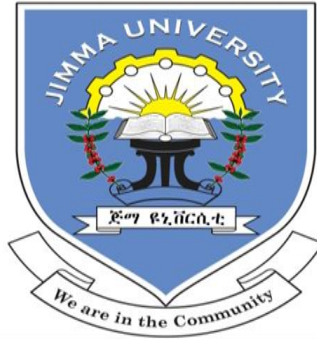


**AGILE AND LEAN SUPPLY CHAIN PRACTICE AND CHALLENGE: THE
CASE OF CADILA PHARMACUTICAL ETHIOPIA (PLC) GELAN, OROMIA
ETHIOPIA**



**A Thesis Submitted to Research and Postgraduate Office in Partial
Fulfilment of The Requirement for Master of Art in Logistics and
Transport Management.**

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Jimma, Ethiopia

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**Agile and lean supply chain practice and challenge: the case of cadila pharmaceutical
Ethiopia (P.L.C) Gelan, Oromia Ethiopia**

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Statement of Certification

This is to certify that Mr.Eskindir Ayalew has carried out his research work on the topic entitled: “**Agile and Lean Supply Chain Practice and challenge: the Case of Cadila Pharmaceutical Ethiopia (P.L.C) Gelan, Oromia Ethiopia**” is his original work and is suitable for submission for the award of Masters of Art

Degree in Logistics and Transportation management (MLTM)

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Statement of Declaration

I, Eskindir Ayalew, declare that this Master's research "**Agile and Lean Supply Chain Practice and challenge : the Case of Cadila Pharmaceutical Ethiopia (P.L.C) Gelan, Oromia ,Ethiopia**" is submitted in partial fulfillment of the requirements for the degree of Master's of Arts in Logistics and Transportation Management at Jimma university College of business and Economics Department of Management. The thesis is my original work and has not been presented for a degree in any other university and all sources of materials used for the thesis have been duly acknowledged.

Declared by:

Eskindir Ayalew

Date & Signature

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Acronym and Abbreviation

ASC	Agile supply chain
CRM	Customer Relationship Management
CPE	Cadila pharmaceutical Ethiopia
ETB	Ethiopian birr
EU	European Union
EFDA	Ethiopian food medicine control authority
DDS	Decision Support System
FMOH	Federal Ministry of health
GMP	Good Manufacturing Practice
GTP	Growth and transformation plan
JIT	Just-in-Time
LSC	Lean supply chain
LPS	Lean production system
LSCM	Lean supply chain management
PLC	Private limited company
PI/CS	Pharmaceutical Inspection Co-operation Scheme
PFSA	Pharmaceutical Fund and Supply Agency
SCM	Supply chain management
SC	Supply chain
USD	United States Dollar
WHO	World Health Organization
WTO	World Trade Organization

Abstract

Now days, Supply Chain management practices have become critical for securing competitive advantage. In order to cope up with a continuous changing competitive environment, organizations should have a paradigm shift in their supply chain strategy. This includes implementing lean and agile supply chain system. Therefore, this study aimed to explore the practice and challenge of agile and lean supply chain at Cadila Pharmaceuticals Ethiopia. The objective the study was to assess the practice and challenge of agility and leanness of a pharmaceutical supply chain management system at Cadila Pharmaceuticals Ethiopia, Oromia, Ethiopia. Among different supply Chain practices, the study conducted on strategic supplier partnership, customer relationship, level of information sharing, and from lean practice waste elimination and demand management practice and from agility supply chain flexibility, responsiveness and market sensitivity was assessed .The study used a descriptive cross sectional research design by using structured self-administered questionnaire and in-depth interview in order to capture the practice and challenge of agility and leanness and the data was analyzed by using a descriptive analysis using mean and standard deviation and narration .The result indicate that there where male employee dominated and most of them completing bachelor degree, Inclusion of key customers in planning and goal setting activities was agreed by most of the respondents, joint product development with business partner was practiced ,the company frequently determine future customer expectations as part of agility and Sharing proprietary information with trading partners is the least activity by the company. The company has a good start and promising activity in terms of agility and leanness of its supply chain management. Based on the findings the researcher recommends that management of the company has to improve relationship with suppliers', service delivery by being market sensitive, stock out, supply chain disruption, customer relationship and lean practice of the company.

