- my daughter, Tidimalo, for patience and understanding
- my mother who has always been my pillar of strength

ACKNOWLEDGEMENTS

I would like to send my grateful thanks to all those individuals and organisations that contributed to successful completion of this study. The assistance of the following is well acknowledged:

- Dr Henry Lotz, my supervisor, for his advice, motivation and support
- Mrs. Wilma Pretorius for her encouragement and support throughout the MBA studies
- MBA staff at the North West University Potchefstroom campus for help and support
- Mr. Khoadi for editing the content of the document
- respondents who supplied the empirical data
- Dr Suria Ellis for statistical measures

DETERMINING SUPPLY CHAIN MANAGEMENT TRENDS IN THE PHARMACEUTICAL INDUSTRY

BY

MAKGOKONG ELIZABETH TSOKU

DEGREE: Magister in Business Administration

FACULTY: Economic and Management Sciences

SUPERVISOR: Dr Henry Lotz

ABSTRACT

For quality service, business management is continually evolving. This also applies to pharmaceutical business management from manufacturing to distribution and retail pharmacies.

The main problem being faced is to work on the demand and supply challenges that are being faced by the pharmaceutical businesses and to build and optimize supply chain management in pharmaceutical business in South Africa. The main objective of this study sets to evaluate whether supply chain trends bring any efficiency and effectiveness to supply chain management in South African pharmaceutical businesses.

The study also sets to propose an integrated framework that can facilitate and sustain supply chain management in South African pharmaceutical businesses. The study included a literature review on supply chain characteristics, five basic supply chain components, theories and a framework regarding supply chain management and trends. Quantitative research method was undertaken by means of structured questions. The questionnaires were sent to product managers of the manufacturing pharmaceutical industries and to responsible pharmacists of the pharmaceutical distributors and retail pharmacies.

The results obtained from the total of 98 respondents who participated in this study indicated that outcomes from majority of respondents were able to answer research questions. Empirical results obtained support the elements of supply chain management stated from the literature review. They also proved that supply chain management practices improve customer service level and level of business performance. However there are some areas of concern that remain to be further researched.

CONTENT

PAGE

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION, NATURE AND SCOPE OF STUDY

CHAPTER TWO

CHARACTERISTICS AND NATURE OF SUPPLY CHAIN MANAGEMENT

CHAPTER 3

CONTRIBUTION OF SUPPLY CHAIN MANAGEMENT AND TRENDS TO THE PHARMACEUTICAL INDUSTRY

CHAPTER 4

EMPIRICAL RESEARCH

CHAPTER 5

INTEGRATION OF FINDINGS OF EMPIRICAL SURVEY WITH LITERATURE REVIEW, AS WELL AS RECOMMENDATIONS AND CONCLUSIONS

LIST OF FIGURES

PAGE

LIST OF TABLES

LIST OF ANNEXURES

LIST OF APPENDICES

CHAPTER 1

NATURE AND SCOPE OF STUDY

1.1 INTRODUCTION

In the business world change is continuous due to supply and demand of furnished products and quality service. The pharmaceutical businesses relies more on logistics and operation management to compete in the changing business environment. Lambert, Cooper and Pagh (1998:14) refer to logistics as activities that occur within the boundaries of a single orgarnisation. Dong (1999:779) identified the advantage of the old supply chain system which included greater regulation on drug quality and price, but lacked competitive mechanisms which could result in bureaucratic behaviours, inefficiencies and imbalanced supply.

According to Oliver and Weber (1982:67), supply chain management appeared as a term in the early 1980s and since then has rapidly evolved. Lambert *et al.* (1998:16) stated that supply chain has been seen as networks of companies that work together and coordinate their actions to deliver a product to the market. A supply chain is the sequence of orgarnisations, their facilities, functions and activities that are involved in producing and delivering a product or service.Jain, Wadhwa and Deshmukh (2006:69) defined supply chain as a dynamic process that involves the constant flow of information, materials and funds across multiple functional areas both within and between chain members.

Jain *et al*. (2007b:28) stated that the strategic shift of focus for mass customization, quick response and high quality service cannot be achieved without more sophisticated cooperation and dynamic formation of supply chains. They further mentioned that supply chain management is critical to business operations and success because it is globally necessary due to emerging trends like rapid growth of multinational corporation and strategic partnerships, global expansion and sourcing. The concept of supply chain

management is gaining increased importance in today's economy, due to its impact on firms' competitive advantage.

A typical pharmaceutical supply chain consists of the following members: primary manufacturing, secondary manufacturing, market warehouse/ distribution centers, wholesalers, retails, hospitals and patients (Shah, 2004:936). All participants in the supply chain management are required to consider shorter cycle time a competitive advantage. The major influential factors are, the change in customer needs, the growth of just-in-time, quick response inventory management and third party supply chain management (Zigiaris, 2000:8).

The pharmaceutical supply chain is usually described as a producer-driven one, despite the specific consumer demand characteristics, especially in the private segment of the health care market. This description reflects the significant market presence and influence of the large multinational pharmaceutical producers in the health care market.

The international market for the production of pharmaceutical products has seen several waves of merger and acquisition activity in the past decade (Hartzenberg, 2002:2) , as pharmaceutical firms have tried to negotiate the myriad of changes, not only in pharmaceutical research and manufacture, but also in the regulatory environment and in the demand for pharmaceutical products. The South African pharmaceutical industry has reflected international trends, a selection of which will be presented in Chapter 3 of this study.

The main aim of a pharmaceutical Industry is to develop research and distribute drugs in order to provide health care for the people in the society (Economy Watch, 2010:1). The South African pharmaceutical industry is of substantial economic significance to the country contributing about 5% to the gross domestic product (GDP) (South African Country Report, 2012:1).

1.2 PROBLEM STATEMENT

Large impact is seen in the business environment whereby supply chain boosts customer service by making sure that the right product assortment and quantity are delivered in a timely fashion at the right location. Supply chain management also improves the bottom line because the use of large fixed assets (plants, warehouses and transportation vehicles) is decreased.

Notwithstanding the added value, the challenge is how to build and optimize supply chain management in pharmaceutical business in South Africa for achievement of a host of competitive advantages, as there are recurring challenges in demand and supply uncertainty. According to Handfield, Ragatz, Petersen and Monczka (1999:74), supply chain managers are being asked to address the following:

- Improve customer service;
- Enhance continuity of supply;
- Reduce the exposure of the business to unanticipated risks in the supply chain;
- Improve the new product design process;
- Reduce environmental waste;
- Improve environmental performance;
- Contribute to enhancement of product and service quality.

1.3 RESEARCH OBJECTIVES

Primary and secondary objectives set for this study were:

1.3.1 Primary objective

The primary objective of this study is to evaluate whether supply chain management trends contribute to efficiency and effectiveness of South African pharmaceutical industry.

1.3.2 Secondary objectives

The following secondary objectives were devised to achieve the primary objectives:

- Give an overview of the scope, concept and philosophy of supply chain management.
- To identify important best practices in supply chain management (which will serve as guidelines to investigate the pharmaceutical industry's supply chain).
- Determine whether the current trends help increase the value and service provided to end-users, especially customers.
- Investigate delays and uncertainty of supply to the end-users.
- Assess planning and control strategies employed by managers in pharmaceutical businesses for optimization of supply chain.
- Determine the internal business factors that have an influence on supply chain management (that is principles and methodologies in pharmaceutical business).
- Investigate the supply chain challenges faced by health care department and the impact on end-users, which are customers or patients.
- Propose a framework to facilitate, enhance and sustain supply chain management in pharmaceutical business.

1.4 SCOPE OF THE STUDY

This section describes the field of study, industry and geographical demarcations.

1.4.1 Field of study

The subject involved in this field of the study is Supply Chain Management and it involves terminologies such as supply chain management and logistics.

1.4.2 Industry demarcation

In order to make the size of this research manageable, the scope of this study was limited to pharmaceutical businesses in South Africa specifically in Gauteng province. These businesses are: Ranbaxy pharmaceutical company, Adcock Ingram pharmaceuticals, Novartis pharmaceuticals, Transfarm pharmaceutical distributors,

Pharmed pharmaceutical distributors and MediRite retail group of pharmacies and two independent retail pharmacies in Gauteng area (Lunar Pharmacy and Medicare Pharmacy).

1.4.3 Geographical demarcation.

The geographical research project focus is in Johannesburg and Pretoria areas of the Gauteng province in South Africa.

1.5 DEFINITIONS OF KEY CONCEPTS AND TERMS

To gain insight of the key concepts and terms, definitions are outlined below:

1.5.1 Supply chain management

Different views have been raised by many authors regarding the definition of supply chain management. For the term “supply chain management” there appears to be little consensus on its definition (Mentzer *et al*, 2001:18; Kauffman, 2002:48). Kathawala and Abdou (2003:141) concluded that supply chain “has been poorly defined and there is a high degree of variability in people’s mind about what is meant”. According to Baltzan and Phillips (2010:137), supply chain management involves the management of information flows between and among stages in a supply chain to maximize total supply chain effectiveness and profitability. They further stated that the four basic components of supply chain management are: supply chain strategy, supply chain partners, supply chain operation and supply chain logistics.

However, Mentzer *et al*., (2001:18) proposed a definition that is broad, and not confined to any specific discipline area and adequately reflecting the breadth of issues that are usually covered under this term. The definition thus states that supply chain management is a systemic, strategic coordination of the traditional business functions within a particular company across businesses supply chain, for the purpose of improving long-term performance of the individual companies and the supply chain as a whole.

1.5.2 Logistics

The term logistics originated in the military which was concerned with the movement of personnel and materials during the times of emergency. It was later adopted by businesses and became part of commonly used terminology in professional societies and academic programs. According to the Council of Supply Chain Management Professionals(CSCMP), logistics is that “part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of consumption in order to meet customer’s requirements. Bozarth and Handfield (2006:2) further stated that companies depend on their logistics systems to move material, goods, equipment and people among supply chain partners. It covers a wide range of business functions including:

- Transportation;
- Warehousing;
- Material handling;
- Packaging;
- Inventory management; and
- Logistics information systems.

The logistics network consists of suppliers, warehouses, distribution centers, retail outlets, as well as raw-material, work-in-process inventory, and finished goods that flow between different facilities which are part of the network.

1.6 RESEARCH METHODOLOGY

In order to achieve the objectives of this study, both primary and secondary sources of information was used. The study was conducted in two phases. Phase one is a literature review and phase two is empirical research.

1.6.1 Literature review

The literature review focused on the theory of the previous research been done and provided a background of the study being proposed. The necessary information regarding supply chain management and supply chain trends was collected during the literature study. It specifically focused on:

- Defining pharmaceutical supply-chain management and trends;
- Importance of supply-chain management to the pharmaceutical industry;
- Discussing the trends changing the pharmaceutical supply-chain to-day;
- Identifying the major forces changing the way pharmaceutical medications are purchased, distributed and sold throughout the supply-chain;
- Supply chain challenges faced by health care departments, especially pharmaceutical industries, distributors, retail pharmacies and hospital sectors.

The knowledge obtained from literature review assisted in stating the significance of the problem, development of the research questions, assisted in obtaining information about what is already known about the topic and to build on the platform of existing knowledge.

1.6.2 Empirical research

Empirical research can be defined as the research that bases its findings on experimentation or observation. It is usually conducted to answer a specific question or to test a hypothesis. Empirical research for this study focused on how the research was conducted (research design), who were participants in the survey (sample design), methods of data collection and procedures used to analyze the data.

1.6.2.1 Research design

A quantitative method of collecting data was used in this study. Data was collected in the form of numbers in the quantitative technique. A sample survey using questionnaires containing close-ended questions was developed. Validity of the questionnaires was evaluated to determine as to whether the questions relate to the subject under debate. Close-ended questions were formulated to obtain structured data.

To derive key insights to primary change drivers influencing the future of pharmaceutical supply chains, questionnaires were sent to key informants at participating level of supply value chain.

1.6.2.2 Study population

The study population for this study consisted of three groups. The first group consisted of pharmaceutical manufactures, the second group consisted of wholesalers or distributors within South Africa, and third group consisted of the South African pharmaceutical retailers or retail pharmacies.

In the first and second study population, non-probability convenience sampling on the basis of being accessible or convenience (Mc Millan & Schumacher, 2001:175) was used. Pharmaceutical manufacturers and pharmaceutical distributors were analyzed based on product offering and efficient distribution of medications. The pharmaceutical manufacturers and distributors were contacted telephonically requesting permission to conduct a research. A set of questionnaires were developed to support the data collection process.

The third study population was selected by means of non- probability purposeful sampling based on knowledge about the retail pharmacy. This sampling method allows the researcher to select particular elements from the population that will be representative or informative about the topic of interest (Mc Millan & Schumacher, 2001:175). E-mails were sent to retail pharmacies within selected geographical area requesting permission to conduct a research. Analysis of this sector was based on service quality and customer satisfaction.

1.6.2.3 Constructing the research instrument

The research instruments selected for the purpose of this study was a set of three questionnaires.

1.6.2.4 Data collection

To collect the data, the following procedures were followed:

Two pharmaceutical distribution companies (each based at Johannesburg and Pretoria respectively) were contacted telephonically. The pharmaceutical manufacturers were contacted by an e-mail. The purpose of the study was explained and the permission to distribute the questionnaires was requested.

After permission has been granted, the questionnaires along with the covering letter were provided to pharmaceutical manufacturers and distributors. The third set of questionnaires were distributed to each responsible pharmacist of each retail pharmacy after permission has been granted, following the same procedure. Saunders, Lewis and Thornhill (2000:14) stated that this questionnaire delivery and collection method helps to increase the response rate in the survey. A questionnaire is also economical, has the same questions for all the subjects and ensures anonymity.

1.6.2.5 Data Analysis

Quantitative analysis was used to analyze responses from questionnaires. Descriptive analysis was used for manufacturing, distribution and retail responses. The box and skew plot was used to determine the efficient and effective use of supply chain management by pharmaceutical manufacturers, distributors and retailers. A summary of box and skew was plotted to indicate percentages of responses of pharmaceutical businesses in the Gauteng area.

1.7 LIMITATIONS OF THE STUDY

Although supply chain management in the pharmaceutical industry has been conducted before, this study attempted to make a significant contribution to existing knowledge.

- This study was limited to supply chain trends and management of the pharmaceutical supply chains in South Africa. Limitation in this study is that a response from respondents was not as expected, and therefore results cannot be generalized to other subjects.
- The study only focused on Gauteng province in the area of Johannesburg region. The response also indicated poor response rate due to unwillingness of

representatives of pharmaceutical managers in manufacturing, distribution and retail businesses to complete questions especially in a given time frame.

- Questionnaires for each group of study were similar but not the same.
- The other limitation is that e-mails might not have been received by some respondents or there could have been a possibility of change in respondents' e-mails addresses.
- A judgment is made about which subjects or sample should be selected to provide the best information to address the purpose of the research.
- In quantitative studies for non-probability purposeful sampling, the emphasis is on the judgment of the researcher to select a sample that is representative of the population while qualitative researchers are more interested in selecting cases that are information rich.

1.8 PLAN OF THE STUDY

Five chapters set in this study were presented as follows:

Chapter 1: NATURE AND SCOPE OF STUDY

Definition of key concepts and terms to be used in this study will be provided. Statement of the problem on which this study is based, the research objectives and the scope of the study will follow. Description of research methodology, limitations and plan of the study will conclude the chapter.

Chapter 2: CHARACTERISTICS AND NATURE OF SUPPLY CHAIN MANAGEMENT

The characteristics and the nature of supply chain management will be explained by means of relevant literature study. The five basic supply chain management components will be discussed. Various theories and frameworks regarding supply chain management and trends will be presented. Key dimensions of supply chain

management will be viewed. Principles of Supply Chain Management will also be discussed.

Chapter 3: CONTRIBUTION OF SUPPLY CHAIN MANAGEMENT AND TRENDS TO THE PHARMACEUTICAL INDUSTRY

Chapter 3 will review contribution of supply chain management to the pharmaceutical industry, international trends that have been reflected by South African pharmaceutical industry, contribution of these changes to bring efficiency in medication distribution and improved patient care will be investigated.

Chapter 4: EMPIRICAL RESEARCH METHODOLOGY

This chapter will describe the design of the empirical study by identification of the problem statement, creation of research design, methods of collecting the data, data analysis, tables of relevant data and interpretation and discussion of the results.

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

Research findings will be integrated with the literature study. Anticipated outcomes from the survey will have to answer research questions and backup or fill the gaps that the theory from the literature review did not cover.

CHAPTER 2

CHARACTERISTICS AND NATURE OF SUPPLY CHAIN MANAGEMENT

2.1 INTRODUCTION

Supply Chain Management (SCM) is an important issue facing many businesses worldwide. Traditionally, SCM has been a melting pot of various aspects, with influences from logistics and transportation, operations management and materials and distribution management, marketing as well as purchasing and information technology (Croom, 2011: 508). Ideally, the all- encompassing philosophy of SCM embraces each of these functions to produce an overall supply chain strategy that ultimately enhances firm performance (Wisner & Tan, 2000: 38).

According to Lambert and Cooper (2000:81) SCM is an important area that helps maximize competitiveness and profitability for the business as well as other supply chain members which integrate and coordinate across their whole extended network. They further explained that managing the supply chain has become way of improving competitiveness by reducing uncertainty and enhancing customer service. Lambert and Cooper (2000:81) continues that not all orgarnisations are successful in achieving a higher level of performance even if they have implemented the SCM concepts. In order for firms to succeed, survive, and sustain their competitive positions, certain characteristics of SCM have to exist.

2.2 CHARACTERISTICS OF SUPPLY CHAIN MANAGEMENT (SCM)

There have been different definitions of SCM presented by different authors. Academics first described SCM from theoretical standpoint to clarify the difference from more traditional approaches to managing flow of materials and the associated flow of information (Ellram, Lisa & Cooper, 1990:1).

The initial use of the term emphasized a reduction in inventory both within and across businesses but that initial perspective has been broadening. The International Centre

for Competitive Excellence in 1994 defined SCM as the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers. However, Baltzan and Phillips (2010:137) debated that supply chain management involves the management of information flows between and among stages in a supply chain to maximize total supply chain effectiveness and profitability.

The term supply chain management has not been used only with regard to the logistic activities and the planning and control of materials and information flows internally within a company or externally between companies. In the past some authors have used it to discuss an alternative organisational form to vertical integration (Thorelli, 1986:48), such as storage, obsolescence, damage, deterioration, shrinkage, insurance and management costs, as well as the more traditional cost of capital. With an incorrect assessment of inventory costs, there is the danger that companies may make inaccurate supply chain trade-offs in this respect and, therefore, hold too much inventory (Lee & Billington, 1992:444). However, improved coordination within and between various supply chain members can lead to reduction in lead times and costs, alignment of interdependent decision-making processes, and improvement in the overall performance of each member as well as the supply-chain(Kishore, Surendra & Govindan, 2009: 27).

The global markets offer a variety of products of different quality and cost. As a result, businesses are always competing and trying to reduce costs and improve quality (Quesada & Meneses) 2010:37).Customers look for more choices, better service, higher quality, and faster delivery. The relationship with customers has turned a strategic issue for today's companies. Businesses are inclined to work with different suppliers in different ways. It is important that the relationship with suppliers satisfies their business needs. Relationships among suppliers may be beneficial to network the supplier, to develop partnerships and alliances that will benefit both partners (Hines, 2004:37).

In order to manage effectively in a supply chain, businesses are moving to adopt closer relationships with key suppliers. This collaboration leads to a high degree of interdependence along the supply chain (Hoyt & Huq, 2000:757).Collaborative supply chain partnerships, according to Hoyt & Huq (2000:757), support the development of flexibility, responsiveness, low cost/low volume manufacturing skills and also collaboration among businesses on the management of various supply chain activities can lead to a competitive advantage over other supply chains.

In the past, businesses focused primarily on manufacturing and quality improvements within their four walls (Baltzan & Phillips, 2010:137). Today's supply chain is a complex web of suppliers, assemblers logistic firms, sales/marketing channels, and other business partners linked primarily through information networks and contractual relationships.

SCM encompasses the management of all (processes) activities associated with moving goods from raw materials through to the end user. SCM coordinates and integrates all of these activities into a seamless process. It embraces and links all of the partners in the chain. For this reason, successful SCM is the process of optimizing a company's internal practices, as well as the company's interaction with suppliers and customers, in order to bring products to market more efficiently.

According to Baltzan and Phillips (2010:141), the following key factors are essential for the successful implementation of supply chain management: inventory management, cost, information, customer service and relationships. Baltzan and Phillips (2010:141) explained the above mentioned key factors as follows:

- **Inventory management:** Inventory management, according to Baltzan and Phillips (2010:142) refers to the management of flow and level of inventory. This form of management is a central focus of supply chain management. Inventory management is also a major performance metric for gauging success in supply chain management. The inventory level must be sufficient to provide acceptable customer

service but low enough to minimize supply chain management. To maintain balance between supply and demand for inventory stock, the supply chain requires integrated management to avoid duplication among members of supply chain.

- **Cost:** Cost as explained by Baltzan and Phillips (2010:142) refers to the amount needed to manage supply chain. The important objective of supply chain management is to lower cost especially at the end of supply chain.

- **Information:** Information needs to be managed for efficiency and effectiveness in the supply chain. To maximize the potential of supply chain management information needs to be in two directional flows (Baltzan & Phillips, 2010: 143).

- **Customer service:** In the context of supply chain management, according to Baltzan and Phillips (2010:143), customer service is also a very important attribute of successful supply chain. The first level minimum inventory level is reliable on time delivery and accurately filled orders. The second level attribute may entail scheduled deliveries, advance shipment notices and tailored pallet packs. The third and highest level is namely adding value to customers. Examples of value adding services includes vendor-managed inventory, collaborative planning and forecasting, lastly supply chain visibility. The aim of the third level is to grow market share.

- **Relationships:** Baltzan and Phillips (2010:143) stated that relationships refer to collaboration among supply chain partners. This collaboration is an important ingredient to supply chain management success and to the ultimate goal of integration that is operating the whole supply chain as if it were a single orgarnisation. The collaboration among supply chain partners also need to incorporate more than shared information and a focus upon supply chain cost.

2.3 BASIC SUPPLY CHAIN MANAGEMENT COMPONENTS

An essential underlying premise of the SCM framework is that there are certain management components that are common across business processes and members of the supply chain (Andrews, Dorine & Susan, 1994:6). It is the management of these common components that is important, since they determine how the business processes and the supply chain are managed and structured.

Baltzan and Phillips (2010:138) indicated that supply chain management improves ways for companies to find raw components they need to make a product or service, manufacture that product or service, and deliver it to customers. The five basic supply chain management components are highlighted as follows:

- **Plan:** A plan is the essential ingredient of a company for management of all the resources that go towards meeting customer demand for products and services. A big piece of planning is developing asset of metrics to monitor the supply chain so that it is efficient, cost less and deliver high quality and value to customers (Baltzan & Phillips, 2010: 139).
- **Source:** According to Baltzan and Phillips (2010:139) companies must carefully choose reliable suppliers that will deliver goods and services required for making products. Companies must develop a set of pricing, delivery, and payment processes with suppliers and create metrics for monitoring and improving the relationships.