Keywords: Agility, Cadila-Ethiopia, flexibility, leanness, manufacturing, pharmaceutical, supply chain management

CHAPTER ONE

INTRODUCTION

The aim of this chapter is to provide a brief outline of agility and leanness in supply chain management and its relation in pharmaceutical supply chain management using the case examples of pharmaceutical companies in different part of the world mainly in lower-middle income countries. The remaining parts of the chapter are organized as follows. The first section of the research presents background for the study, section two presents background of the organization and then statement of problems comes in the third section. The fourth, fifth and sixth section sets out objectives, significance and scope of the study respectively. Finally, section seven and eight presents limitation and structure of the study respectively.

1.1. Background of the Study

Supply chain management is a critical feature of the success of any business organization and scholars define Supply chain management as the term used to describe the management of the flow of materials, information, and funds across the entire supply chain, from suppliers to component producers to final assemblers to distribution (warehouses and retailers), and ultimately to the consumer (Emmitt, 2009). Pharmaceutical supply chain is the path through which essential pharmaceutical products are distributed to the final user with the right quality, at the right place and at the right time the pharmaceutical manufacturing industry is defined as organizations involved in the discovery and production of medications. Pharmaceutical industries are one of the largest industries in the world now several elements are pressing pharmaceutical firms to change their old manners of conducting business (Gholamhossein Mehralian, et al. 2012).

Supply chain management has two main strategies those are namely, lean supply chain and agile supply chain strategies. Lean was defined as the enhancement of value by the elimination of waste (Womack & Jones, 2003) Christopher described agility as a business approach that has flexibility as its fundamental principle. This enables a manufacturer to respond rapidly to changes in the volume and variety of goods required by the market. In order to develop agile capability, a firm needs to develop a supply chain that is focussed on the customer and that exhibits cooperation between stakeholders and effectively deploys people and information to manage uncertainty (van Hoek, Harrison & Christopher 2001).

Lean and agile supply chain practices are being implemented by various firms to improve supply chain performances as companies compete more through the effectiveness and efficiency of their supply chains (Cabral, Grilo 2012). Lean and agile supply chain management was ideologies were practiced in the post-war by the automobile and textile industry in Japan but there was lack of literature in assess the implementation of the practice in pharmaceutical manufacturing organization (Wachholtz, 2012)

The implementation those practice was worldwide in different business organization In developed country like USA and UK the principle and concept of agility and lean supply chain management where implemented (Robert Spekman et al., 2012)One of the focus areas taken during redesign and restructure of pharmaceutical industry is SCM. To get competitive advantage over rivals, supply chain emerged as a core capability for most pharmaceutical companies (Lurquin, 1996).

In 1964EC Manufacturing of medicines in Ethiopia started with the establishment of one joint venture manufacturing company According to the secretary of the PMSMA the production capacities of the majority of the industries are at lower capacity and could only cover about 20% of the local demand Manufacturing of medicines in Ethiopia are still outstanding issues to be addressed, such as the low production capacity and overwhelming dependence on importation of medicines shortage of qualified management and technical personnel and inadequate continuing professional development for practicing professionals and poor supply chain management practice (Tsige Gebre-Mariam, et al. ,2016). Pharmaceutical manufacturing firms are met with challenges of performance in delivery of expected profits and return on investment by shareholders. This has forced managers to strive to implement strategies like agile and lean supply chain management similarly, global and local competition that has drove them to look for appropriate lean and agile management practices and strategies to promote their efficiency and competitiveness (Collin, 2003). Nowadays several factors are pressuring pharmaceutical firms to change their old manners of conducting business. One of these pressuring factors is the supply chain management practice which is changing to a source of competitive advantage.

Pharmaceutical firms in Ethiopia are not protected from such pressuring factors to change their supply chain management practice into competitive advantage. Therefore, this study will be conducted at Cadila pharmaceutical manufacturing company to evaluate the leanness and agility practice and challenge the researcher empirically determine the importance of lean and agile practice to achieve competitive advantage and The finding this study will provide practical and theoretical knowledge on those supply chain strategy and fill the information gap related to the agile and lean practice in pharmaceutical manufacturing sector and it can also provide as baseline data for policy makers local pharmaceutical manufacturer , cadila and other researcher for further improvement of the practice and implementation of the practice.

1.2. Background of organization

Cadila Pharmaceuticals is a multinational research based pharmaceutical group in India with more than 6 decades of experience. Company's integrated operations covers entire gamut from manufacturing products ranging from API's-Intermediates, finished formulations, over the counter-Food Supplements, Biotechnology Products and pharmaceutical Machinery. International operation of Cadila Pharmaceuticals is spread across 58 countries including Americas, Japan, Asia and Africa. Cadila Pharmaceuticals Ethiopia PLC is a joint venture between Cadila Pharmaceuticals Limited PLC of India (60%) and Almeta Impex PLC (40%) share with the total investment of 10million USD started production in 2008. CPEL is one of the few large states of the art pharmaceuticals manufacturing plants in the country, with the Capacity to manufacture 390 million tablets, 165 million capsules and 1.44 million liters per liter per year in 3 shifts of 8hours each. The company has three people on the management level and sixteen sales and medical representatives.