- **Make:** This is the step where companies manufacture their products or services. This can include scheduling the activities necessary for production, testing, packaging, and preparing for delivery. This is most metric-intensive portion of the supply chain, measuring quality levels, production output, and worker productivity (Baltzan &Phillips, 2010:139).
- **Deliver:** According to Baltzan and Phillips (2010:139), this step is commonly referred to as logistics. Logistics is the set of processes that plans for and controls the efficient and effective transportation and storage of supplies from suppliers to customers. Companies must be able to receive orders from customers, fulfill the orders

via a network of warehouses, pick transportation companies to deliver the products, and implement a billing and invoicing system to facilitate payments.

- **Return:** As stated by Baltzan and Phillips (2010:139), this is typically the most problematic step in the supply chain. Companies must create a network for receiving defective and excess products and support customers who have problems with delivered products.

2.4 THEORIES AND FRAMEWORKS REGARDING SUPPLY CHAIN MANAGEMENT (SCM) AND TRENDS

2.4.1 THEORIES REGARDING SUPPLY CHAIN MANAGEMENT

2.4.1.1 Theoretical foundations of SCM

Recently there have been valuable contributions presented by academics to enhance our understanding of the concept of interorgarnisational management of different flows of products and information (Ballou, Gilbert & Mukherjee, 2000:7). Majority of these contributions, as Ballou *et al.* (2000:7) pointed out, focus on definitions and concepts from a functional point of view such as logistics, operations, marketing and purchasing), providing pragmatic recommendation on how to improve a firm's performance and implementation of postponement by supply chain configuration.

Four international theories regarding SCM and their characteristics will be discussed. There have been an argument from several authors that although these theories are the only ones that can be used to establish a theoretical framework of SCM, they can be used to set the structure and management issues of supply chain.

The set of inter-orgarnisational theories will be presented logically as follows:

2.4.1.2 Supply Chain Management mitigating agency problems-The Principal Agent Theory (PAT)

As stated by Logan (2000: 26) the contract between the principal and the agent governs the relationship between the two parties. The aim of the Principal Agent Theory is to design a contract that can reduce the harmful effects of potential agency problems. Successful achievement of supply chain management is obtained when potential problems that may occur between the principal and the agent within existing business relations are being investigated. Narayanan and Raman(2004: 98); Baiman and Rajan(2002:226) further stated that setting up supply chain networks by forming competitive structures will increase the efficiency and effectiveness of creating goods and services in the supply chain and it will reduce misalignment in the supply chain.

2.4.1.3 Supply Chain Management as coordination of transferred rights of disposals-Transaction Cost Analysis (TCA)

TCA offers a normative economic approach to determine the firm's boundaries and can be used to present efficiency as a motive for entering inter-organisational arrangements (Williamson, 1996). A company may reduce its total transaction costs by cooperating with external partners.

Transaction Cost Analysis has often been used in make-or-buy decisions in supply chains. Examples are outsourcing of logistics activities (Maltz, 1993:48), buyer-supplier relationships (Mikkola, 2003b:448; Stuart & McCutcheon, 1996:748) and restructuring of supply chains (Croom, 2011:509). In essence, TCA is a useful instrument to decide whether a transaction should be performed in the marketplace or in-house.

2.4.1.4 Supply Chain Management as reciprocated interactions between institutions –The Network Perspective (NT)

The performance of a firm depends not only on how efficiently it cooperates with its direct partners, but also on how well these partners cooperate with their own business partners (Oliver & Webber, 1982:66). They also highlighted that Network Theory (NT) contributes profoundly to an understanding of the dynamics of interorgarnisational relations by emphasizing the importance of “personal chemistry” between the parties, the build-up of trust through positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes. Networks increase capabilities of competencies of companies.

According to Johanson and Mattsson (1987:42), through direct communication, the relationships convey a sense of uniqueness, ultimately resulting in supply chains as customization to meet individual customer requirements. They also clarified that NT is descriptive in nature and has primarily been applied in SCM to map activities, actors, and resources in a supply chain. The focus has been on developing long-term, trust based relationships between the supply chain members.

2.4.1.5 Supply Chain Management as coordination of relational assets- the Resource-Based View (RBV)

The Resource Based View(RBV) deals with competitive advantages related to the firm’s possession of heterogeneous resources (financial, physical, human, technological, organizational, and reputational) and capabilities (combination of two or more resources) (Grant, 1991:126; Prahalad & Hamel, 1990:79). These resources and capabilities constitute the core competence of the particular firm and serve ultimately as its source of competitive advantage.

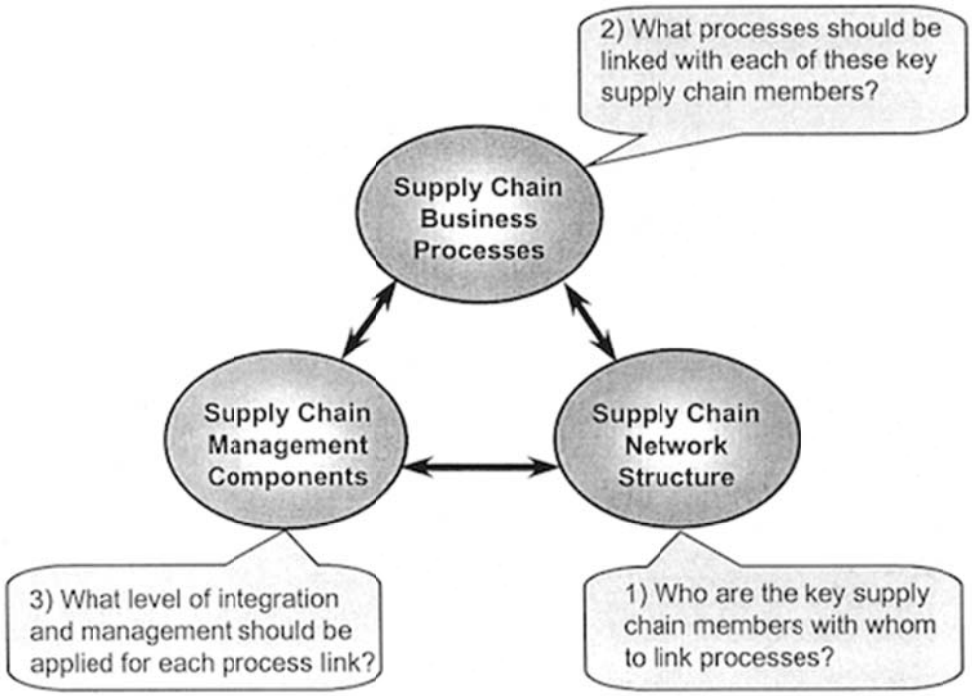
According to (Prahad & Hamel, 1990:79) the dynamic aspects of the RBV consider a firm’s core competence to be its ability to react quickly to situational changes and build

further competencies or dynamic capabilities (Eisenhardt, 1989:60). In essence, RBV maintain sustainable competitive advantage originating from resources.

2.4.2 FRAMEWORKS OF SUPPLY CHAIN MANAGEMENT

Mentzer (2001) stated that based on the literature, five supply chain management frameworks that recognize the need to implement business processes have been identified and each has distinctive characteristics and objectives. According to Lambert, Cooper and Pagh (1998:1), implementation is carried out through three primary elements: the supply chain network structure, the supply chain business processes and the management components**.** In 1994, executives from a group of multi-national companies, later to become Global Supply Chain Network (GSCF), developed a definition for supply chain management and a framework was developed in 1996 (Lambert, 2004**).** Supply chain framework is indicated in Figure 2.1.

Figure 2.1: Framework of supply chain management



Source: Lambert and Cooper: 2000:70

2.4.2.1 Processes in the supply chain

The following eight supply chain management processes are included in the Global Supply Chain Framework (GSCF):

- 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 other customers (Croxton, Sebastian, Lambert & Rogers, 2001:58).Customer service management provides the business's face to the customer, a single source of customer information, and the key point of contact for administering the product service agreements (Bolumole, Knemeyer & Lambert, 2003:18).

- Demand Management

  Provides the structure for balancing the customers' requirements with supply capabilities, including reducing demand variability and increasing supply chain flexibility (Croxton *et al*., 2002: 58).

- Order Fulfillment

  Order fulfillment includes all activities necessary to define customer requirements, design a network, and enable the business to meet requests while minimizing the delivered cost (Croxton, 2003:26).

- Manufacturing flow management

  This includes all activities necessary to obtain, implement and manage manufacturing flexibility and move products through the plants in the supply chain (Goldsby & Sebastian, 2003:48).

- 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 (Croxton *et al*., 2001: 59).

- Procurement

  Procurement processes focuses on managing relationships with strategic suppliers rather than the traditional bid and buy system. The objective is to support the manufacturing flow management process and new product development.

- Product Development and Commercialization

  Provides the structure for developing and bringing to market new products jointly with customers and suppliers (Rogers, Lambert & Knemeyer, 2004:49).

- Returns Management

  Includes all activities related to returns, reverse logistics, gatekeeping, and avoidance (Rogers *et al*., 2002: 14).

2.4.2.2 Supply Chain Management Components

- The following management components in the GSCF framework that supports the processes include the following as highlighted by Cooper, Lambert & Pagh (1997).
- Planning and control structure

  Planning and control of operations are keys to moving an orgarnisation or supply chain in a desired direction.

- Product flow facility structure

  Refers to the network structure for sourcing, manufacturing and distribution across the supply chain.

- Information flow

  The kind of information passed among channel members and the frequency of information updating has a strong influence on the efficiency of the supply chain.

- Values and attitudes

  Lack of coordination in new product development can lead to inefficiencies of production, but there is also a risk of giving away corporate competence.

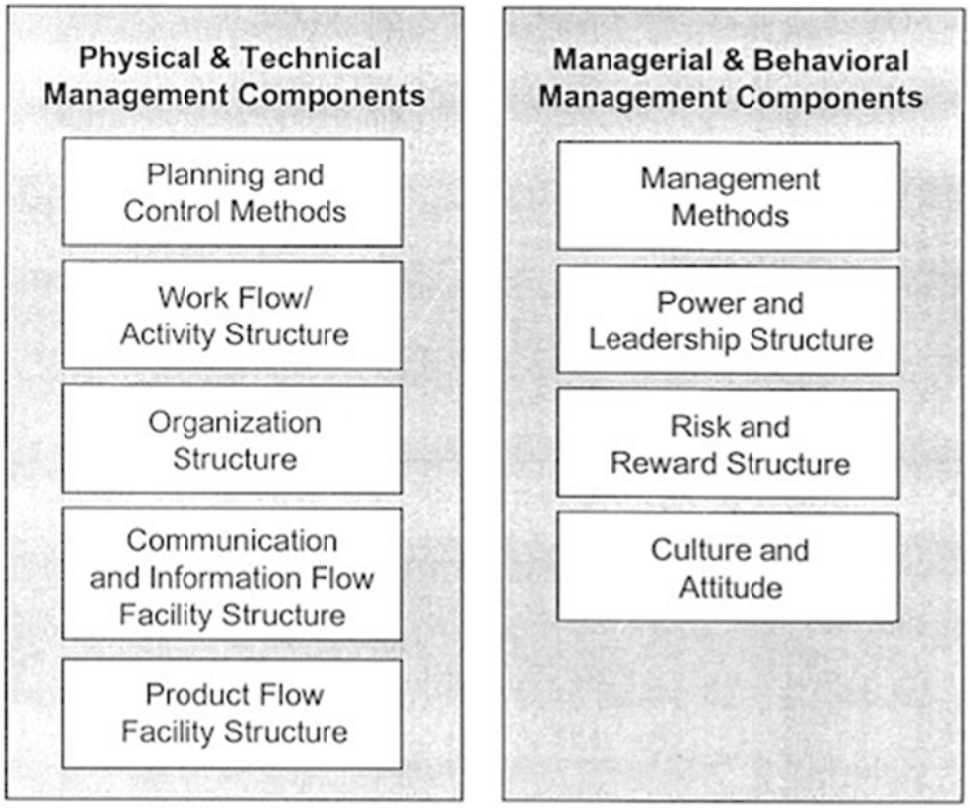
- Organisational culture

  Aspects of culture include how employees are valued and incorporated into management of the firm.

- Management methods

  Include the corporate philosophy and management techniques. The level of management involvement in day-to-day operations can differ across supply chain members. The exercise of power, or lack of, can affect the level of commitment of other channel members. Figure 2.2 also describes the management components of SCM.

Figure 2.2: The Management Components of SCM



Source: Lambert and Cooper: 2000:79

2.4.3 Structure of the Supply Chain

According to Cooper *et al.* (1997:9), all firms participate in a supply chain from the raw-materials to the ultimate consumer. How much of this supply chain needs to be managed depend on several factors, such as the complexity of the product, the number of available suppliers, and the availability of raw materials. Dimensions to consider include the length of the supply chain and the number of suppliers and customers at each level.

If there are many components for a product, it will take considerable management time for all of these relationships to be partnerships.

Determining which parts of the supply chain deserve management attention depends on a number of factors, which must be weighed against firm capabilities and the importance of the firm.

2.5 KEY DIMENSIONS OF SUPPLY CHAIN MANAGEMENT

In order to achieve a competitive advantage, supply chains need to be managed appropriately (Bode, Wagner, Petersen & Ellram, 2011:833).The set of practices developed by an organization to effectively manage the functioning of a supply chain are known as supply chain management practices (Li,Ragu-Nathan & Rao, 2006:107). Three important supply chain management dimensions were identified from extensive analysis of different SCM practices. These dimensions include strategic purchasing, concurrent engineering, and long term relationships.

- **Strategic purchasing**

Purchasing has been viewed as an essential component of a firm's strategic planning process (Castaldi, Ten Kate & Den Braber, 2011:983; Cousins, 2005:403; Ferguson, Hartley, Turner & Pierce, 1996:51). Purchasing is often linked to an organization's achieving competitive advantage (Ferguson *et al.*, 1996).

As recognized by Carr and Peterson (2002:1048), strategic purchasing is an upstream component of supply chain management (SCM). This dimension involves strategically selecting the suppliers. The construct of strategic purchasing is operationalized in terms of dimensions such as whether purchasing is aligned with the firm's strategic orientation, whether purchasing is carried out while keeping the long-term issues of the firm in mind, and whether the suppliers have adequate knowledge of the firm's strategic goals (Chen & Paulraj, 2004a:152). They further stated that strategic purchasing also enhances knowledge development leading to organisational development and improvement in interaction between the member components of a supply chain.

- **Concurrent engineering**

Concurrent engineering deals with the early involvement of suppliers, customers, and buyers during the product/service design stage (Celtek & Kaynak, 1999). From a supply chain perspective, the involvement of various components of the supply chain is widely stressed. The critical element in concurrent engineering practice is the simultaneous inclusion of all phases of the related divisions (Jarvis, 1999:89). This essentially means that during the product design stage, the customers who are part of the cross functional teams can voice their opinions along with other functional area members such as marketing, production, and finance.

- **Long term relationships**

According to (Griffith, Harvey & Lusch, and 2006:92), organisations engaged in SCM should constantly monitor the long term relationships dimension of the supply chain. Some of the key advantages of maintaining long-term relationships include sharing important information with involved partners, and sharing a certain level of trust and improvements in knowledge management and overall business level benefits.

2.6 PRINCIPLES OF SUPPLY CHAIN MANAGEMENT

Muckstadt, Murray, Rappold & Collins (2001: 427-453) pointed out that application of five guiding principles are necessary for effective supply chain in order to attain and sustain competitive advantage. These principles are detailed below:

First principle:

Know the customer: Without a clear understanding and definition of customer requirements, a supply chain cannot be effectively constructed. To gain this understanding requires the use of classical market research techniques, the construction of an information infrastructure to capture customer transaction data, and the storage and analysis of these data from an operational perspective. The objective is to obtain a clear statement of the customer's requirements. A supply chain's requirements vary by customer, product, and location. These requirements must be

thoroughly understood and be the foundation for constructing an efficient and effective supply chain.

Second principle:

Adopt lean philosophies: During the past two decades, operationally excellent companies have focused on creating lean organizations. As a consequence, these companies have shortened internal lead times and made them more predictable and repeatable, reduced work-in-process inventories from months of supply to days, implemented just-in-time delivery strategies for their most costly component materials, and have worked to dramatically reduce setup times.

These actions have substantially reduced indirect costs and improved use of physical space. More importantly, they have created cross-trained, empowered and more highly motivated workers.

Third principle:

Create a supply chain information structure: An effective information infrastructure, both intra-and inter-organizationally, is necessary for a supply chain to achieve competitive advantage. Today, B2B collaboration via the Internet makes it much easier for supply chain partners to share timely demand information, inventory status, daily capacity usage requirements, evolving marketing. These processes, coupled with the information infrastructure, support the efficient flow of material through the supply chain.

Fourth principle:

Integrate business processes: Business processes must be established both intra- and interorganisationally to support the supply chain’s managing the reorder points.

Fifth principle:

Unite decision support systems: Decision support systems that have been built for supply chains. Their goal is to generate plans that simultaneously consider all elements of the supply chain. These systems and their embedded rules drive many daily supply chain activities.

2.7 CONCLUSION

Various aspects of supply chain management such as characteristics, basic components, theories and frameworks, key dimensions and principles from different views of authors and researchers on the importance of implementing effective supply chain management have been presented in this chapter. Successful implementation and sustainability of competitive advantage is seen with organisations that portray characteristics of SCM.

Components of SCM stated make it possible for organisations to effectively manage delivery of the right product or service to the right customer at the right time and the right place. Theories and different views of authors and researchers discussed give a broader understanding of SCM in practice. Guiding principles necessary for effective supply chain management assist organisations to operate effectively and efficiently.

Chapter three will focus on contribution of supply chain management to the pharmaceutical industry.

CHAPTER 3

CONTRIBUTION OF SUPPLY CHAIN MANAGEMENT AND TRENDS TO THE PHARMACEUTICAL INDUSTRY

3.1 INTRODUCTION

The health care systems across the world are constantly being subjected to differing needs of consumers, funding and infrastructural constraints. Hence, the supporting role of the pharmaceutical industry in developing and delivering good quality medical supplies to the population is critical to the success of the healthcare initiatives taken up by various public and private organisations (Sukati, Hamid, Baharun & Huam, 2011: 169).

The way the companies structure their supply chains clearly reinforces the importance of product, knowledge and information flows. The pharmaceutical marketplace is facing major pressures from a broad range of dynamic and powerful forces (Holdford, 2005:388; Chen & Hung, 2009:7483). Accordingly, government agencies and third party payers expect the provision of pharmaceutical products to be cost effective, keeping costs to a minimum, so strategic planning has become imperative for all organisations in the pharmaceutical distribution system (Birdwell, 1994:193).

3.2 IMPORTANCE OF SUPPLY CHAIN MANAGEMENT TO THE PHARMACEUTICAL INDUSTRY

Healthcare is one of the industries with high potential to contribute further towards the economy. Therefore, it is important to look into the determinants that will improve healthcare organizational performance. Of the various determinants, supply chain management (SCM) practices have been viewed as the vital determinant to improve healthcare organisational performance.

SCM practices involve a set of activities undertaken in an organization to promote effective management of its supply chain (Koh, Demirbag, Bayra, Tatoglu & Zaim, 2007: 106). The short-term objectives of SCM are to enhance productivity, reduce inventory and lead time. The long-term objectives of SCM are to increase market share and integration of supply chain (Koh *et al*., 2007:109). SCM practices can be defined in various ways. Donlon (1996:57) coined SCM practices as practices that include supplier partnership, outsourcing, cycle-time compression, continuous process flow and information technology sharing. These practices are a set of activities that orgarnisations undertake to promote effective management of the supply chain (Li, Ragu-Nathan & Rao, 2006: 116).

The supply chain management practices are viewed to be related to supply chain responsiveness which will increase supply chain competitive advantage and then lead to organisational performance (Sukati *et al.,* 2011:166). The effective supply chain management practices will reduce costs, boost revenues, increase customer satisfaction, and also improve service delivery (Baltacioglu, Ada, Kaplan, Yurt & Kaplan, 2007: 116).

However, Alvarodo and Kotzab (2001:390) viewed SCM practices in terms of reducing duplication effects by focusing on core competencies and using inter-organisational standards such as activity-based costing or electronic data interchange, and eliminating unnecessary inventory level by postponing customizations towards the end of the supply chain. Koh *et al*. (2007:115) categorized SCM practices from the following aspects: close partnership with suppliers, close partnership with customers, just-in-time supply, strategic planning supply chain benchmarking, few suppliers, holding safety stock and sub-contracting, e-procurement, outsourcing and many suppliers.

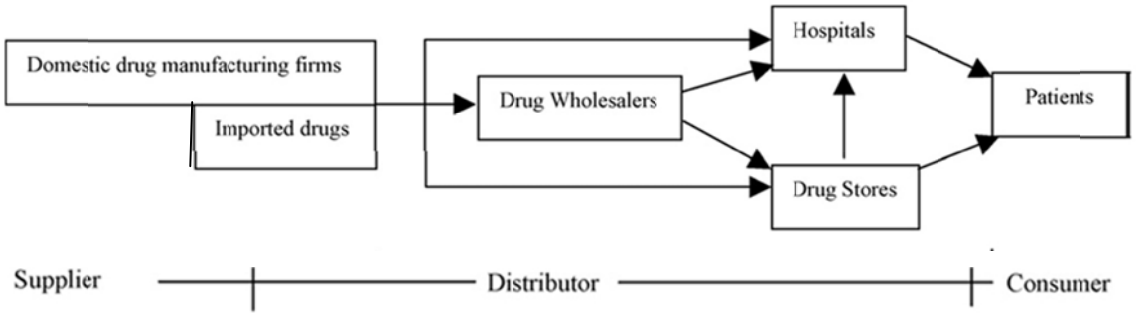
Supply chain innovation and efficiency has been found to be positively related to organisational performance. Customer value creation such as efficient data management, reduction in medical error and speedy processing of patient care has positive impact on the business performance (Lee & Schniederjans, 2011:1204).

The pharmaceutical industry is explained as a system of procedures, operations and organisations involved in the discovery, development and production of drugs and medications. Pharmaceutical companies supply chain is composed by the pharmaceutical companies, their suppliers to upstream, and to downstream, distributors, retailers, institutional clients and customers**.**

A typical pharmaceutical supply chain consists of the following members: initially manufacturing, secondary producing, market warehouse/ distribution centers, wholesalers, retails/hospitals and patients (Shah, 2004:929).Among pharmaceutical supply chain components, it has been argued that delivery of medicines has substantial effect on customer satisfaction (Rossetti, Handfield & Dooley, 2011:601). Due to changing economic system, pharmaceutical supply chain has been reformed. Drugs play an important role in the delivery of healthcare and they flow through supply chain that includes manufacturers, wholesalers and pharmacies as illustrated in Figure 3.1 below (Mehralian, Rajabzadeh, Morakabati & Vatanpour, 2012: 209).

The Pharmaceutical Supply Chain (PSC) is very complicated and greatly responsible to ensure that the appropriate drug reaches the right people at the right time and in the right situation to fight against sickness and sufferings. It is a highly sensitive supply chain and 100% customer service level is acceptable as it directly influence health and safety.

Figure 3.1 Pharmaceutical supply chain



Source: Mehralian *et al.* (2012)

Health Distribution Management Association (HDMA, 2009) stated that wholesalers play a key role in the distribution of pharmaceuticals as majority of drugs currently flow through wholesalers. Some recent trends in the pharmaceutical supply chain, such as consolidation, mail order business, and third party logistics, have put additional competitive pressure on the already low-margin pharmaceutical wholesaling business (Jambulingam, Kathuria & Nevin, 2009:305).

To compete effectively, optimized supply chains directly contribute to bottom line results by providing reliability, responsiveness and agility within the organisation.
Agility has been proposed as a reply to the high levels of intricacy and uncertainty in advanced markets (Christopher & Juttner, 2000:117). Embracing of these agile strategies has some benefits for the organisations, including quick and efficient reaction to changing market requests, the ability to customize products and services delivered to customers, the capability to manufacture and deliver new products in a cost efficient mode, decreased producing costs, enhanced customer satisfaction, removal of non-value added activities and increased competitiveness (Swafford, Ghosh & Murthy, 2006:121).

3.3 TRENDS REFLECTED BY SOUTH AFRICAN PHARMACEUTICAL INDUSTRY

The South African pharmaceutical industry, like many developing countries, faces many significant developments and new challenges. Some of these challenges and developments include the growth of generic medicine and the proposed National Health Insurance (NHI) scheme which is set to have major implications for the pharmaceutical industry. In addition, increased regulation and legislation, such as single exit price, the dispensing fee, the Consumer Protection Act and the Medicines and Related Substances Control Act will continue to impact on the marketing, distribution and packaging of pharmaceuticals (Omnisurge, 2012). Trends affecting South African pharmaceutical industry are:

3.3.1 Changes in regulatory environment and in consumer demand

Mandatory generic substitution proposed by Medicines and Related Substances Control Act of 1965, is likely to increase the elasticity of demand for ethical or prescription drugs meaning that a branded medicine of an interchangeable source may be substituted with a generic drug unless expressly forbidden by the patient to do so. However the demand for ethical or prescription drugs is still relatively inelastic but the elasticity is higher than it used to be as a result of the above changes (Hartzenberg, 2001:2)

3.3.2 Changes of pharmaceutical distribution

Over the past few years, there have been a number of mergers and take-overs, as the industry has restructured to meet competitive challenges. Multinational pharmaceutical companies continue to dominate the industry (Hartzenberg, 2001:3).

3.3.3 Structural changes

According to Hartzenberg (2001:3) top businesses in the industry acquired other businesses or merged to form new joint venture and spin-offs of non-core businesses. This has been done to allow investments in more research and developments (R&D) projects that diversify their future drugs portfolio and make them much more stable in the long term regardless of economies of scale in manufacturing, clinical trials and marketing.

3.3.4 Major factors of future growth

The pharmaceutical industry showed high sales growth rates in the recent past, and a number of factors suggest that this trend will continue in the future. Due to numerous advancements in science and technology, including those in the health care industry, life expectancy in has been steadily growing. As the result, growing proportion of elderly people promises further growth of demand for healthcare products. (Booth & Zemmel, 2004: 451) stated that further reforms of legislation system such as patent protection issues, will inevitably result in growing pharmaceutical sales.

3.3.5 Protection of patents

Generic drugs manufacturers represent a significant threat to research-based pharmaceutical companies. These manufacturers sometimes start production of patent-protected drug analogues even before a patent expires. Therefore, protection of patents is one of the key conditions necessary for further development of the pharmaceutical industry.

3.3.6 Outsourcing

Current practices and future trends in pharmaceutical industries have actually enhanced the vulnerability of their supply chains (Blackhurst, Craighead, Elkins & Handfield, 2005: 4077).First as in other industries, outsourcing has become an important strategic issue for the pharmaceutical companies due to increasing competitive pressures to reduce costs and time-to-market. In addition to outsourcing traditional non-core functions such as manufacturing and clinical trials, pharmaceutical companies increasingly outsource upstream functions, including drug discovery, biotech R&D, and even clinical research.

Unfortunately, these outsourcing trends render pharmaceutical supply chains longer, more complex, and reduce their visibility (Blackhurst *et al*., 2005:4078).They further stipulated that sales and distribution of pharmaceutical products depend heavily on the third party who fully own and control inventories once they leave the manufacturers site. The involvement of additional parties in pharmaceutical supply chains increases their complexity and the odds of malfunction.

3.3.7 Global manufacturing

The pharmaceutical industry traditionally has been constrained by rigid global manufacturing with specialized production equipment, long lead times for materials and extensive regulatory requirements. This has led to inflexibility and inability to react quickly to changes that are either capacity constrained or underutilized.

It has also been stipulated by researchers that globalization of the pharmaceutical industry increases the risk of supply chain disruptions by adding more complexity and geographical scope to supply chains that are already overburdened (Lee, 2003).

3.3.8 Increased competition

Competition and race towards gene profiling for therapeutic drugs is pushing pharmaceutical companies into niche drugs and smaller batch production. With continued commoditization of many pharmaceutical products, pharmaceutical companies need better ways to distinguish themselves (Ng, 2009:11).

3.3.9 Technological developments

Today, the use of technology has helped pharmaceutical companies find new ways to engage patients and provide them with useful services that can improve quality of life. The technological development of wireless sensors helps for gathering target information for research, efficacy and compliance. These can help bring products to market more quickly by allowing patients to provide real-time data right from their own homes (Huiskonen & Pirttila, 2002: 181).

3.4 EFFECT OF RECENT TRENDS ON MEDICATION DISTRIBUTION AND IMPROVED PATIENT CARE

Procurement of high-priced products such as originator brands and inefficiencies in the supply and distribution chain are amongst others the determinants of low public sector availability of medicines. Markups are applied to the cost of the production of medicines as they move through the supply and distribution chains. The final price of medicines can be strongly determined by the high add-on costs in the supply chain. A key contributor to these add-on costs are wholesaler and retailer markups. Countries such as South Africa have attempted to make private sector markups transparent.

In the majority of cases, generically equivalent products are priced substantially lower than the originator brand. Increasing the use of quality-assured generic medicines is therefore a key strategy for improving the affordability of medicine. According to Medicines and Related Substance Act of 1965, a pharmacist shall:

- inform all members of the public who visit his or her pharmacy with a prescription for dispensing, of the benefits of the substitution for a branded medicine of an interchangeable multi-source medicine; and
- dispense an interchangeable multi-source medicine instead of the medicine prescribed by a medical practitioner, dentist, practitioner, nurse or other person registered under the Health Professions Act, 1974, unless expressly forbidden by the patient to do so.

Recent trends that have putted competitive pressure on pharmaceutical supply chain are:

3.4.1 Mergers

The industry's preferred mechanism to overcome the productivity crises has been to increase investment in current business activities, primarily R&D and sales, the two extreme ends of the supply chain. This has been implemented by organic growth or by mergers and acquisitions (M&A) to exploit economies of scale. Companies that have merged contributed to a high market share of merged products, however they affect different role players along the supply chain as follows:

- Pharmacists could face a problem in obtaining products that they are looking for in time or there could be delays in receiving the ordered items.
- Doctors may end up settling for prescribing a particular drug when a different one may be more apt for a particular patient or condition. The patients would have no inkling of the doctor's hidden ties with the drug company and would simply have to trust that the prescription was appropriate.
- Patients:

The mergers may have positive and negative effects for the patients covered. On the positive side, patients may be getting improved health care in the sense that there would be increased education and supervision, perhaps more accurate prescribing, and an emphasis on preventive measures and disease management programs.

Possible negatives include the loss of privacy associated with information databases, the possibility that the formulary they are under does not list the medicine that would best treat them, the lack of autonomy (and truly informed consent) that is associated with the hidden ties between drug companies, pharmacists, and doctors, and the lack of control in that plan sponsors and drug companies and their Prescribed Minimum Benefits (PMB)s are determining what is best for the patients (Rosetti, Handfield, & Dooley, 2011: 615).

4.2 Partnership issues

As global markets grow increasingly efficient, competition no longer takes place between individual businesses, but between entire value chains. Therefore executives are developing supply chain partnerships/collaboration in an attempt to reduce costs, improve service and to gain competitive advantage.

Frankel, Goldsby and Whipple (2002:57) indicated that one of the most common usages of partnerships is in the provision of transport and distribution services. Authors recommended that rather than devoting effort and resources to build an in-house supply chain it can often be much more cost effective to form a partnership with a shipping company, and allow them to perform the job of distribution at a lower cost than the enterprise could manage itself.

3.4.3 Outsourcing

Shortened product life cycles and increasing global competition has tempted traditional manufacturers to contemplate on their competencies, such as product design and development, and a decision to outsource.

Chase and Jacobs (2010:417): stated that outsourcing is the act of moving some of a firm’s internal activities and decision responsibilities to outside providers. They further mentioned that outsourcing goes beyond the more purchasing and consulting contracts because not only are the activities transferred, but resources that make the activities

occur, including people, facilities, equipment, technology, and other assets are also transferred.

Outsourcing allows a company to focus on activities that represent its core competencies. The company can create a competitive advantage while reducing costs. Reasons to outsource and their resulting benefits, as stated by Chase and Jacobs (2010:417) are:

- Improving credibility and image by associating with superior providers.
- Quality and productivity improvement.
- Obtaining expertise, skills, and technologies that are not otherwise available.
- Improving the effectiveness by focusing on what the company does best.
- Increasing flexibility to meet changing demand for products and services.
- Increasing product and service value by improving response to customer needs.

However, there are projected strategic benefits and problems relating to outsourcing decisions. These as indicated by Jennings (2002:26) and Zeng (2003:367) include issues of cost, quality, flexibility, strategic focus, diversification, the potential loss of critical skills and knowledge, and appropriation of final product value.

3.4.4 Third party logistics

A major issue in designing a great supply chain for manufactured goods is determining the way those items are moved from the manufacturing plant to the customer (Chase & Jacobs, 2010:434).For consumer products this often involves moving product from the manufacturing plant to a warehouse and then to a retail store. The problem of deciding how best to transport goods from plants to customers affects cost of a product. Major trade-offs related to the cost of transporting the product, speed of delivery and flexibility to react to changes are involved.

Due to an increase in globalization of markets, businesses began to view logistics as more than simply a source of cost savings and recognize it as a source of enhancing product and service offerings (Pinna, Carrus & Pettinao, 2010:300). They further stated that logistics form art of a broader supply chain process to create competitive advantage. Lack of competence to operate logistics activities internally by logistic users, create an environment to develop outsourcing with third party logistics.

3.4.5 Global issues

There is an increasing pressure faced by healthcare supply chain. Challenges being faced such as production of pharmaceuticals is getting more complex as pharmaceutical businesses expand in order to align to rapidly changing markets. There is new demand being created for affordable, effective healthcare products due to the growth in global economy. To meet these challenges, businesses in the pharmaceutical sector will have to develop new capabilities and new ways of working together.

3.4.6 Technological developments

Supply chain management until recently was used to track and trace the product up to the retailer. Product dispensation at retailer and replenishment of the stocks at retailer levels was part of the sales and marketing function. Growing importance of supply chains, technology today has an integral role to play in the system. Companies today are willing to invest in technology to ensure seamless order to delivery. Industry's current focus is on improving product traceability and supply chain security to build links with customers, distribution partners and all stakeholders to drive complete customer satisfaction, accurate forecasting and timely replenishment.

In Supply Chain Management technology has been used for two main functions such as Enterprise Resource Planning (ERP) and Order to Delivery. The fundamental of ERP is integration of the processes by which business operations saves time and expense (Baltzan & Phillips, 2010:158). They further highlighted that decisions can be made

more quickly and with fewer errors. Data becomes visible across the orgarnisations. Tasks that benefit from this integration include:

- Sales forecasting, this allows inventory optimization
- Order tracking, from acceptance through fulfillment
- Matching purchase orders (what was ordered), inventory receipts (what arrived) and costing (what the vendor invoiced).

The new generation of low-cost technologies, combined with emerging software solutions, has the potential to deliver unprecedented value for Supply Chain Management. Healthcare and other allied life sciences sectors are expected to follow the trends observed in the pharmaceutical industry. The reason is that these industries are driven by the need for anti-counterfeiting measures and patient safety enhancements, and not just economics.

This is good for the Healthcare industry as it will drive scale, which in turn will drive down costs for all Healthcare constituents. The need of an hour is affordable technology solution that helps improve overall process efficiencies in the Healthcare Industry which in turn shall enable a reduction in delivery costs to the end user, which in this case is the patient. The technology, which will drive economies-of-scale, would benefit consumers, government and the pharmaceutical companies.

CHAPTER 4

EMPIRICAL RESEARCH

4.1 INTRODUCTION

The objective of this chapter is to discuss the methodology of research applied, how the sample was drawn, how the questionnaires were developed and designed, the processes followed during data collection, how the obtained data was analyzed, present findings from the research conducted and discussion of the results.

4.2 SAMPLING

Three sample lists were selected from three groups for this study. In the first study group, a sample of two distributors in Gauteng areas of Johannesburg and Pretoria was selected from the first study population. Non-probability convenience sampling on the basis of being accessible was used. Respondents were chosen because they were easy to recruit and accessible to the researcher. A sample list numbering 30 respondents was received from the two selected pharmaceutical distributors.

In the second study group, three pharmaceutical manufacturers from the Johannesburg areas of Gauteng Province were selected as a sample. Non-probability convenience sampling on the basis of being accessible was used. A sample list numbering 28 respondents from the three selected pharmaceutical manufacturers was received.

The third study group, of which the third sample was selected, consisted of retail pharmacies based in Johannesburg and Soweto areas of the Gauteng province. Non-probability purposeful sampling on the basis of knowledge about the retail pharmacies was used. A sample list numbering 40 respondents was received from the 8 selected retail pharmacies.

4.3 RESEARCH DESIGN

In this section the design and the development of questionnaires is being discussed. The intention of the study is to examine the variables and investigate the relationships by issuing questionnaires to people who have knowledge about the industry. Three questionnaires were designed, one to be distributed to responsible pharmacists of the retail pharmacies (see Annexure 4.1), one to be distributed to pharmaceutical distributors(Annexure 4.2), and the third one to the pharmaceutical manufacturers(Annexure 4.3). The questionnaires were posted together with the covering letter (see Appendix 1).

Questionnaires were sent to the sampled companies via e-mail with a request that it be returned by fax or e-mail. This enabled the researcher to reach the respondents which would otherwise be inaccessible. The respondents could be contacted through e-mail and the questionnaire could be completed and returned in time. Distributing these questionnaires through e-mail made it possible to reach the respondents at low cost. Use of questionnaires made it easy to obtain specific information. Questions were designed to identify important best practices in the pharmaceutical supply chain. They were also used to determine the efficiency of SCM and customer value creation. The questions were also used to determine the significance of current trends in the pharmaceutical industry, measure the relationship between business performance and supply chain management.

Questionnaires were designed in order to be completed within a short time. An e-mail was developed and a request for assistance letter was designed to be e-mailed together with each questionnaire. The request for assistance letter was used to inform the respondents about the purpose of the research, that the completion of the questionnaire will only take about 20 minutes of their time, and that the completed questionnaire will be treated as confidential.

4.4. DATA COLLECTION

A total of 150 questionnaires were distributed to three samples with 50 questionnaires for every sample. Table 4.1 below shows the data collection procedure.

Table 4.1: Summary of data collection procedure

Sector of Pharmacy	**Number of questionnaires posted**	**Number of questionnaires returned**	**Percentage**
Retail pharmacies	50	40	80
Distributors	50	30	60
Manufacturers	50	28	56
Total	150	98	65.3

The average response rate for the total questionnaires that were distributed was 65 percent with 98 questionnaires being returned out of 150 being sent. The total results of the three questionnaires are represented in Appendices 2 to 4.

4.5 DATA ANALYSIS

4.5.1 Quantitative analysis of the results of the questionnaires

The set of questions for the three sets of questionnaires were designed to measure the relationship between business performance and supply chain management, to identify the best practices of the pharmaceutical supply chain, to assess planning and control strategies employed by pharmaceuticals for optimization of supply chain management, to determine SCM efficiency and the value it creates for customer satisfaction. Results of the responses for the sample of retail pharmaceutical business is represented in

Table 4.2 below. The data is a representation of the cumulative percentages of sample responses.

Table 4.2: Cumulative percentages of sample responses from pharmaceutical retailers

Questions	1	2	3	4	5	6	7	8	9	10	11
Sample total	40	40	40	40	40	40	40	40	40	40	40
Cumulative	62.5	35.7	82.5	95.0	75.0	77.5	55.0	87.5	85.0	82.5	87.5
percentage											

Questions	12	13	14	15	16	17	18	19	20	21	22	23	24
Sample total	40	40	40	40	40	40	40	40	40	40	40	40	40
Cumulative	92.5	80.0	85.0	82.5	67.5	85.0	90.0	42.5	47.5	27.5	20.0	10.0	17.5
percentage													

Source: Results obtained from analysis of responses for pharmaceutical retailers

Table 4.3 and Table 4.4 below will present cumulative percentages of sample responses from pharmaceutical distributors and pharmaceutical manufacturers.

Table 4.3: Percentages of sample responses from pharmaceutical distributors

Questions	1	2	3	4	5	6	7	8	9	10	11	12
Sample total	30	30	30	30	30	30	30	30	30	30	30	30
Cumulative	76.7	76.7	83.3	70.0	80.0	73.3	90.0	76.7	86.7	90.0	93.3	96.7
percentage												

Questions	13	14	15	16	17	18	19	20	21	22	23	24
Sample total	30	30	30	30	30	30	30	30	30	30	30	30
Cumulative	56.7	90.0	80.0	80.0	80.0	66.7	60.0	33.3	46.7	36.7	3.3	20.0
percentage												

Source: Results obtained from analysis of responses for pharmaceutical distributors

Table 4.4: Percentages of sample responses from pharmaceutical manufacturers

Questions	1	2	3	4	5	6	7	8	9	10	11	12
Sample total	28	28	28	28	28	28	28	28	28	28	28	28
Cumulative	46.4	64.3	85.7	78.6	96.4	89.3	96.4	89.3	67.9	57.1	60.7	67.9
percentages												

Questions	13	14	15	16	17	18	19	20	21	22	23
Sample total	28	28	28	28	28	28	28	28	28	28	28
Cumulative	71.4	67.9	42.9	96.4	78.6	96.4	96.4	60.7	60.7	92.9	67.9
percentages											

Source: Results obtained from analysis of responses for pharmaceutical manufacturers

4.6 FINDINGS

Distribution of data has been calculated with the support of a statician. Due to a small number of responses received from respondents, data analysis and interpretation has to be reported on the number of people not the percentages. A discussion of the results

and each factor is set out below. From the 30 respondents received from retail pharmaceutical businesses, the following findings were made:

Question 1 showed that 21 respondents out of 40 recognize the importance of supply chain management (SCM).

Question 2: 25 respondents do consider SCM important to retail pharmaceutical businesses.

Question 3: 24 respondents replied positively on principles of SCM being visible on daily practices.

Question 4: 26 people responded that methodologies of SCM are often implemented for optimization of the business.

Question 5: 22 respondents reported that their businesses often form close partnerships with suppliers and customers.

Question 6: 20 respondents replied that constant flows of information between members of supply chain do not happen so often.

Question 7: 22 respondents replied that they sometimes run out of stock whereas 18 of them responded that they often run out of stock.

Question 8: However, 15 respondents agreed that distributors often inform them about shortages or delays of stock whereas 15 of them say that they distributors sometimes inform them.

Question 9: 19 respondents agreed that they do provide feedback to their distributors and manufacturers.

Question 10: Most of the respondents (24) agreed that they have procedures to enhance continuity of supply to customers and agreed that they utilize inventory management system.

Question 12: 23 respondents agreed that they do use efficient data management system but not to a great extent, 22 of them also have strategies to enhance customer services and use feedback mechanisms in terms of unavailability of products.

Question 15: A high number of respondents (31) agreed that there is a speedy processing of patient care if SCM practices are implemented. They also have planning and control strategies to optimize SCM.

Question 17: Majority of respondents (22) agreed that SCM trends bring efficiency and effectiveness to South African Pharmaceutical retail sector.

Question 18: A high number of respondents (22 to 32) agreed that implementation of SCM do bring overall improvement in the business performance.

From the 30 responses received from the pharmaceutical distributors, findings made were as follows:

Question 1: 16 respondents responded that businesses do often recognize the importance of SCM and practices and the principles of SCM are visible on daily practices

Question 3: Majority of distributors (17 respondents) replied that methodologies of supply chain are implemented for optimization of the business.

Question 4: 20 respondents agreed that they form close partnership with manufacturers and customers and continuity of supply is also enhanced.

Question 6: 18 respondents believe that continuity of supply is being enhanced

Question 7: 19 respondents agree that there is often a constant flow of information, materials between members of supply chain.

Question 8: 11 respondents say they often run out-of-stock,11 of them also reported that they sometimes run out-of-stock and 8 of them mentioned that manufacturers often inform them in advance about shortages or delays of stock as compared to 14 of them who says manufacturers does it sometimes.

Question 10: 15 respondents reported that they often provide feedback to manufacturers as compared to 11 of them who say they sometimes do.

Question 11: 21 respondents have procedures to enhance continuity of supply but not to a great extent. However nearly equal number of respondents (17) often utilizes inventory management system whereas 10 of them say they sometimes do.

Question 13: 16 respondents utilize efficient management system

Question 14: 17 respondents indicated that they do have strategies to enhance to enhance customer services, but the same number of respondents reported that they often encounter challenges when improving customer services.

Question 15: 18 respondents have a feedback mechanism they utilize in terms of unavailability of products.

Question 17: 12 respondents agreed that there is speedy processing of patient care if SCM practices are implemented.

Question 18: A greater number of respondents (14) indicated that SCM compel them to maintain lower inventories.

Question 19: 27 respondents agreed that implementation of SCM practices increases their level of sales and accuracy in costing and also improve overall business performance.

Findings from responses obtained from pharmaceutical manufacturers were as follows:

Question 1: Almost all the respondents indicated that they often recognize the importance of supply chain management.

Question 2: 16 respondents stated that SCM practices regularly do enhance product differentiation whereas 10 of them said that it does but not to a great extent.

Question 3: 24 respondents agreed that they can often determine appropriate customer service level, 19 of them stated that they often ensure that there is continuous product availability to maintain higher customer service levels.

Question 5: Majority of respondents (27) responded that they can sometimes avoid silent build-up inventory.

Question 6: 20 respondents agreed that they do practice demand forecasting technique but not to a great extent.

Question 7: Majority of respondents (19) replied that they often respond to demand for lower cost.

Question 8: 17 out of 28 respondents agreed that sustainable development concept have a less impact on availability of raw-materials or resources for manufacturing of medicines, whereas 8 of them were not certain about it.

Question 9: 27 respondents believed that they do have an elevated level of trust and collaboration with suppliers.

Question 10: 9 respondents have rapid and high product development and technology transfer.

Question 11: Majority of respondents (27) agreed that they do embark upon outsourcing in order to lean out inventories or responding for lower cost.

Question 12: 20 of the respondents indicated that they make certain that their products are of substantial standard.

Question 13: 26 respondents agreed that SCM practices do enhance competitive capabilities such as cost leadership.

Question 14: About 16 respondents reported that they sometimes experience delays in product development whereas 12 of them mentioned that they seldom do so.

Question 15: 12 respondents do not have difficulties in forecasting sales accurately, whereas 15 of them said it has very little impact on them.

Question 16: 21 of respondents confirmed that they have adequate marketing techniques.

Question 17: 12 respondents indicated that they often struggle with slow product innovations.

Question 18: 22 respondents confirmed that they do not have any manufacturing difficulties or struggle with high inventory levels.

Question 19: A total number of 28 respondents agreed that planning and control strategies do optimize supply chain management.

Question 20: Almost all respondents agreed that they use key operational business processes, with 11 of them emphasizing that they do use it to a great extent.

Question 21: Manufacturers agreed that they do use key operational business processes and do not need to improve or re-design their business processes.

4.7 SUMMARY OF FINDINGS

The summary of the findings is based on box and skew analysis of manufacturing, distribution and retail businesses of the pharmaceutical industry (see appendices 2.1 to 4. 1).Table 4.5 below indicates analysis done by box and skew. The distribution of data has been calculated to be “skewed” to either the left or the right of the centre point. In a right skewed distribution, the mode has the lowest value, followed by the median and finally the mean whereas in the left skewed distribution is the opposite. Distribution, retail and manufacturing data distribution is right skewed as is indicated by higher percentages of distribution, which is 68%, retail being 79.2% and manufacturing 52%.This means a positive response towards implementation of SCM. However, 50% of the sample population remained at 16%, 12.5% and 17.4% respectively for distribution, retail and manufacturing. Left skewed data is supported by 16%, 8.3% and 30.4% which meant negative response towards implementation of SCM. Thus it clearly indicates the need for enhancement of the implementation of supply chain management principles in some other areas of the pharmaceutical businesses in South Africa.

Table 4.5 Summary of box and skew

Distribution %			Retail %		Manufacturing %	
	Number	%	Number	%	Number	%
Right skewed	17	68	19	79.2	12	52
Centre	4	16	3	12. 5	4	17.4
Left skewed	4	16	2	8.3	7	30. 4
	25	100	24	100	23	99.8

Source: Responses for Data Interpretation

CHAPTER 5

INTEGRATION OF FINDINGS OF EMPIRICAL SURVEY WITH LITERATURE REVIEW, AS WELL AS RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The purpose of this chapter is to combine the data obtained from the empirical survey with the theory developed from the literature study. Results obtained from the empirical study will be integrated with the theory, conclusions will be drawn and recommendations to other areas of research will be made.

5.2 CONCLUSIONS

Descriptive statistics have been used in this study for the empirical survey. From the overall empirical results, it is derived that based on these findings, the conclusion that can be reached from the empirical study is that:

All the three groups recognize the importance of supply chain management (SCM). The three groups do portray characteristics of SCM such as inventory management, cost savings, information flows, customer services and relationships, except for the retail pharmaceutical businesses in which constant flow of information especially with their distributors does not happen so often. This could be that retail pharmaceutical businesses feel that they are not important members of SCM.

Results obtained from the findings also indicated that all the three groups form close partnership in order to enhance customer service. This is because all the groups are highly interdependent on each other for effective and efficient supply of medication to patients. All the three groups utilize inventory management system. This is because managing flow and level of inventory proved to be essential for success of SCM,

meaning that the level of inventory must be sufficient to satisfy and provide acceptable customer service and low to minimize SCM costs.

Respondents from the three groups also responded to demand for lower cost which is an objective of SCM. The reason is that the most effective supply chain should deliver products as fast and as cheaply as possible without sacrificing quality. The findings also reveal that members from the three groups of supply chain have strategies to enhance customer services, though there could be challenges that they encounter when improving customer services. Factors causing these challenges could be recommended for further research as customer service is a very important attribute of successful supply-chain.

Members of the supply chain from the three groups have a plan for managing all the resources for meeting customer demand in terms of supplying products or providing excellent services. It can be derived based on this finding that they also have planning and control strategies to optimize SCM. Efficient management of common components of SCM was shown by the three groups. It has been explained that effective management of these components assist on how SCM business processes are managed and structured.

Findings from the pharmaceutical manufacturers indicated that they have an elevated level of trust and collaboration with suppliers which may involve strategic selection of suppliers. All the three groups indicated that they form collaborative partnership with their supplier which is necessary to increase value and service to customers.

Empirical results also indicate that pharmaceutical manufacturers embark upon outsourcing to lean out inventory or responding for lower costs. They believe that it allows them to focus on activities that represent its core competencies. Respondents from the three groups believe that current trends like the use of technology help to increase value, improve service provided and the quality of life to end-users. Businesses like manufacturers have high product development and technology transfer. Majority of pharmaceutical retailers believe that SCM trends such as technological

developments, mergers and partnership issues bring efficiency and effectiveness to SCM retail sector which in turn increase the value and service provided to customers.

In conclusion, based on the findings from the empirical study, the three groups portrayed SCM characteristics, basic SCM components and they also showed to implement SCM processes such as demand management, CRM and the others.

However, there are areas of concern that needs improvement such as lack of constant flow of information in some retail pharmaceutical businesses and their distributors, the out-of-stocks experienced by retailers and distributors, why do distributors encounter challenges when improving customer services. The reason why manufactures often struggle with slow product innovations and experiencing delays in product development needs to be investigated. The retailers also are rarely informed about the delays or shortages of stock by suppliers.

In conclusion, successful implementation of SCM characteristics and processes improve the overall performance of the organisations which in turn help to increase and sustain competitive advantage.

5.3 RECOMMENDATIONS

The objective of the supply chain management is to meet customer demand for delivery of high quality and low cost with minimal lead time. To achieve this objective, organisations need to have a better visibility into the entire supply chain of their own plans as well as those of their suppliers and customers. The need to analyze the entire supply chain process is important as businesses today need to be agile enough to rebuild plans in real time to take care of unexpected events in the supply chain.

The reason why constant flow of information especially in distributors does not happen often needs to be brought into attention and ways to improve the situation has to be explained. Flow of information is important in order to administer materials flow into and within the business. Distributors need to recognize that accurate and timely flow of information allows the business to minimize inventories, improve routing and scheduling of transportation vehicles which will improve customer service levels.

Challenges met by distributors when trying to improve customer services need to be identified. They need to plan and implement strategies to enhance customer services. To overcome these challenges when improving customer services, distributors need to ensure that orders are taken, packaged and dispatched promptly without compromising on the quality. The business should cater to the demands of the customers while maintaining high standards. SCM tools like order-fulfillment should be implemented which will help to provide a simple and effective business operation without escalating costs or increasing the risks. Use of inventory management software can assist to keep track of inventory levels in order to maintain optimal inventory levels, to keep or always have what customers want in stock.

Using effective information technology is important because without information sharing product flow is impossible. This can help to improve constant flow of information between members of supply chain. Out-of-stocks in retailers and distributors is another area of concern. The main problem lies with suppliers or manufacturers of stock. Products become out-of-stock for a very long time. Pharmaceutical retailers should have collaborative partnerships with many suppliers. Bulk ordering can also help to solve the problem. Cross-selling or substitution of immediately available products like generic medicine especially for retailers could help to keep already existing customers. Distributors should have access to information about the product availability. They should have a close partnership with the manufacturers.

Slow product innovations and product development delays from manufacturers remain areas of concern that need to be further researched. However, to overcome these challenges, manufacturers should consider incorporating customer service requirements into aspects of business activities like product design. Pharmaceutical businesses have to implement SCM dimensions such as strategic purchasing, concurrent engineering and long-term relationships in order to manage supply chain appropriately for them to achieve and sustain competitive advantage. Five guiding principles of SCM stated in Chapter 2 such as creating a supply chain information structure need to be adhered to by pharmaceutical businesses for successful implementation and sustainability of competitive advantage.

In conclusion, efficient supply chain management can be achieved through careful consideration of capacity and material information. To achieve world class business performance, businesses today redesign their processes to reduce inefficiencies. Some of these inefficiencies can be found from the industry, some being caused by their suppliers and industry. Since every industry has different business characteristics and supply chain management processes, it is better to focus on the problem area based on specific scenario. Setting proper performance measures is also an important task.

BIBLIOGRAPHY

ALVARADO, U.Y. & KOTZAB, H. 2001. Supply chain management: The integration of logistics in marketing *Industrial Marketing Management*, 18(5):386-400.

ANDERSSON, D. 1997. Third party logistics-outsourcing logistics in partnerships. Linkoping Studies in Management and Economics.

ANDREWS, DORINE, C. & SUSAN, K. 1994. *Business Reengineering: The Survival Guide*.

BAIMAN, S. & RAJAN, M.V. 2002. Incentive issues in inter-firm relationships. *Accounting, Organizations and Society*, 27: 213-238.

BALLOU, R.H. GILBERT, S.M. & MUKHERJEE, A. 2000. New managerial challenges from supply chain opportunities. *Industrial Marketing Management*, 29:7-18.

BALTACIOGLU, T., ADA, E., KAPLAN, M.D., YURT, O. & KAPLAN, Y.C. 2007. A new framework for service supply chains. *The Service Industries Journal,* 27(2): 105-124.

BALTZAN, P. & PHILLIPS, A. 2010. Business Driven Technology.4th Ed. McGraw Hill/ Irwin. 137-143.

BIGLAISER, G. & RIORDAN, M. 2000. Dynamics of Price Regulation, RAND *Journal of Economics,* 31(4):744-767.

BIRDWELL, S.W. 1994. Strategic planning in the pharmaceutical distribution system. *American Journal of Pharmaceutical Education,* 58(2): 193-196.

BLACKHURST, J., CRAIGHEAD, C.W., ELKINS, D. & HANDFIELD, R.B. 2005. An empirically derived agenda of critical research issues for managing supply-chain disruptions, *International Journal of Production Research*, 43(19): 4067-4081.

BLOWFIELD, M.E. 2005. Going global: how to identify and manage societal 5(3):119-128.

BODE, C., WAGNER, S.M., PETERSEN, K.J. & ELLRAM, L.M. 2011. Understanding Responses To Supply Chain Disruptions: Insights from Information Processing And Resource Dependence Perspectives. *Academy of Management Journal*, 54(4), 833-856.

BOLUMOLE, Y.A., KNEYEMER, A. LAMBERT, D.M. 2003. The Customer Service Management Process. *The International Journal of Logistics Management,* 14(2):15-31.

BOOTH, B. & ZEMMEL, R. 2004. Drug Discovery. Nature's Review, 3: 455.

BOZARTH, C. & HANDFIELD, R. 2006. Introduction to Operations and Supply Chain Management. Prentice Hall, Upper Saddle River, NJ.

CARR, A.S. & PEARSON, J.N. 2002. The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance. *International Journal of Operation & Production Management,* 22(9):1032-1053.

CASTALDI, C., TEN KATE, C. & DEN BRABER, R. 2011. Strategic purchasing and innovation: A relational view. *Technology Analysis & Strategic Management,* 23(9):983-1000.

CELTEK, S., & KAYNAK, H. 1999. *Characteristics of supply chain management: towards the development of a measurement instrument.* Proceedings. The second annual North American research symposium on purchasing and supply chain management.

CHASE, R.B. & JACOBS, F.R. 2011. Operations and Supply Chain Management. NY. Mc Graw Hill. Irwin, 13: 417-421.

CHEN, L.H. & HUNG, C.H. 2009. An integrated fuzzy approach for the selection of outsourcing manufacturing partners in pharmaceutical R& D. *International Journal of Production Research,* 48(24): 7483-7506.

CHRISTOPHER, M. & JUTTNER, U. 2000. Developing strategic partnerships in the supply chain: a practitioner perspective*, European Journal of Purchasing and Supply Management,* 6(2): 117-127.

COOPER, M.C, DOUGLAS, M.L. & PAGH.J.D. 1997. *The International Journal of Logistics Management*, 8(1): 1-14.

COUSINS, P.D. 2005. The alignment of appropriate firm and supply strategies for competitive advantage. *International Journal of Operations & Production Management,* 25(5):403-428.

CROOM, S. 2011. Restructuring supply chains through information channel innovation. *International Journal of Operations & Production Management*, 21(4): 504-515.

CROXTON. K.L. 2003.The order Fulfillment Process. *The International Journal of Logistics Management,* 14(1): 19-33.

CROXTON, K.L. LAMBERT, D.M., SEBASTIAN, J. & ROGERS, D.S. 2002. The Demand Management Process. *The International Journal of Logistics Management,* 13(2):51-66.

CROXTON, K.L., SEBASTIAN, J., LAMBERT, D.M. & ROGERS, D.S. 2001. The Supply Chain Management Process. *The International Journal of Logistics Management,* 13(2):51-66.

DAVENPORT, T.H. 1993*. Process Innovation, Reengineering Work through Information Technology.* Harvard Business School Press.

DONG, H. 1999. Drug policy in China: pharmaceutical distribution in rural areas. *Social Science & Medicine,* 48: 777-786

DONLON, J.P. 1996. Maximizing value in the supply chain. *Chief Executive*, 117:54-63.

ECONOMY WATCH, 2010. South African Economy. Date of Access: 31August 2013. URL: www.economywatch.com.

ELLRAM, LISA, M. & COOPER, M.C. 1990. Supply Chain Management, Partnership, and the Shipper-Third Party Relationship. *The International Journal of Logistics Management,* 1(2):1-10.

FERGUSON, W.C., HARTLEY, M.F., TURNER, G.B. & PIERCE, E.M. 1996. Purchasing role in corporate strategic planning. *International Journal of Physical Distribution and Logistics Management,* 26(4):51-62.

FRANKEL, R., GOLDSBY, T.J, WHIPPLE, J.M. 2002. Grocery Industry Collaboration in the wake of ECR. *The International Journal of Logistics Management,* 13(1): 57-72.

GOLDSBY, T.J. & SEBASTIAN, J. 2003. The Manufacturing Flow Process. *The International Journal of Logistics Management,* 14(2): 33-52.

GRANT, R.M. 1991. "The Resource-based theory of competitive advantage: implications for strategy formulation". *California Management Review*, 33(33): 114-135.

GRAY, A.L. 2009. Medicine pricing interventions. The South African experience. *Southern med Review*.2 (2):19.

GRAY, A. & SULEMAN, F. 1999. Drug policy. *South African Health Review*, 13:161-174.

GRIFFITH, D.A., HARVEY, M.G. & LUSCH, R.F. 2006. Social exchange in supply chain relationships: The resulting benefits of procedural and distributive justice. *Journal of Operations Management,* 24(2), 85-98.

HANDFIELD, R.B. & NICHLOS, E.L. 2002. Supply Chain Redesign: Transforming Supply Chain into Integrated Value Systems. Pearson Education, Financial Times Press, Upper Saddle River, N.J.

HANDFIELD, R.B., RAGATZ, G.L., PETERSEN, K.J. & MONCZKA, R.M. 1999. Involving suppliers in new product development. *California Management Review*, 42 (1):59-84.

HATZENBERG, T. 2001. Select competition issues arising from changes in the distribution of Pharmaceutical products in South Africa.

HDMA. 2009. The Role of Distributors in the US Healthcare Distribution Management Association, Center for Healthcare Supply Chain Research.

HINES, T. 2004 Supply Chain Strategies. Burling, M.A: Elsevier Butterworth-Heinemann.

HOLDFORD, D. 2005. Understanding the dynamics of the pharmaceutical market using a social marketing framework. *Journal of Consumer Marketing*, 22(7): 388-396.

HOYT, J. & HUQ, F. 2000. From arms length to collaborative relationship in the supply chain. *International Journal of Physical Distribution & Logistics Management*, 30 (9): 750-764.

HUISKONEN, J & PIRTILLA, T. 2002. Lateral co-ordination in a logistics outsourcing

relationship. *International Journal of Production Economics,* 78(2): 177-185.

JAIN, V., WADHWA, S. & DESHMUKH, S.G. 2006. Modeling and analysis of supply chain dynamics: a high intelligent time petri net based approach. *International Journal of Industrial and Systems Engineering, 1*(1/2): 59-86.

JAIN, V., WADHWA, S. & DESHMUKH, S.G., 2007b. A negotiation to co-ordinate mechanism for modeling buyer-supplier relationship in dynamic environment. *International Journal of Enterprise Information Systems*, 3(2), 1-31.

JAMBULINGAM, T., KATHURIA, R. & NEVIN, J.R. 2009. How fairness garners loyalty in the pharmaceutical supply chain. Role of trust in the wholesaler-pharmacy relationship. *International Journal of Pharmaceutical and Healthcare Marketing,* 3(4):305-322.

JARVIS, M. 1999. Concurrent Engineering. *Work, Study.* 48(3):88-91.

JENNINGS. 2002. Strategic sourcing: benefits, problems and a contextual model. *Management Decision*, 40(1):26-34.

JOHANSON, J. & MATTSON, L.G. 1987. Inter-organizational relations in industrial systems: a network approach compared with the transaction cost approach. *Inter-organizational Studies of Management and Organization,* 17(1): 34-48.

KATHAWALA, Y.K. & ABDOU, K. 2003. Supply chain evaluation in the service industry: a framework development compared to manufacturing. *Managerial Auditing Journal*, 18(2): 140-149.

KAUFFMAN, R.G. 2002. Supply management. *The Journal of Supply Chain Management*: 46-50.

KISHORE, K. SURENDRA, M. & GOVINDAN, K. 2009. "Metrics for performance measurement of a reverse/ closed-loop supply chain". *International Journal Business Performance and Supply Chain Modeling,* 1(1): 8-32.

KOH, S.C. L., DEMIRBAG, M., BAYRAKTAR, E., TATOGLU, E. & ZAIM, S. 2007. The impact of supply chain management practices on performance of SMEs. *Industrial Management & Data Systems,* 107(1):103-124.

LAMBERT, D.M. 1994. The International Centre for Competitive Excellence. University of North Florida.

LAMBERT, D.M. 2004. *Supply Chain Management: Processes, Partnerships, Performance,* 8: 118-243.

LAMBERT, D.M. & COOPER, M.C. 2000. Issues in supply chain management. *Industrial marketing Management, 29*:65-83.

LAMBERT, D.M., COOPER, M.C. & PAGH, J.D. 1998. Supply Chain Management: Implementation Issues and Research Opportunities. *The International Journal of Logistics Management.* 9(2):1-19.

LAMMING, R.C. 1993. Beyond Partnership: Strategies for Innovation and Lean Supply, Prentice-Hall, Hemel Hampsted.

LEE, K. 2003. Health impacts of globalization: towards global governance. London. Palgrave Macmillan.

LEE, H.L. & BILLINGTON, C. 1992. "Managing supply chain inventory: pitfalls and opportunities". *Sloan Management Review,* 65-73.

LEE, S.M., LEE, D., & SCHNIEDERJANS, M.J. 2011. Supply chain innovation and organizational performance in healthcare industry. *International Journal of Operations& Production Management,* 31(11):1193-1214.

LI, D.C & DAI, W.L. 2009. Determining the Optimal Collaborative Benchmarks in a Supply Chain. *International Journal of Production Research*, 47(16): 4457-4471.

LI, S., RAGU-NATHAN, B., RAGU-NATHAN, T.S. & RAO, S.S. 2006. The impact of supply chain management practices on competitive advantage and organizational performance. *The International Journal of Management Science*, 34:107-124.

LOGAN, M.S. 2000. Using agency theory to design successful outsourcing relationships. *International Journal of Logistics Management,* 11(2):21-82.

LUMMUS, R.R., KRUMWLEDE, D.W. & VOKURKA, R.J. 2001. The relationship of logistics to supply chain management: developing a common industry definition. *Industrial Management & Data Systems*, 101(8); 426-431.

LUMMUS, R.R & VOKURKA, R.J. 1999. Defining supply chain management: a historical perspective and practical guidelines. *Industrial Management & Data Systems*, 99(1):11-17.

MALTZ, A. 1993. Private fleet use: a transaction cost model. *Transportation Journal,* 32(3): 46-53.

MCMILLAN, J.H. & SCHUMACHER, S. 2001. Research in Education. NY. Addison Wesley Longman Incorporation. 5th Ed. 175-176.

MEADE, L., SARKIS, J., 2002. A conceptual model for selecting and evaluating third-party reverse logistics providers. Supply Chain Management*: An International Journal*, 7(5):283-295.

MEHRALIAN, G.H. RAJABZADEH, A. MORAKABATI, M. & VATANPOUR, H. 2012. Developing a suitable model for supplier selection based on supply chain risks. *Iranian Journal of Pharmaceutical Research,* 11(1): 209-219.

MENTZER, J.T. 2004. Fundamentals of Supply Chain Management. Thousand Oaks, CA.

MENTZER, J.T., MIN, S. & ROBBITT, L.M. 2004. Towards a unified theory of logistics. *International of Physical Distribution & Logistics Management,* 34(8): 606-627.

MENTZER, J.T. 2001. Supply Chain Management, Thousand Oaks, CA.

MUCKSTADT, J.A., MURRAY, D.H., RAPPOLD, J.A., COLLINS, D.E. 2001 Guidelines for Collaborative Supply Chain System Design and Operation. *Information Systems Frontiers*, 3:4, 427-453.

MENTZER, J.T., DE WITT, W., KEEBLER, J.S., MIN, S. NIX, N.W., SMITH, C.D. & ZACHARIA, Z.G. 2001. Defining supply chain management. *Journal of Business Logistics,* 22(2):1-25.

MIKKOLA, J.H. 2003b. “Modularity, component outsourcing, and inter-firm learning”. *RD Management,* 33(4): 439-454.

MIN, S. & MENTZER, T. 2004. Developing and measuring supply chain management concepts. *Journal of Business Logistics.* 25(1):63-99.

MUCKSTADT, J.A., MURRAY, D.H., RAPPOLD, J.A. & COLLINS, D.E. 2001. Guidelines for Collaborative Supply Chain System Design and Operation. *Information Systems Frontiers,* 3(4): 427-453.

NARAYANAN, V.G. & RAMAN, A. 2004. Aligning incentives in supply chain. *Harvard Business Review*. 82(11):94-102.

NG, R. Drugs: 2009. From Discovery to Approval. New Jersey. John Wiley and Sons Incorporation. .

OLIVER, R. & WEBBER. 1982. Supply chain management: logistics catches up with strategy. *Logistics: The strategic Issues,* Chapman& Hill: 63-75

OMNISURGE, (2012), Medical News. Date accessed: 29 Aug 2013. www.omnisurge.co.za

PRAHALAD, C& HAMEL, G. 1990. "The core competence of the corporation. *Harvard Business Review,* 68(3) 79-91.

QUESADA, H. & MENESES, M. 2010. Determination de un Negocios para Apoyar.

ROGERS, D.S., LAMBERT, D.M. & KNEMEYER. 2004. The Product Development and Commercialization Process. *The International Journal of Logistics Management,* 13(2):43-56.

ROGERS, D.S., DOUGLAS, M.L., KEELEY, L.C. & SEBASTIAN, J. 2002. The Returns Management Process*. The International Journal of Logistics Management*, 13(2): 1-18.

ROSSETTI, C.L., HANDFIELD, R. & DOOLEY, K.J. 2011. Forces, trends, and decisions in pharmaceutical supply chain management. *International Journal of Physical Distribution and Logistics Management*, 41(6):601-622.

SAUNDERS, M.N.K., LEWIS, P. & THORNHILL, A. 2000, Research Methods for Business Students, Prentice Hall, London.

SHAH, N. 2004. Pharmaceutical supply chains: key issues and strategies for optimization. *Computers and Chemical Engineering*, 28: 929-941.

SOUTH AFRICAN COUNTRY REPORT. 2012. Date of access: 31 August 2013.www.education.gov.za/LinkClik.aspx?

SRIVASTAVA, S.K., SRIVASTAVA, R.K. 2006. Managing product returns for reverse logistics. *International Journal of Physical Distribution& Logistics Management,* 36(7):524-546.

STUART, I.F. & Mc CUTCHEON, D. 1996. "Sustaining strategic supplier alliances. *International Journal of Operations & Production Management*, 32(9): 734-754.

SUKATI, I., HAMID, A. B. A., BAHARUN, R. & HUAM, H.T. 2011. Supply chain management practices: an empirical investigation on consumer goods industry in Malaysia*. International Journal of Business and Social Science,* 2(17):166-176.

SWAFFORD, P.M., GHOSH, S. & MURTHY, N.N. 2006. A framework for assessing value chain agility. *International Journal of Operations and Production Management,* 26(2): 118-140.

SVENSSON, D. 2002. The theoretical foundation of supply chain management: a functionalist theory of marketing", *International Journal of Physical Distribution & Logistics Management,* 32(9): 734- 754.

THORELLI, H.B. 1986. Networks: Between Markets and Hierarchies. *Strategic Management Journal,* 7(1): 37-51.

WILLIAMSON, O. 1996. The Mechanisms of Governance, Oxford University Press, Oxford.

WISNER, J. & TAN, K.C. 2000. Supply chain management and its impact on purchasing. *Journal of Supply Chain Management,* 36(4): 33-42.

ZENG, A.Z. 2003. Global sourcing: process and design for efficient management. Supply Chain Management: *An International Journal,* 8(4):367-379.

ZIGIARIS, S. 2000. *INNOREGIO*: *dissemination of innovation and knowledge management techniques,* BPR Hellas SA. 1-21.

Appendix 1

06th August 2013

For attention: The respondent

REQUEST FOR YOUR ASSISTANCE: RESEARCH QUESTIONNAIRE

Dear Sir / Madam

I am a third year student for the degree Master of Business Administration (MBA) at the North West University Potchefstroom campus. In order to fulfill the requirements of the degree I am conducting business research on contribution and impact of supply chain management and current trends to South African pharmaceutical industry.

Your assistance in this research project will be highly appreciated. Questionnaires together with the cover letter will be sent should permission be granted to conduct the research. Completion the questionnaire will not take more than 20 minutes of your time .The completed questionnaire can either be returned by e-mail or fax and it will be treated as confidential.

Your kind co-operation will be greatly appreciated

M.E. TSOKU

MBA Student

Cell: 0716073457

ANNEXURE 4.1

QUESTIONNAIRE ON DETERMINING SUPPLY CHAIN MANAGEMENT (SCM) TRENDS IN THE PHARMACEUTICAL INDUSTRY (RETAIL PHARMACIES)

SECTION A: DEMOGRAPHIC DATA

This section of the questionnaire is for statistical purposes.

INSTRUCTIONS

Please place a cross (X) in the appropriate box.

1. What is the total number of employees in your pharmacy?

☐ **0- 5** ☐ **6-10** ☐ **11-15** ☐

2. In which area of Gauteng is your pharmacy?

☐ Johannesburg ☐ Pretoria ☐ Soweto

3. What position do you hold in the pharmacy?

☐ Employee ☐ Manager ☐ Co-owner/ Manager ☐ Owner/ Manager

4. What is your gender?

☐ Male ☐ Female

5. What is your race?

☐ Asian ☐ Black

☐ Coloured ☐ White

SECTION B

CONFIDENTIAL

Research: Determining supply chain management trends in the pharmaceutical industry

QUESTIONNAIRE TO THE RETAIL SECTOR OF THE PHARMACEUTICAL INDUSTRY

Please complete the following questions:

Name of your pharmaceutical business:				
Mark your answers with X in the appropriate block:				
The following questions identify important best practices in pharmaceutical supply chain				
To what extent does the business recognize supply chain management (SCM) practices?				
5. A great deal	4.Quite a bit	3. Somewhat	2. Very Little	1.Not at all
How often do you consider SCM important to retail pharmaceutical business?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
Are the principles of supply chain management visible on daily practices?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How often are the methodologies of supply chain implemented for optimization of the business?				
5. Most of the time	4.Often	3. Sometimes	2.Seldom	1. Never
Does the business form close partnership with suppliers and customers?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1. Never
Is there a constant flow of information, materials between members of supply chain (retailers, distributors)?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How frequent do you run out-of-stock and have a list of out-of-stock items?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1. Never

Does the distributor inform you in advance about the shortages or delays of stock?				
5. Most the time	4.Often	3.Sometimes	2.Seldom	1.Never
As part of the SCM do you provide feedback to your distributors and manufacturers?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
Do you have procedures to enhance continuity of supply to customers?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How regularly do you utilize inventory management system?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
The following set of questions determine SCM efficiency and customer value creation **Does the pharmacy utilize efficient data management system?**				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Does the business have strategies to enhance customer services?				
5.A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Does the business utilize feedback mechanism in terms of unavailability of products?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
Are there specific challenges in improving customer services?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Never
If SCM practices are implemented, is there speedy processing of patient care?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Does the business have planning and control strategies to optimize supply chain management?				
5. A great deal	4.Quite a bit	3. Somewhat	2. Very little	1. Not at all

The following questions measure the relationship between business performance and supply chain management				
Do you think SCM trends bring effectiveness and efficiency to supply chain management of South African pharmaceutical retail sector?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1. Not at all
Is there any increase in sales and higher accuracy in costing if SCM practices are implemented?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Is there improved co-ordination between the departments within the business?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1. Not at all
Is there improved co-ordination with suppliers and customers?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Do SCM practices enhance competitive capabilities?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Do SCM practices enhance customer service?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Does SCM implementation improve business performance?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1. Not at all

THANKS FOR COMPLETING THE QUESTIONNAIRE

ANNEXURE 4.2

QUESTIONNAIRE ON DETERMINING SUPPLY CHAIN MANAGEMENT (SCM) TRENDS IN THE PHARMACEUTICAL INDUSTRY (PHARMACEUTICAL DISTRIBUTORS)

Research: Determining supply chain management trends in the Pharmaceutical industry

QUESTIONNAIRE TO DISTRIBUTORS OF PHARMACEUTICAL PRODUCTS

The completed questionnaire will remain confidential

INSTRUCTIONS

Please complete the following questions **Name of pharmaceutical distributor:**				
Mark your answer with X in the appropriate block:				
The following questions identify important best practices in pharmaceutical supply chain				
How often does the business recognize the importance of supply chain management and practices?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
Are the principles of supply chain management visible on daily practices?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
How often are methodologies of supply chain implemented for optimization of the business?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
Does the business form close partnership with pharmaceutical manufacturers and customers?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Is continuity of product supply being enhanced?				
5. A great deal	4.Quite a bit	3.Somewhat	2. Very little	1.Not at all
Is there a constant flow of information, materials between members of supply chain? (manufacturers and retailers)				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
How frequent do you run out of stock and have a list of out-of-stock-items?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never

Do manufacturers inform you in advance about the shortages or delays of stock?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1. Never
As part of the SCM do you provide feedback to manufacturers and retailers?				
5. Most of the time	4.Often	3.Sometimes	2. Seldom	1. Never
Do you have procedures to enhance the continuity of supply to customers?				
5. A great deal	4.Quite a bit	3. Somewhat	2. Very little	1.Not at all
How regularly do you utilize inventory management system?				
5. Most of the time	4. Often	3.Sometimes	2.Seldom	1. Never
The following set of questions determine SCM efficiency and customer value creation				
Does the business utilize efficient Data Management System?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Does the business have strategies to enhance customer services?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Is there any feedback mechanism that the business utilizes in terms of unavailability of products?				
5. A great deal	4.Quite a bit	3.Somewhat	2. Very little	1.Not at all
How often do you encounter challenges when improving customer services?				
5. Most of the time	4.Often	3.Sometimes	2.Seldom	1.Never
If SCM practices are implemented, is there any speedy processing of patient care?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
The following questions measure relationship between business performance and supply chain management				
Do changes in business practices such as SCM compel you to maintain lower inventories?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all

Is there any increase in sales and higher accuracy in costing if SCM practices are implemented?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Do SCM practices improve coordination between departments within the business?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	
Is there any improved coordination with suppliers and customers?				
5. A great deal	4.Quite a bit	3. Somewhat	2.Very little	1.Not at all
Do SCM practices enhance competitive capabilities?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Do SCM practices enhance customer service?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all
Does SCM implementation improve business performance?				
5. A great deal	4.Quite a bit	3.Somewhat	2.Very little	1.Not at all

THANKS FOR COMPLETING THE QUESTIONNAIRE

ANNEXURE 4.3

QUESTIONNAIRE ON DETERMINING SUPPLY CHAIN MANAGEMENT (SCM) TRENDS IN THE PHARMACEUTICAL INDUSTRY (PHARMACEUTICAL MANUFACTURERS)

Research: Determining supply chain management trends in the Pharmaceutical industry

QUESTIONNAIRE TO MANUFACTURERS OF PHARMACEUTICAL PRODUCTS

The completed questionnaire will remain confidential

INSTRUCTIONS

Please complete the following questions

Place a cross (X) in the appropriate box.				
Name of your Pharmaceutical Company:				
CUSTOMER SERVICE LEVEL				
How often does the business recognize the importance of supply chain management and practices?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
How regularly do SCM practices enhance product differentiation?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How often can you determine appropriate customer service level?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
How often do you ensure that there is continuous product availability and always maintains higher customer service levels?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
Are capable of avoiding the silent build-up of inventory that takes place due to increasing uncertainty in supply and demand?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never

Do you practice demand forecasting technique?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How often do you frequently or regularly respond to demand for lower cost?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
Does sustainable development concept affect the availability of raw-material or resources for manufacturing of medicines?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
SIGNIFICANCE OF CURRENT TRENDS IN THE PHARMACEUTICAL INDUSTRY				
Does the business have access to information regarding supply chain planning and product changes ?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Do you have an elevated level of trust and collaboration with suppliers?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1.Not at all
Does the business have rapid and high product development and technology transfer?				
5. A great deal	4.Quite a bit	3. Somewhat	2. Very little	1. Not at all
Does the business embark upon outsourcing in order to lean out inventories or responding for lower cost?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
BUSINESS PERFORMANCE				
How often do you make certain that your products are of substantial standard?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never

Do SCM practices enhance competitive capabilities such as cost leadership?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Never
Do you sometimes experience delays in product development?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
Do you have any difficulty in forecasting sales accurately?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Never
Do you have adequate marketing techniques?				
5. A great deal	4. Quite a bit	3. Sometimes	2. Seldom	1. Never
How constant do you struggle with slow new product introductions?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never
Do you experience any manufacturing difficulties or struggle with high inventory levels?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
Do planning and control strategies in business optimize supply chain management?				
5. A great deal	4.Quite a bit	3. Somewhat	2. Very little	1. Not at all
Does the business use key operational business processes?				
5. A great deal	4.Quite a bit	3. Somewhat	2.Very little	1. Not at all
Is there a need for a business to improve or redesign business processes?				
5. A great deal	4. Quite a bit	3. Somewhat	2. Very little	1. Not at all
How regularly does the supply chain department ensure that they are developing the skills, knowledge and abilities of the next generation of their managers and leaders in the orgarnisation?				
5. Most of the time	4. Often	3. Sometimes	2. Seldom	1. Never

Appendix 2

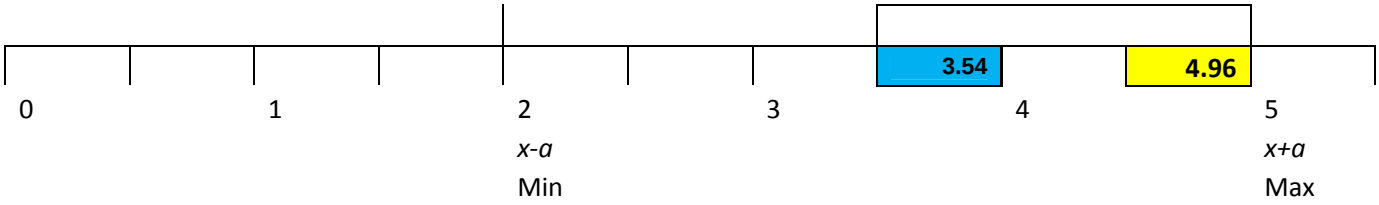
Descriptive Statistics for pharmarmaceutical retailers

	N	Minimum	Maximum	Mean	Std. Deviation	X	Y
Towhatextentdoesthebusiness recognizesupplychainmanage me	40	2.0	5.0	4.250	.7071	4.957	3.543
HowoftendoyouconsiderSCMi mportanttoretailpharmaceutical	40	4.0	5.0	4.625	.4903	5.115	4.135
AretheprinciplesofSCMvisibleo ndailypractices	40	2.0	5.0	3.925	.6938	4.619	3.231
Howoftenarethemethodologies ofsupplychainimplementedfor	40	3.0	5.0	3.750	.5430	4.293	3.207
Doesthebusinessformclosepart nershipswithsuppliersandcus	40	3.0	5.0	4.050	.6775	4.727	3.373
Isthereaconstantflowofinformat ionmaterialsbetweenmember	40	2.0	5.0	3.925	.7642	4.689	3.161
Howfrequentdoyourunoutofsto ckandhavealistofoutofs	40	3.0	4.0	3.450	.5038	3.954	2.946
Dodistributorsinformyouinadva nceabouttheshortagesordel	40	2.0	5.0	3.500	.8771	4.377	2.623
AspartoftheSCMdoyouprovidef eedbacktoyourdistributors	40	2.0	5.0	3.725	.7841	4.509	2.941
Doyouprocedurestoenhanceco ntinuityofsupplytocustomers	40	3.0	5.0	3.950	.6385	4.589	3.311
Howregurlarlydoyouutilizeinve ntorymanagementsystem	40	2.0	5.0	3.800	.6869	4.487	3.113
Doesthepharmacyutilizeefficie ntdatamanagementsystem	40	2.0	5.0	3.700	.6485	4.348	3.052
Doesthebusinesshavestrategie stoenhancecustomerservices	40	3.0	5.0	3.950	.6775	4.627	3.273
Doesthebusinessutilizefeedba ckmechanismintermsofunavail	40	2.0	5.0	3.750	.7763	4.526	2.974
Aretherespecificchallengesini mprovingcustomerservices	40	3.0	5.0	4.050	.5524	4.602	3.498
IfSCMpracticesareimplemente distherespeedyprocessingof	40	3.0	5.0	4.100	.7442	4.844	3.356
Doesthebusinesshaveplanning andcontrolstrategiestooptimi	40	3.0	5.0	3.850	.6622	4.512	3.188
DoyouthinkSCMtrendsbringeff ectivenessandefficiencytoSC	40	3.0	5.0	3.750	.6304	4.380	3.120
Isthereanyincreaseinsalesand higheraccuracyincostingif	40	3.0	5.0	4.525	.5986	5.124	3.926
Isthereimprovedcoordinationbe tweendepartmentswithintheb	40	3.0	5.0	4.500	.5547	5.055	3.945
Isthereimprovedcoordinationwi thsuppliersandcustomers	40	4.0	5.0	4.725	.4522	5.177	4.273
DoSCMpracticesenhancecomp etitivecapabilities	40	4.0	5.0	4.800	.4051	5.205	4.395
DoSCMpracticesenhancecusto merservices	40	4.0	5.0	4.900	.3038	5.204	4.596
DoesSCMimplementationimpr ovebusinessperformance	40	4.0	5.0	4.825	.3848	5.210	4.440
Valid N (listwise)	40						

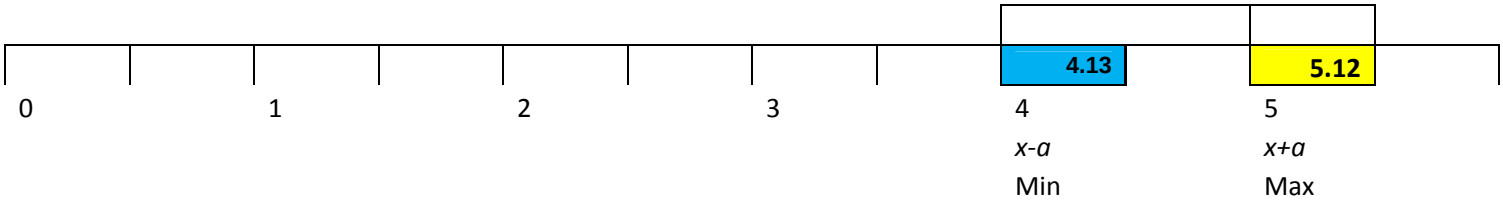
Appendix 2.1

RESPONSES FROM PHARMACEUTICAL RETAILERS – DATA INTERPRETATION

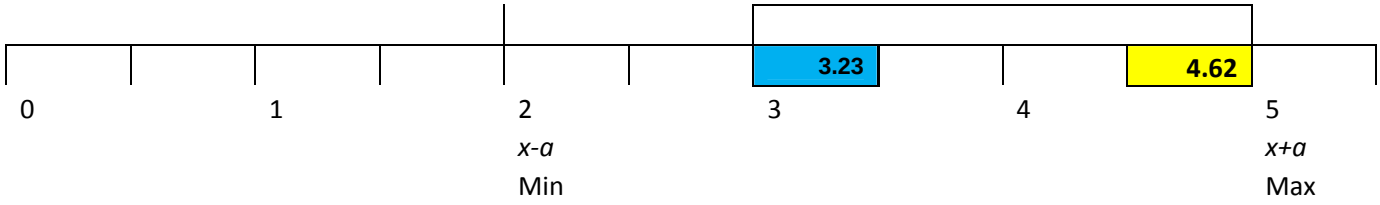
1. To what extent does the business recognize supply chain management?



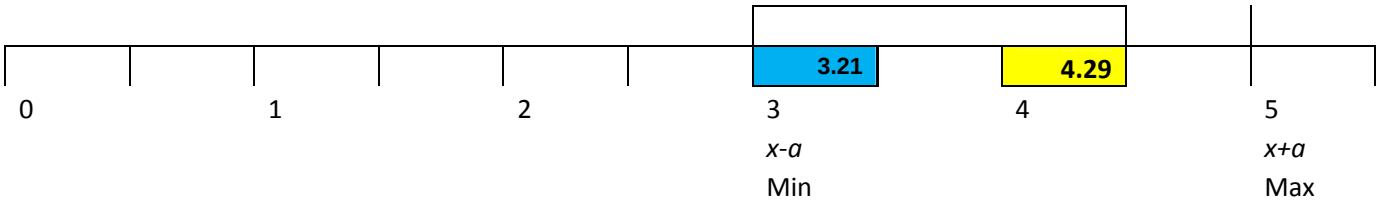
2. How often do you consider SCM important to retail pharmaceutical?



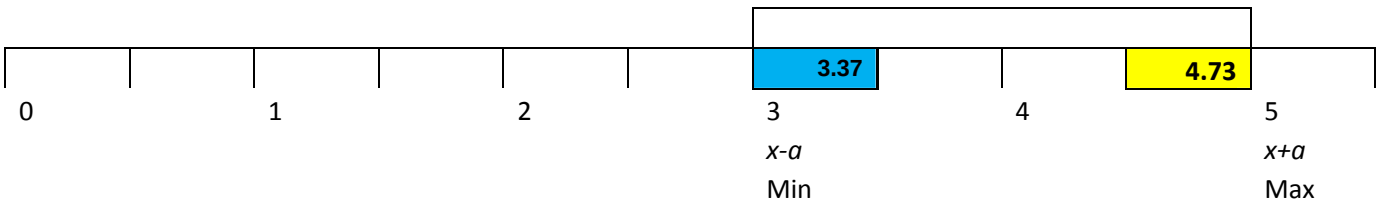
3. Are the principles of SCM visible on daily practices?



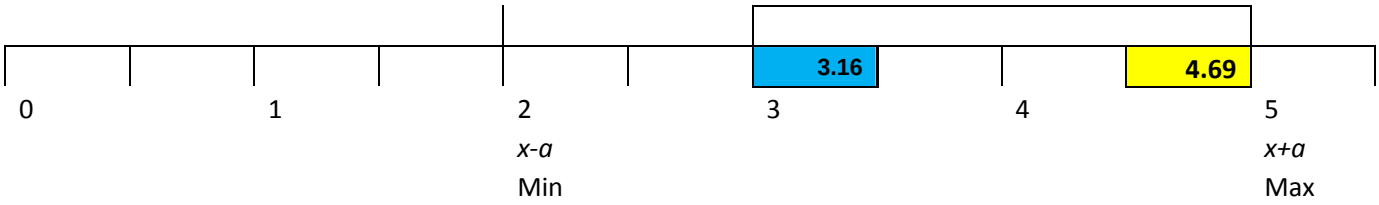
4. How often are the methodologies of supply chain implemented for?



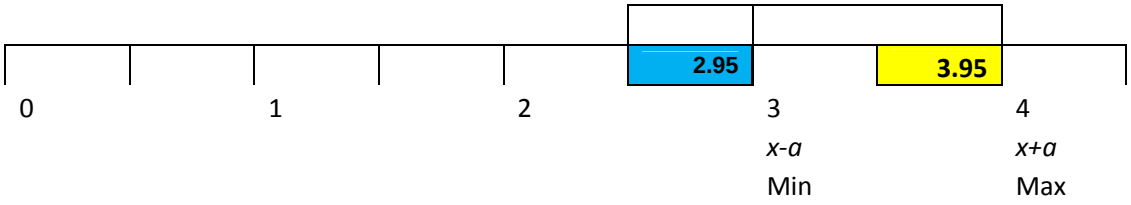
5. Does the business form close partnerships with suppliers and customers?



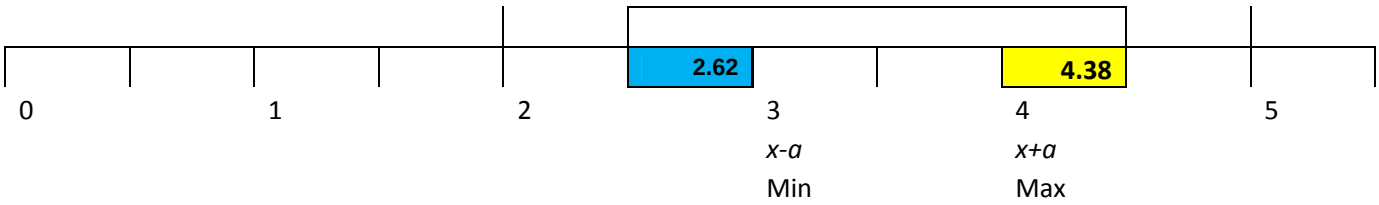
6. Is there a constant flow of information materials between members?



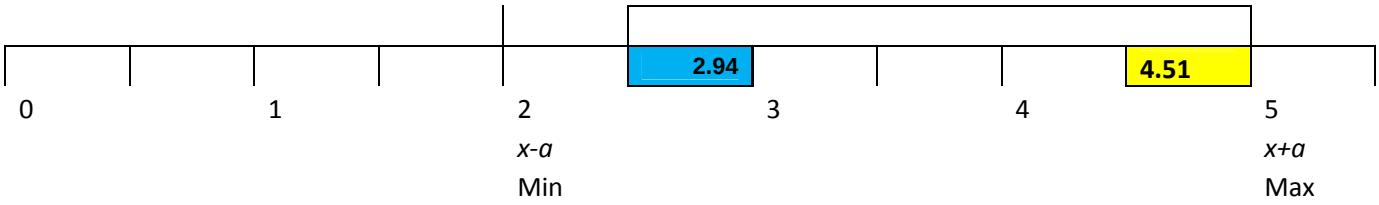
7. How frequent do you run out of stock and have a list of out of stock?



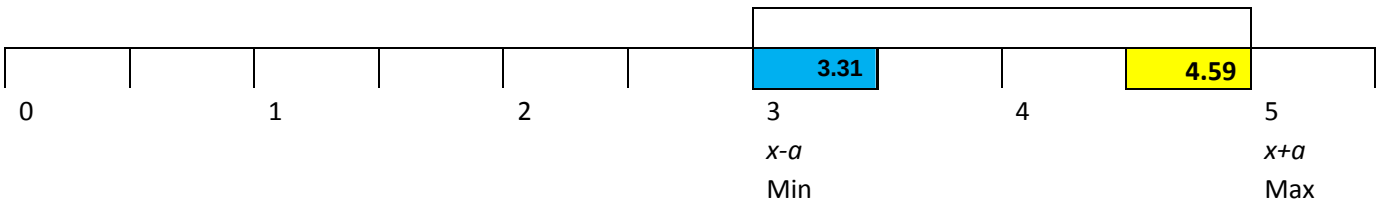
8. Do distributors inform you in advance about the shortages ordered?



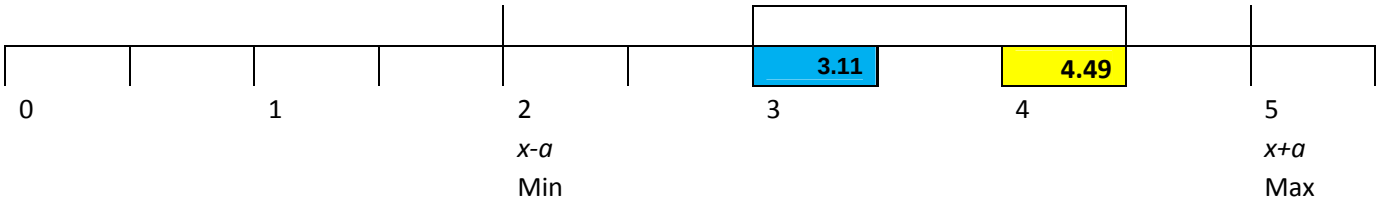
9. As part of the SCM do you provide feedback to your distributors?



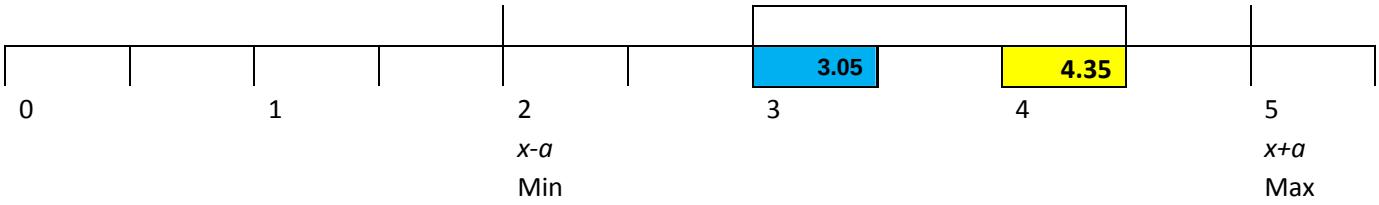
10. Do you procedures to enhance continuity of supply to customers?



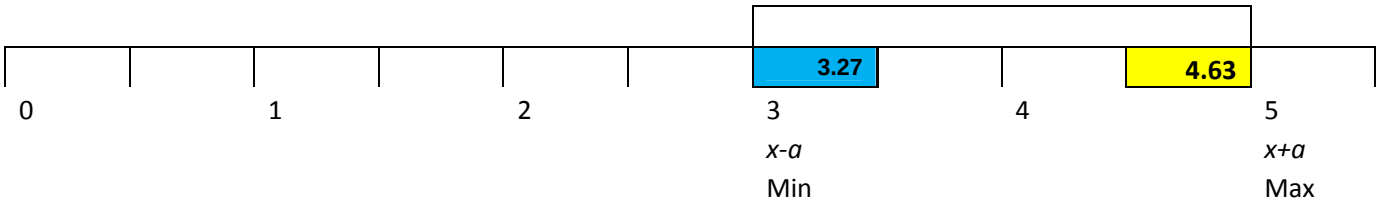
11. How regularly do you utilize inventory management system?



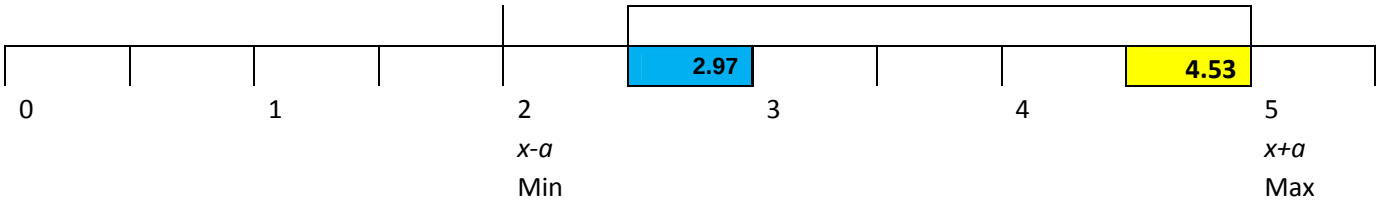
12. Does the pharmacy utilize efficient data management system?



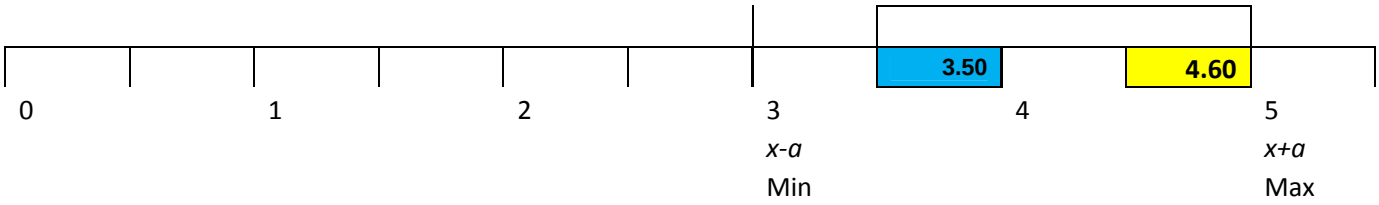
13. Does the business have strategies to enhance customer services?



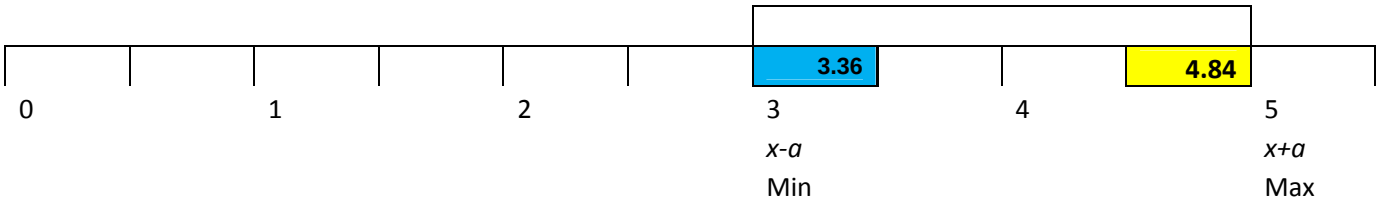
14. Does the business utilize feedback mechanism in terms of unavailability?



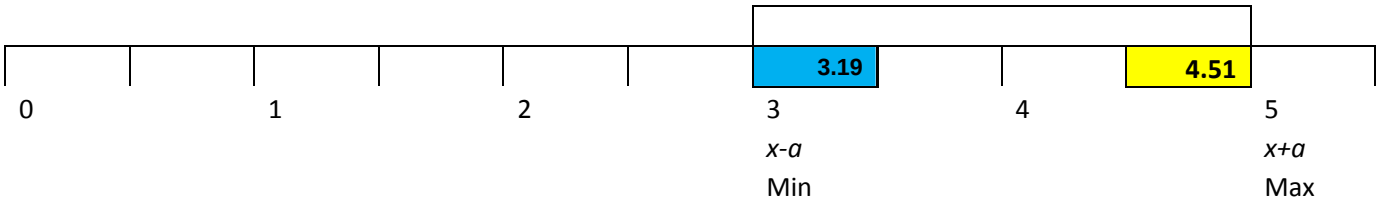
15. Are there specific challenges in improving customer services?



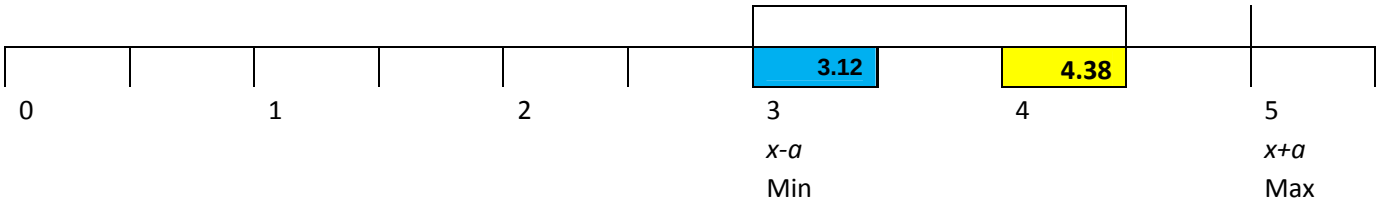
16. If SCM practices are implemented is there speedy processing of information?



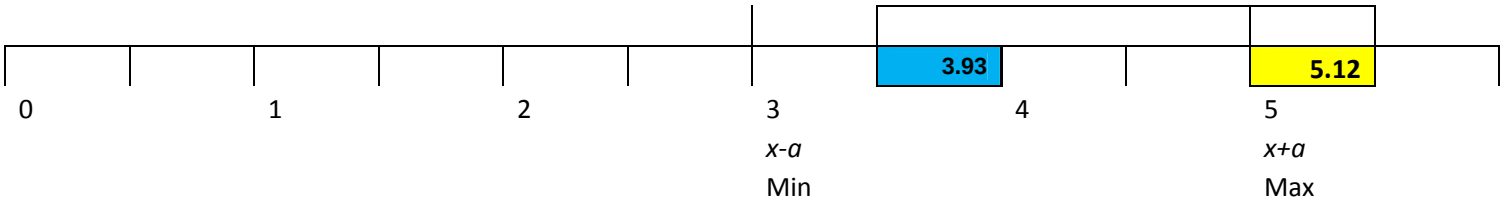
17. Does the business have planning and control strategies to optimize performance?



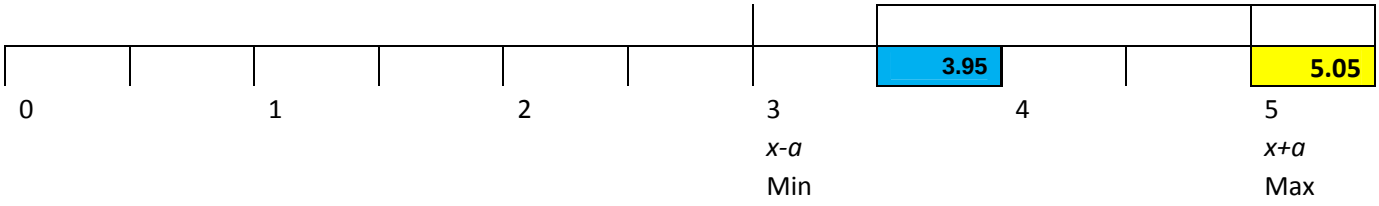
18. Do you think SCM trends bring effectiveness and efficiency to SCM?



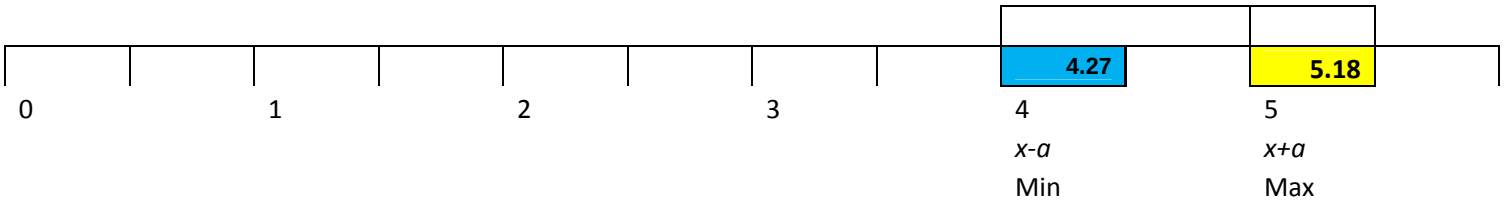
19. Is there any increase in sales and higher accuracy in costing if?



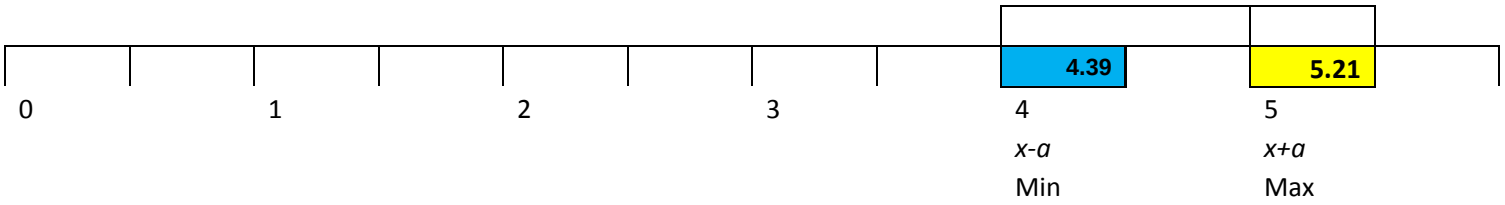
20. Is there improved coordination between departments within the business?



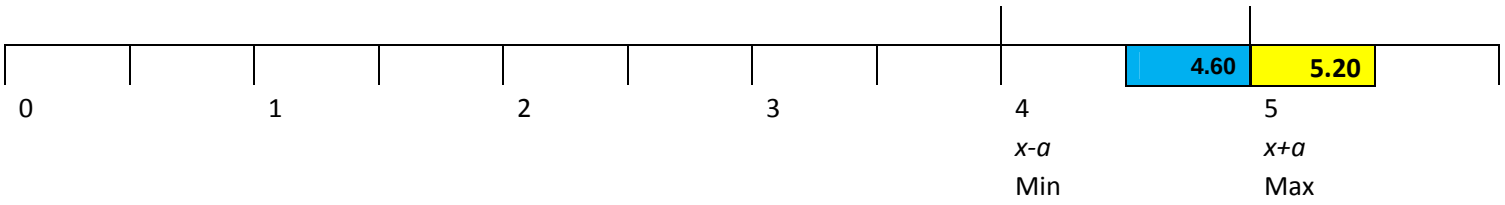
21. Is there improved coordination with suppliers and customers?



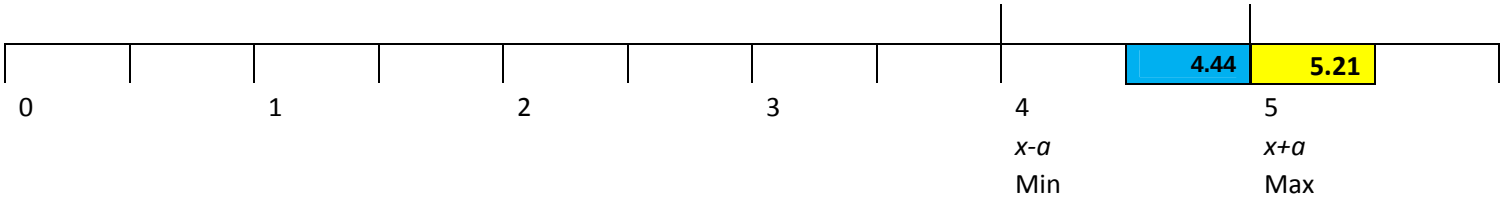
22. Do SCM practices enhance competitive capabilities?



23. Do SCM practices enhance customer services?



24. Does SCM implementation improve business performance?



Appendix 3

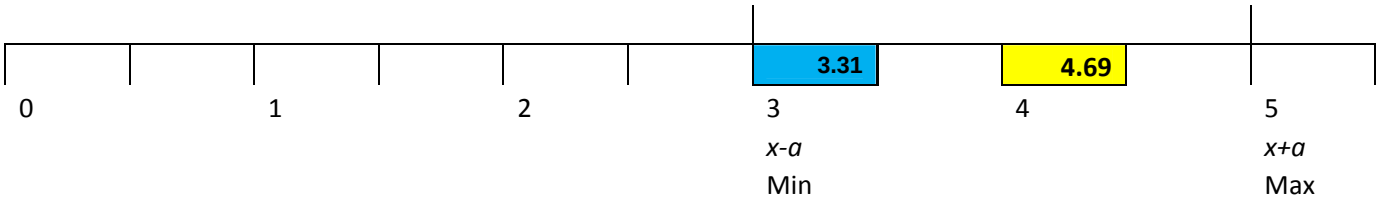
Descriptive Statistics for distributors

	N	Minimum	Maximum	Mean	Std. Deviation
Howfrequentdoesthebusinessrecognizetheimportanceofsuppl	30	3.0	5.0	4.000	.6948
AretheprinciplesofSCMvisibleondailypractices	30	3.0	5.0	4.067	.6397
Howoftenaremethodologiesofsupplychaininplementedforopti	30	2.0	5.0	3.867	.7303
Doesthebusinessformclosepartnershipwithmanufacturesandc	30	3.0	5.0	4.267	.5208
Iscontinuityofproductssupplybeingenhanced	30	3.0	5.0	4.000	.6433
Isthereaconstantflowofinformationmaterialsbetweenmembe	30	3.0	5.0	4.167	.5921
Howfrequentdoyourunoutofstockandhavealistofoutofs	30	2.0	5.0	3.400	.8944
Domanufacturersinformyouinadvanceabouttheshortagesord	30	2.0	5.0	3.700	.8769
AspartoftheSCMdoyouprovidefeedbacktomanufacturersand	30	3.0	5.0	3.767	.6789
Doyouhaveprocedurerstoenhancecontinuityofsupplytocusto	30	2.0	5.0	3.833	.6989
Howregurlarlydoyouutilizeinventorymanagementsystems	30	2.0	5.0	3.667	.6609
Doesthebusinessutilizeefficientdatamanagementsystems	30	3.0	5.0	3.600	.5632
Doesthebusinesshavestrategiestoenhancecustomerservices	30	3.0	4.0	3.433	.5040
Isthereanyfeedbackmechanismthatthebusinessutilizeinter	30	3.0	5.0	3.800	.6103
Howoftendoyouencounterchallengeswhenimprovingcustomerse	30	3.0	5.0	3.967	.6687
IfSCMpracticesareimplementedisthereanyspeedyprocessing	30	3.0	5.0	3.800	.7611
DochangesinbusinesspracticessuchasSCMcompelyoutomaint	30	2.0	5.0	3.800	.8469
Isthereanyincreaseinsalesandhigheraccuracyincostingif	30	3.0	5.0	4.233	.6261
DoSCMpracticesimprovecoordinationbetweendepartmentswithi	30	4.0	5.0	4.400	.4983
Isthereanyimprovedcoordinationbetweendepartmentswithinth	30	4.0	5.0	4.667	.4795
Isthereanyimprovedcoordinationwithsuppliersandcustomers	30	4.0	5.0	4.533	.5074
DoSCMpracticesenhancecompetitivecapabilities	30	4.0	5.0	4.633	.4901
DoSCMpracticesenhancecustomerservices	30	4.0	5.0	4.967	.1826
DoSCMimplementationimprovebusinessperformance	30	4.0	5.0	4.800	.4068
Valid N (listwise)	30				

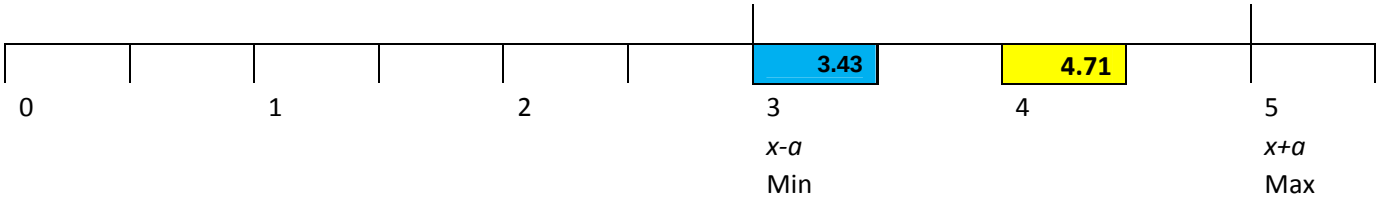
Appendix 3.1

RESPONSES FROM PHARMACEUTICAL DISTRIBUTORS – DATA INTERPRETATION

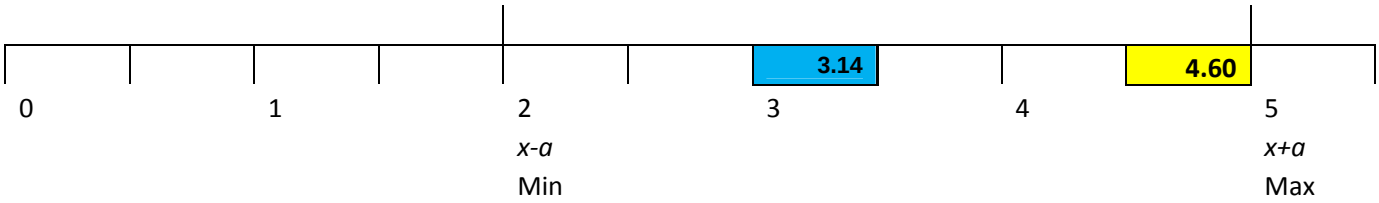
1. How frequent does the business recognize the importance of supply?



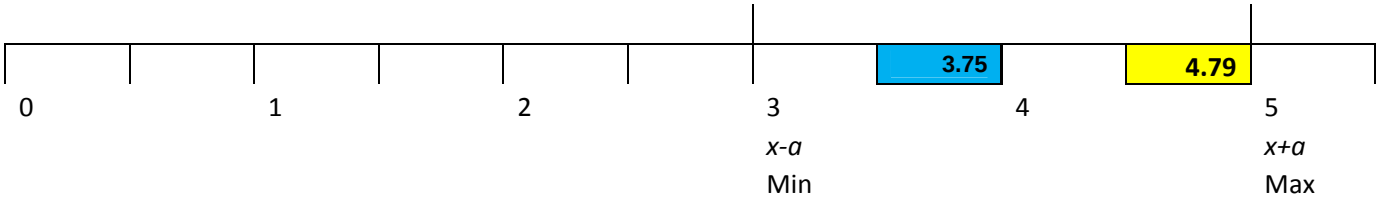
2. Are the principles of SCM visible on daily practices?



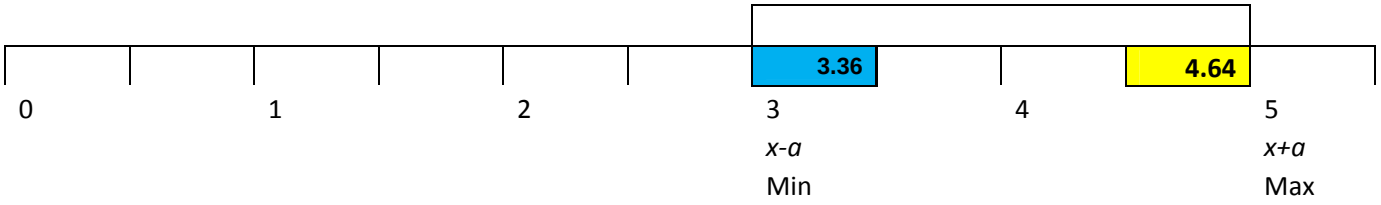
3. How often are methodologies of supply chain implemented for option?



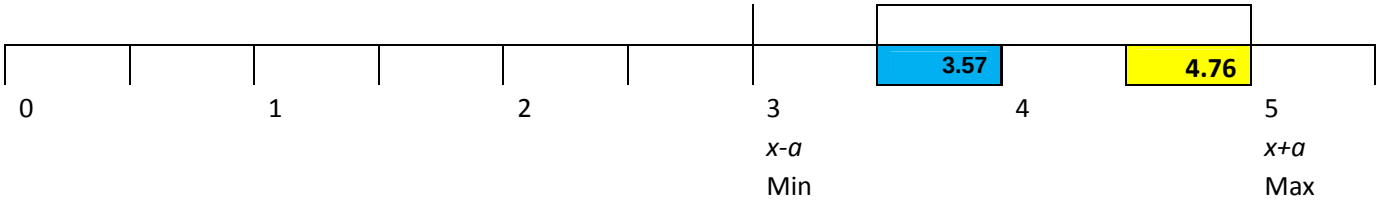
4. Does the business form close partnership with manufactures and co?



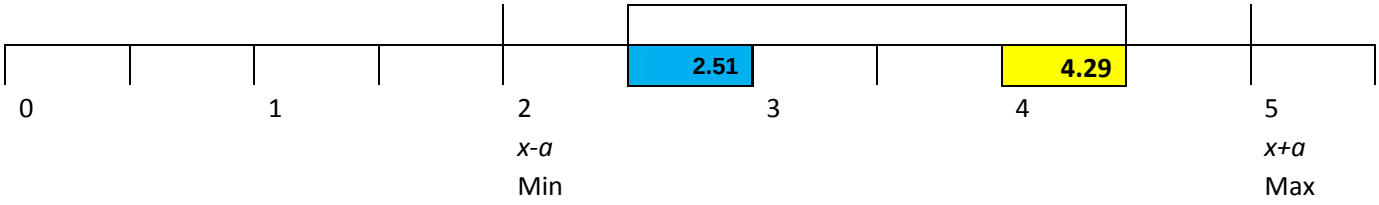
5. Is continuity of products supply being enhanced?



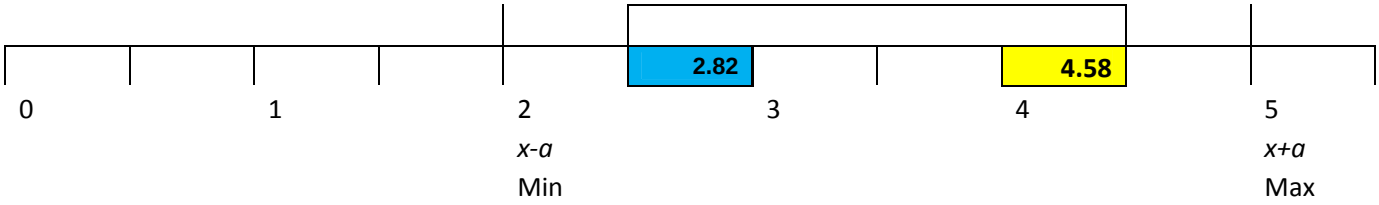
6. Is there a constant flow of information materials between members?



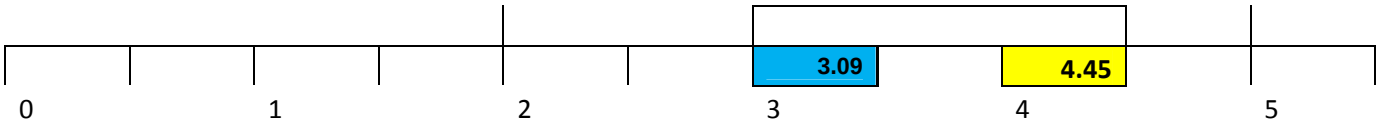
7. How frequent do you run out of stock and have a list of out of stock?



8. Do manufacturers inform you in advance about the shortages ordered?

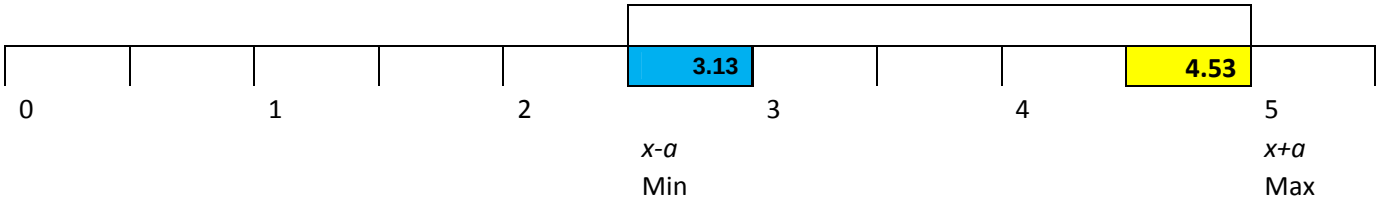


9. As part of the SCM do you provide feedback to manufacturers and distributors?

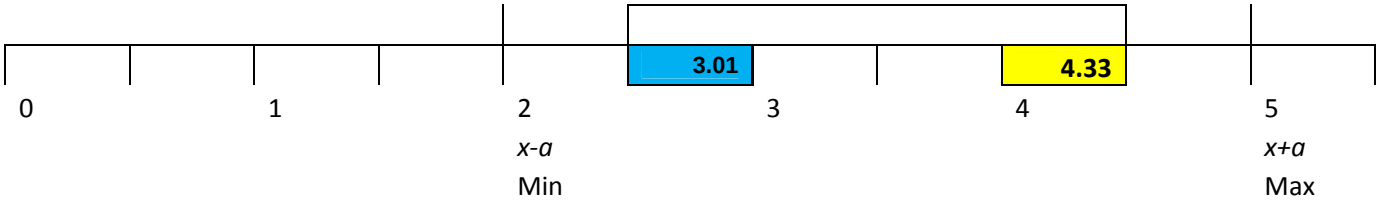


x-a *x+a*
Min Max

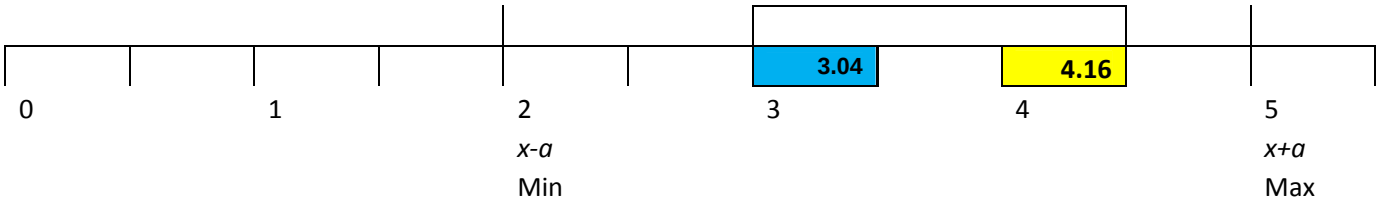
10. Do you have procedures to enhance continuity of supply to customers?



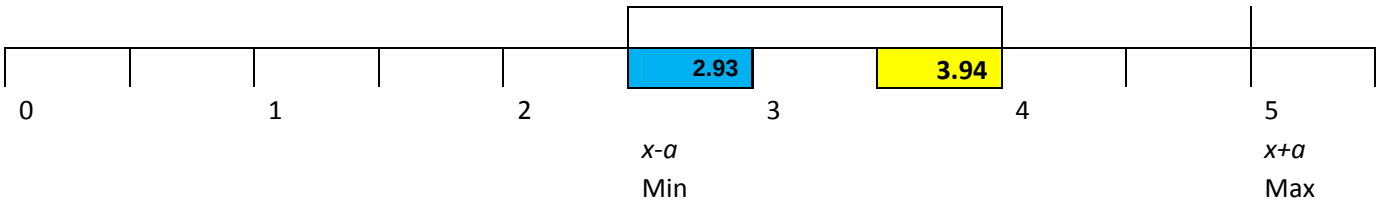
11. How regularly do you utilize inventory management systems?



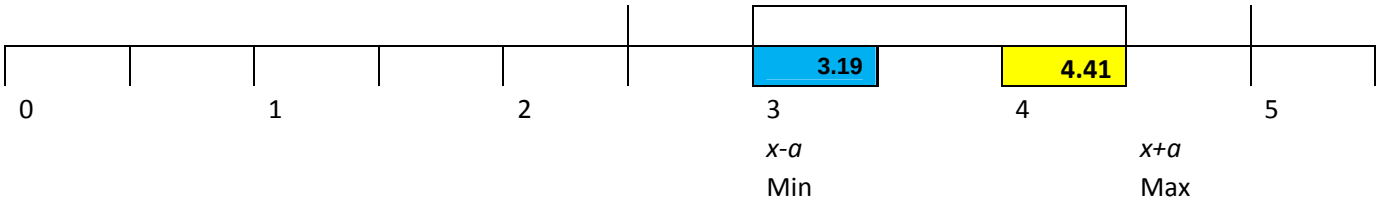
12. Does the business utilize efficient data management systems?



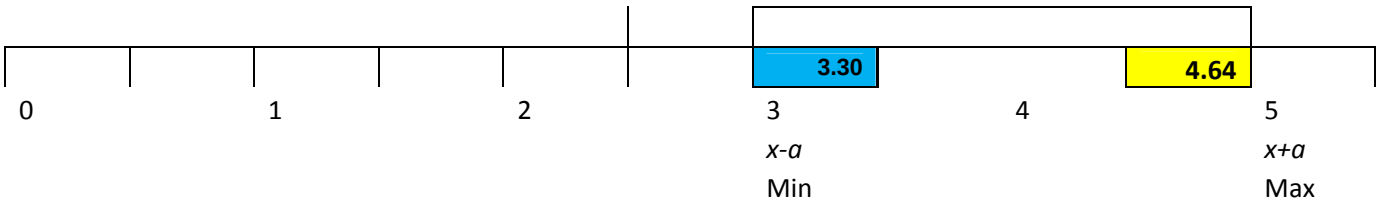
13. Does the business have strategies to enhance customer services?



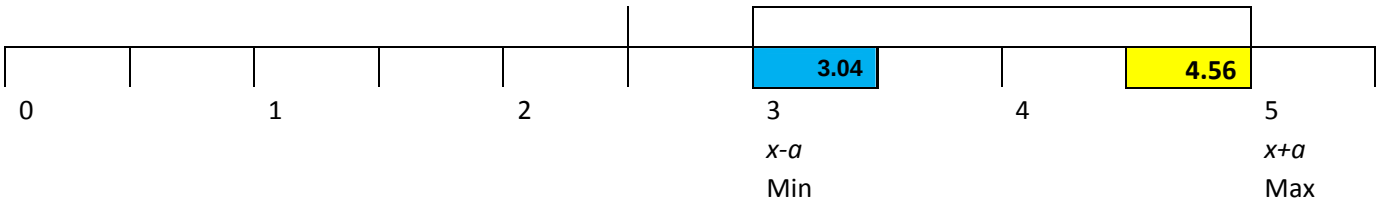
14. Is there any feedback mechanism that the business utilizes internally?



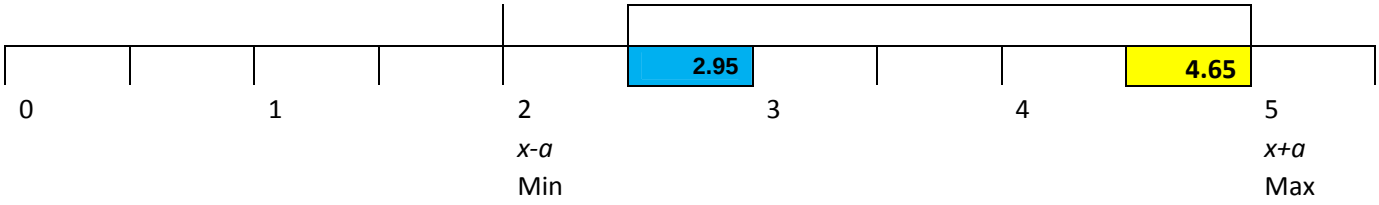
15. How often do you encounter challenges when improving customers?



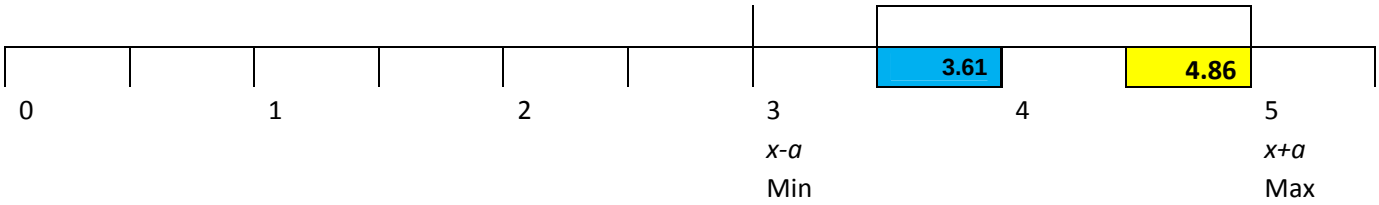
16. If SCM practices are implemented is there any speedy processing?



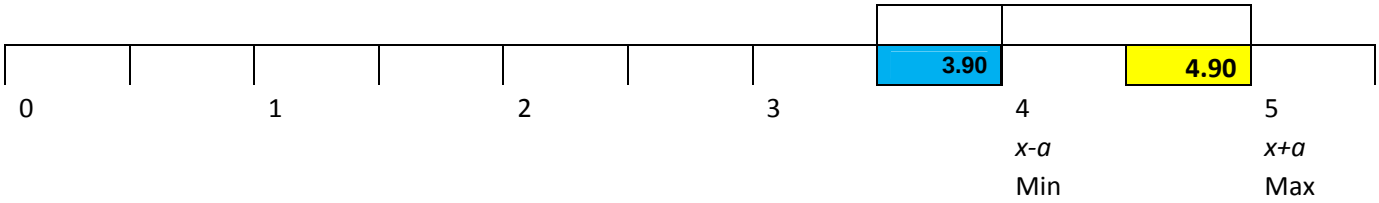
17. Do changes in business practices such as SCM compel you to maintain?



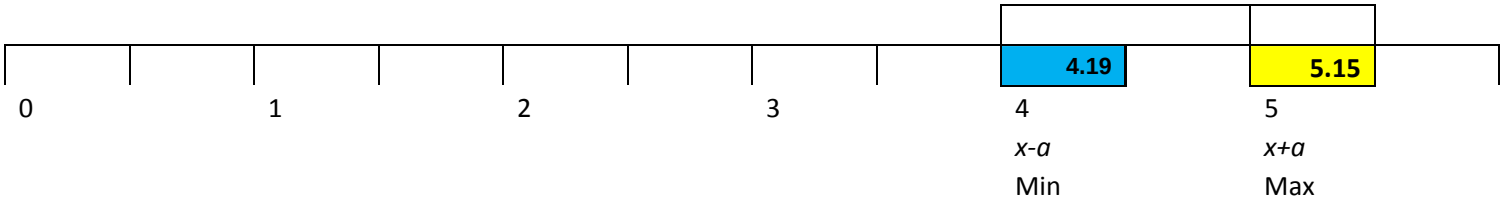
18. Is there any increase in sales and higher accuracy in costing if?



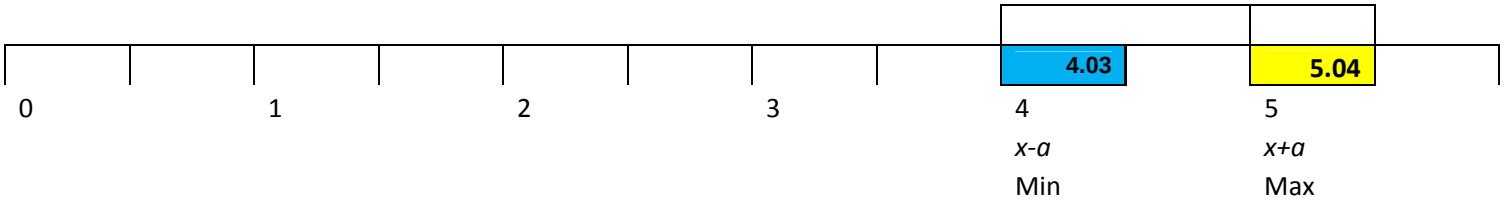
19. Do SCM practices improve coordination between departments within?



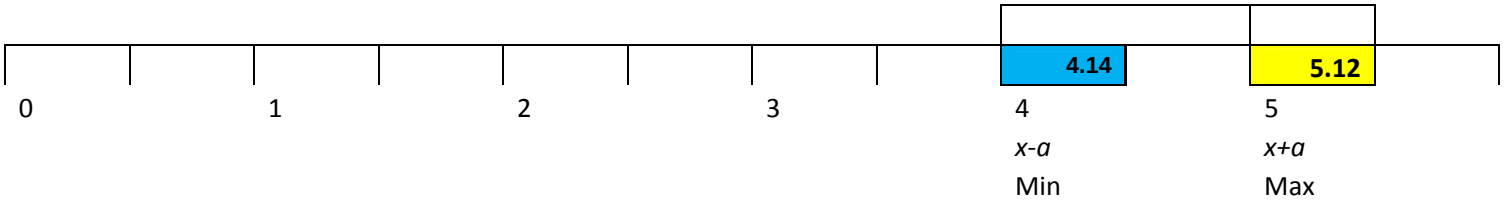
20. Is there any improved coordination between departments within the SCM?



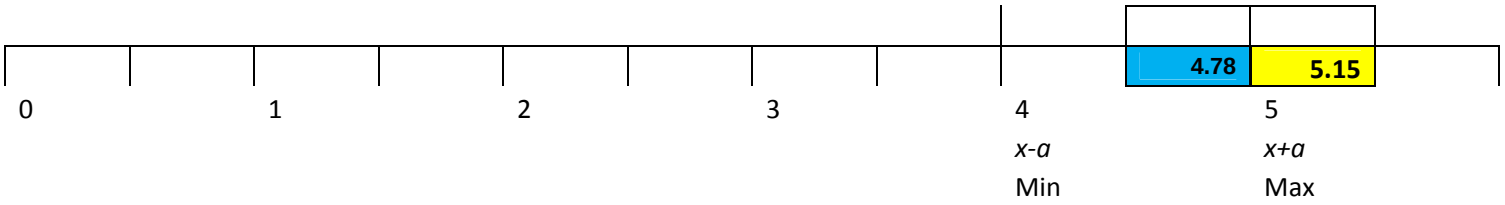
21. Is there any improved coordination with suppliers and customers?



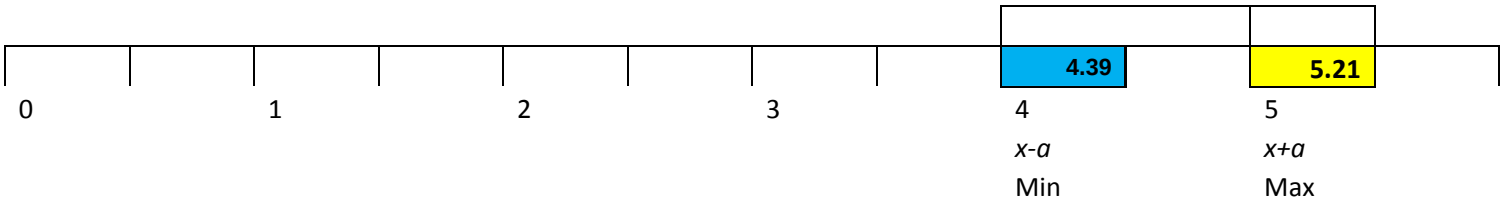
22. Do SCM practices enhance competitive capabilities?



23. Do SCM practices enhance customer services?



24. Does SCM implementation improve business performance?



Appendix 4

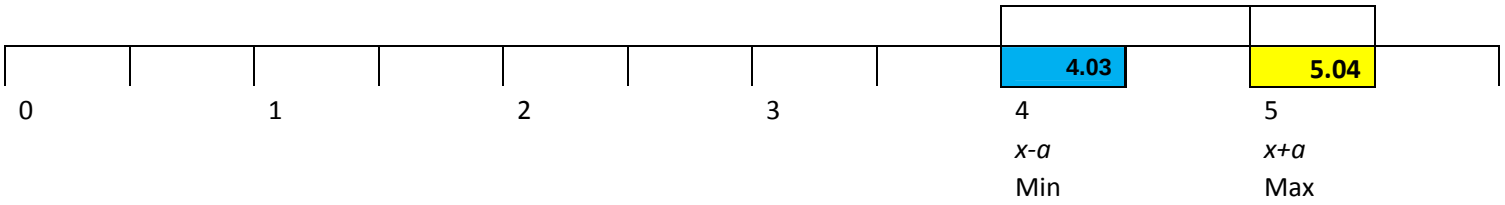
Descriptive Statistics for pharmaceutical manufacturers

	N	Minimum	Maximum	Mean	Std. Deviation	X	Y
Howoftendoesthebusinessrecognizetheimportanceofsupplyc	28	4.0	5.0	4.54	.508	5.0436	4.0278
HowregurlarlydoSCMpracticesenhanceproductdifferentiation	28	3.0	5.0	4.29	.600	4.8855	3.6859
Howoftencanyoudetermineappropriatecustomerservicelevel	28	4.0	5.0	4.143	.3563	4.4992	3.7865
Howoftendoyouensurethattheireiscontinuousproductavailab	28	2.0	5.0	4.071	.6627	4.7341	3.4087
Areyoucapableofavoidingthesilentbuildupofinventorytha	28	2.0	4.0	2.679	.5480	3.2265	2.1306
Doyoupracticedemandforecastingtechnique	28	3.0	5.0	3.929	.5394	4.4680	3.3891
Howoftendoyourespondtodemandforlowercost	28	3.0	5.0	3.750	.5182	4.2682	3.2318
Doessustainabledevelopmentconceptaffectavailabilityofraw	28	1.0	4.0	2.214	.9947	3.2090	1.2196
Doesthebusinesshaveaccesstoinformationregardingsupplych	28	4.0	5.0	4.321	.4756	4.7970	3.8458
Doyouhaveanelevatedleveloftrustandcollaborationwithsu	28	2.0	5.0	4.357	.6785	5.0356	3.6787
Doesthebusinesshaverapidproductdevelopmentandtechnology	28	1.0	4.0	3.000	1.0184	4.0184	1.9816
Doesthebusinessembarkuponoutsourcinginordertoleanouti	28	3.0	5.0	4.286	.5345	4.8202	3.7512
Howoftendoyoumakecertainthatyourproductsareofsubstant	28	3.0	5.0	4.107	.6853	4.7924	3.4219
DoSCMpracticesenhancecompetitivecapabilitiessuchascostl	28	3.0	5.0	4.250	.5853	4.8353	3.6647
Doyousometimesexperincedelaysinproductdevelopment	28	2.0	3.0	2.571	.5040	3.0754	2.0675
Doyouhavedifficultyinforecastingsalesaccurately	28	1.0	3.0	1.607	.5669	2.1741	1.0402
Doyouhaveadequatemarketingtechniques	28	3.0	5.0	4.179	.4756	4.6542	3.7030
Doyouconstantlystrugglewithslownewproductintroductions	28	3.0	5.0	3.500	.5774	4.0774	2.9226
Doyouexperienceanymanufacturingdifficultiesorstrugglewi	28	1.0	4.0	2.214	.7868	3.0011	1.4275
Doplanningandcontrolstrategiesinbusinessoptimizesupplyc	28	4.0	5.0	4.393	.4973	4.8902	3.8955
Doesthebusinessusekeyoperationalbusinessprocesses	28	3.0	5.0	4.321	.6118	4.9333	3.7096
Isthereaneedforabusinessimproveorredesignbusinessproc	28	1.0	4.0	2.321	.8189	3.1404	1.5025
Howregularlydoesthesupplychaindepartmentensurethatthey	28	3.0	5.0	4.286	.5345	4.8202	3.7512
Valid N (listwise)	28						

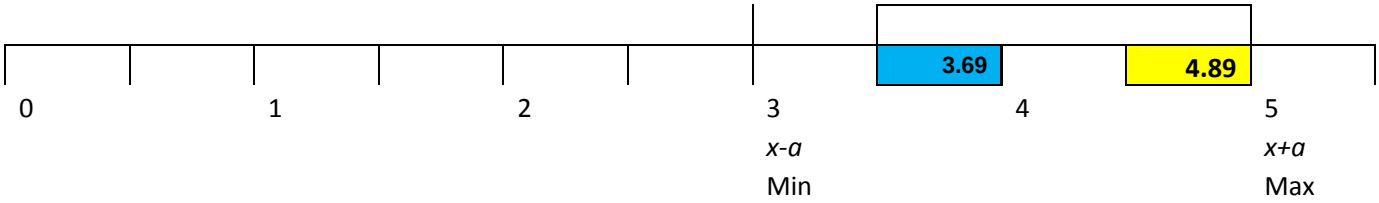
APPENDIX 4.1

RESPONSES FROM PHARMACEUTICAL MANUFACTURES – DATA INTERPRETATION

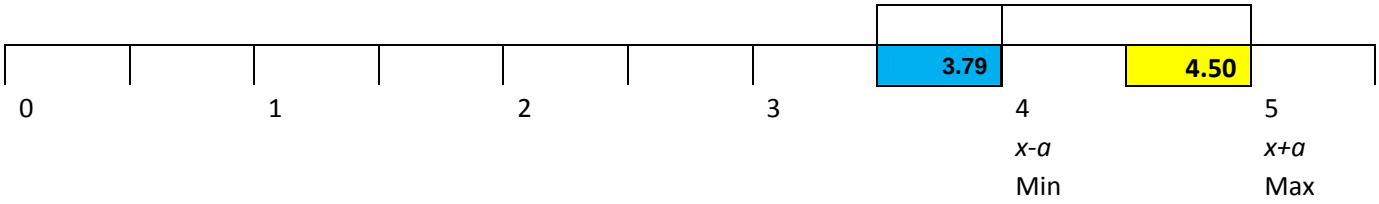
1. How often does the business recognize the importance of supply?



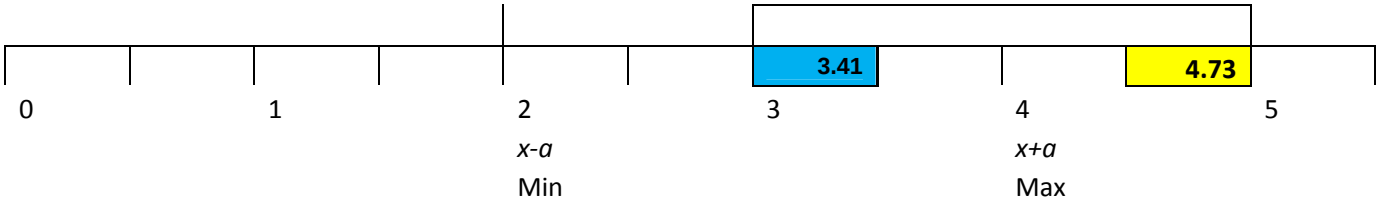
2. How regularly do SCM practices enhance product differentiation?



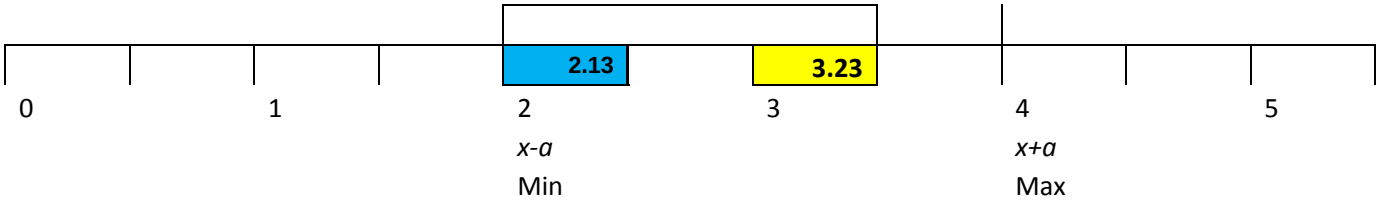
3. How often can you determine appropriate customer service level?



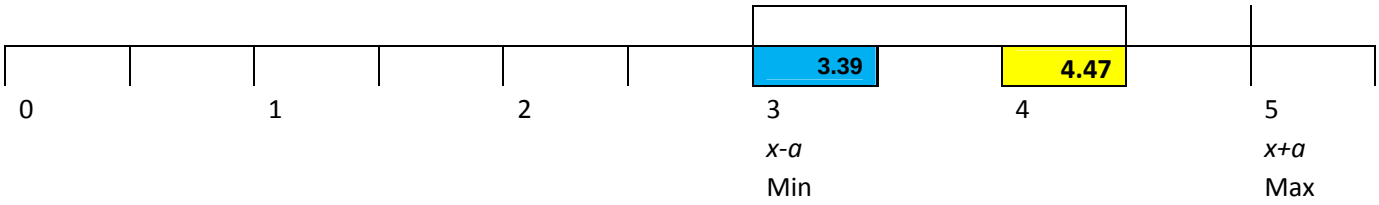
4. How often do you ensure that there is continuous product availability?



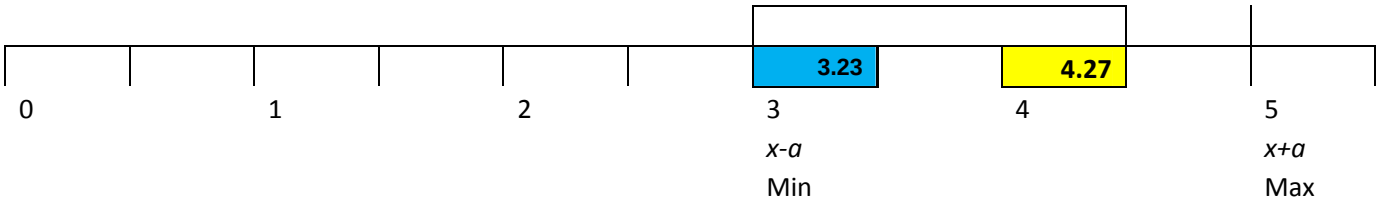
5. Are you capable of avoiding the silent build-up of inventory?



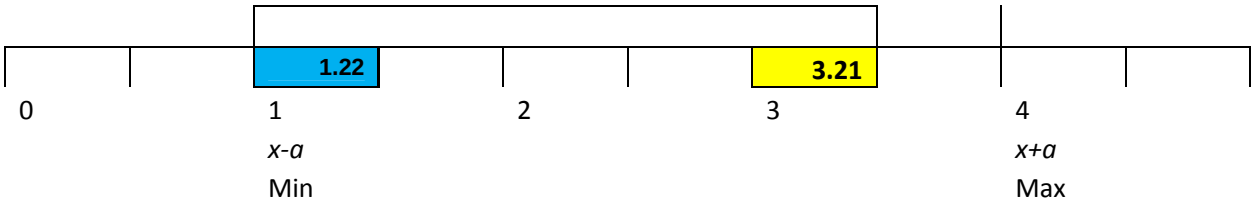
6. Do you practice demand forecasting techniques?



7. How often do you respond to demand for lower cost?

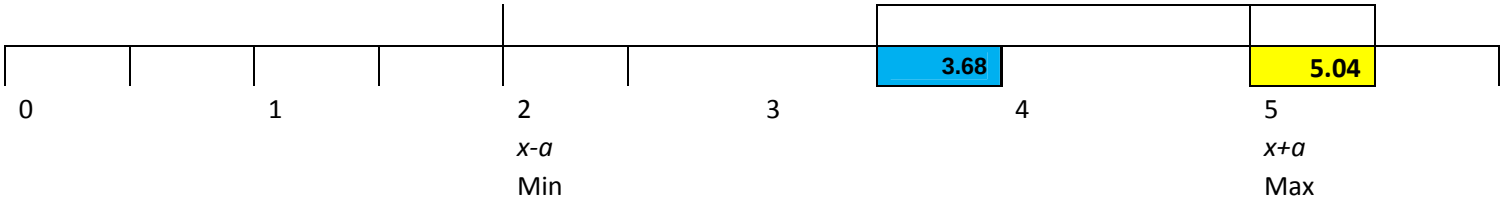


8. Does sustainable development concept affect availability of raw material?

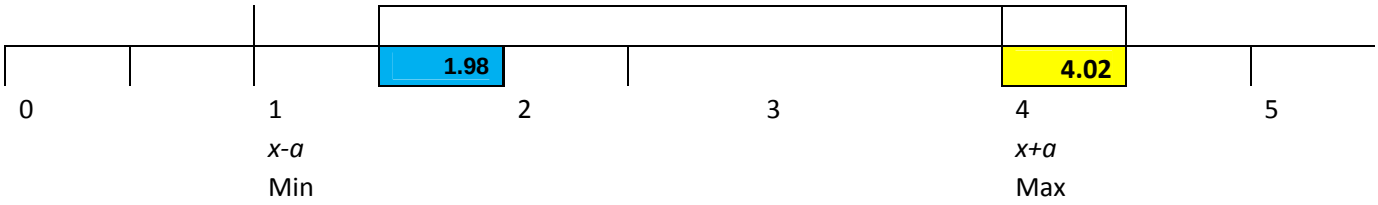


9. Does the business have access to information regarding supply chain management?

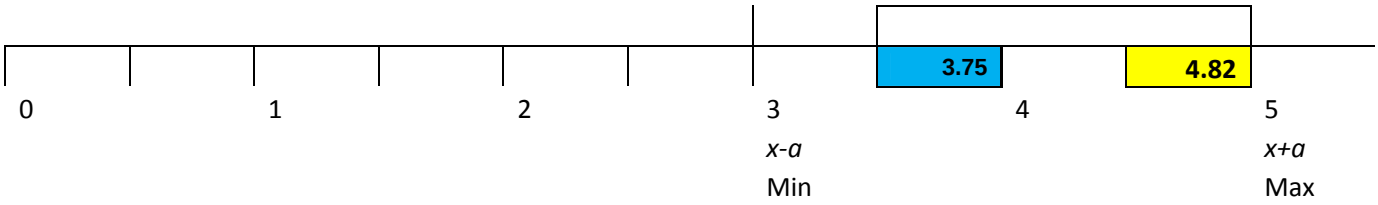
10. Do you have an elevated level of trust and collaboration with suppliers?



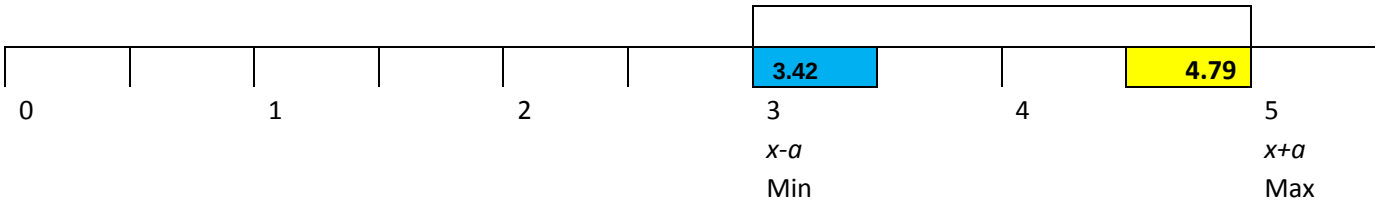
11. Does the business have rapid product development and technology?



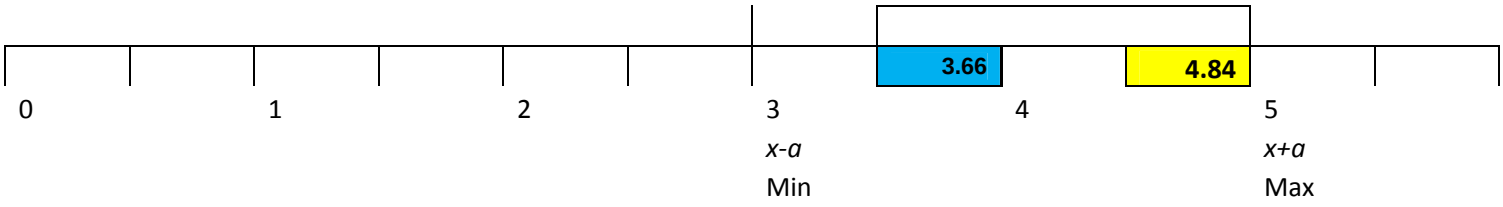
12. Does the business embark upon outsourcing in order to clean out?



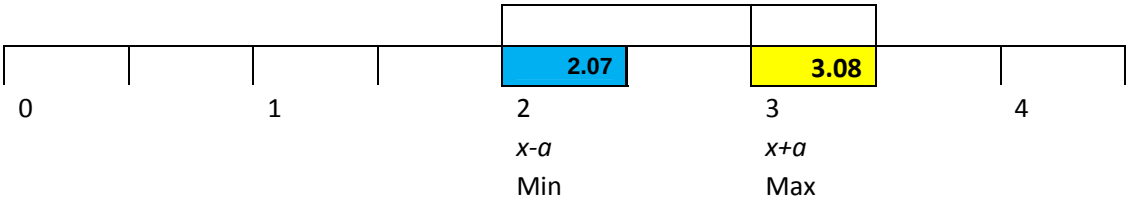
13. How often do you make certain that your products are of substantial?



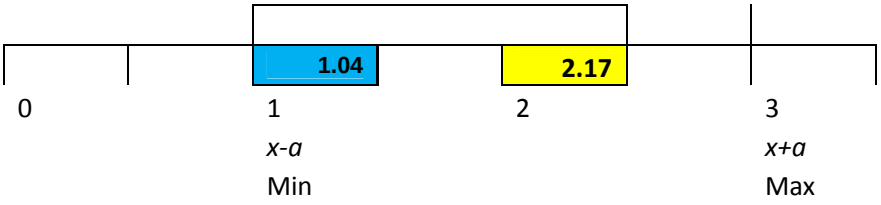
14. Do SCM practices enhance competitive capabilities such as cost limitation?



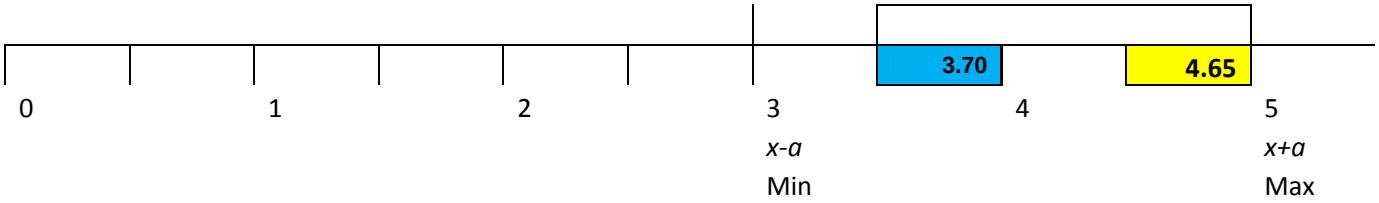
15. Do you sometimes experience delays in product development?



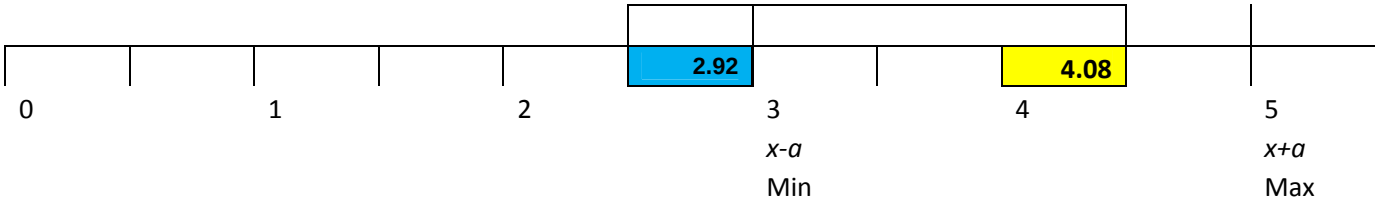
16. Do you have difficulty in forecasting sales accurately?



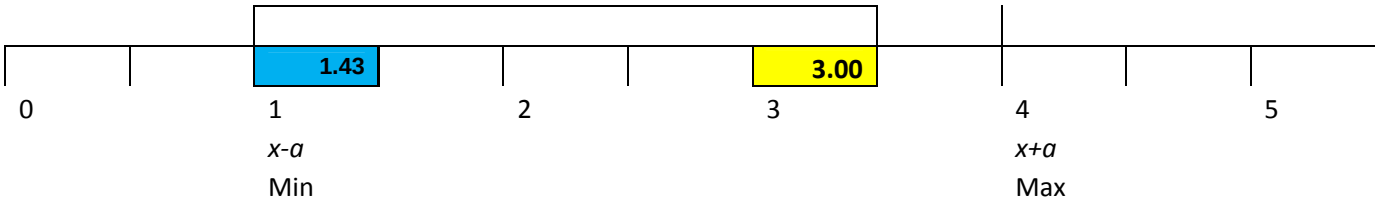
17. Do you have adequate marketing techniques?



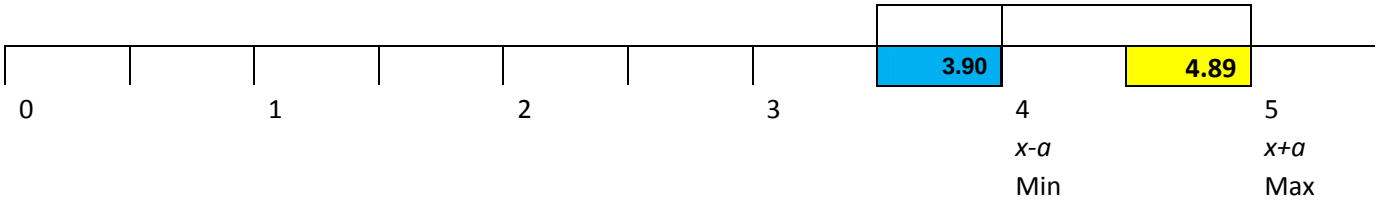
18. Do you constantly struggle with slow new product introductions?



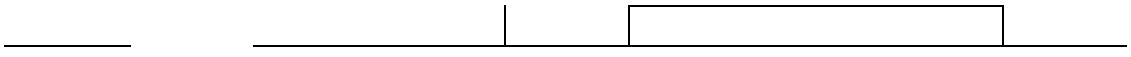
19. Do you experience any manufacturing difficulties or struggle with?

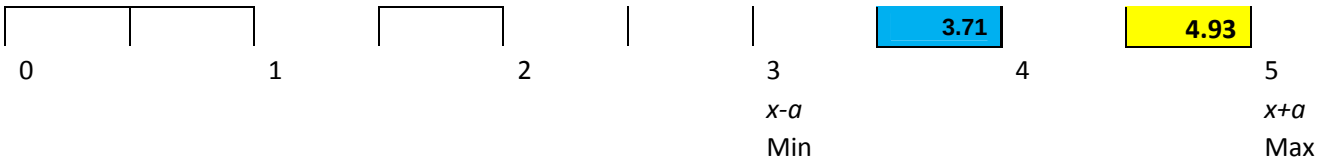


20. Do planning and control strategies in business optimize supply chain?

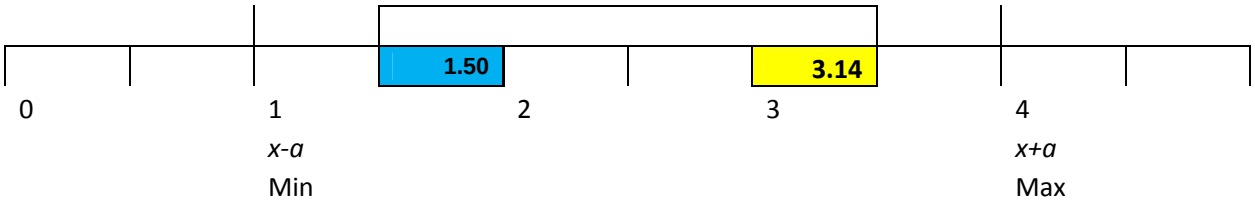


21. Does the business use key operational business processes?





22. Is there a need for a business improve or redesign business procedure?



23. How regularly does the supply chain department ensure that they?