The company was established to Manufacture Tablets, Capsules & Liquids with a state-of-the-art facility at Glean town, near Addis Ababa. The aforesaid Plant is one of the best manufacturing facilities in Ethiopia and the first Pharmaceutical Formulation Manufacturing Plant of the country recognized as per EU guidelines, to comply with the WHO led regulatory requirements of Good Manufacturing Practice (GMP).From the start of its Commercial Production in March 2008, the Company has already sold more than ETB 1 Billion worth of Medicines. Cadila-Ethiopia mainly aims to focus on therapeutic areas such as Cardiovascular, Anti Diabetics, and Antacids, Ant ulcerative, Anti Infective/Antibiotics, Anti-Depressants, Haematinic, Vitamins, Pain Management (Anti Pyretic/Analgesic Anti-inflammatory) Respiratory, Malaria, and Tuberculosis etc.After 7 years of operation, the company also decided for Expansion of Pharmaceutical Manufacturing for which it took 17,390 square meters of land, with this, the production capacity will increase to above ETB 1 Billion per annum within 2016. (Cadila, 2010)

1.3. Statement Problem

The business environment has become more competitive with increasing globalization more complex and demanding customers and companies are challenged to improve the performance of their supply chain various organization implement different initiative to improve their supply chain with goal of being more effective in meeting customers need and being more efficient in supply chain cost and asset management. Lean supply chain initiatives as well as agile supply chain initiative are perceived to be the forefront of improving supply chain performance however the interaction between lean and agility is not fully understood by supply chain practitioner. Pharmaceutical manufacturing supply chain is more complex therefore; companies need to redesign their supply chain to tackle issues of competition and survival. Like other industries Pharmaceutical industry continues to face numerous challenges on supply chain

management practice. (Collin, Jean-Paul. & Lorenzen 2006) The study done in Malaysia electronic sector report there was application lean in production but there were not study focused in pharmaceutical manufacturing Wong et al. (2009). The relationship between lean and agile supply chain strategy and supply chain responsiveness among manufacturing firms in the USA was examined it explained the implementation of the strategy helps the organization to achieve competitive advantage but locally, studies done on lean agile supply chain practices is scarce (Sufian & Monideepa 2013). Kisombe and Ondiek, (2012) carried out a study lean manufacturing tools and techniques among industries that produce sugar in Kenya but there were no studies on pharmaceutical manufacturing sector. Other studies carried out a study among state corporations in the Kenya health ministry and which were practicing Lean supply chain management and linked that to business performance (Onyango, 2014)

According to Wanjiku (2013) in her study lean and agile supply chain management in manufacturing firms in Kenya she come to conclusion that Lean supply chain practices are evident among the manufacturing firms in Kenya, but the study didn't link the lean supply chain management in manufacturing companies to organizational performance most of the studies where focused on the implementation of lean and agile supply on organization performance of manufacturing organization. Based on the study (Fasika Georgise, .et al., 2014) the Practice of supply chain in Ethiopian manufacturing sector is not developed well professionally and practically

Pharmaceutical firms in Ethiopia should examine their supply chain management to redefine their supply to reply promptly to changes in the market and customer demand. Such attributes should include the agility and leanness of their supply chain management that Ethiopian firms should implement 'based on the Ethiopian investment commission report in 2018 SCM practices of Ethiopia pharmaceutical manufacturing companies seems weak in addition, it is stated that many small and medium-sized pharmaceutical producers in Ethiopia cannot cope with the severe competition of the low cost exports of large-scale Asian producers .the limited market size of the sector with high investment needed for building pharmaceutical plants are also one of the challenges that make most of the companies bankrupted. There is also lack of skills in SCM in pharmaceutical sector; the schools are focused more on clinical skills (Sutton and Kellow, 2010). Pharmaceutical manufacturing firm in Ethiopia face fierce competition from Asian pharmaceutical companies due to importing cheap generic product and there were lack of skilled SCM practitioners due most of Ethiopian university providing education related to the SC But there was no industries and university linkage .Most pharmaceutical manufacturers have a low level of capacity compared with their foreign counterpart that leads to the company not to achieving economies of scale. This lead to low level production capacity and high production costs (Sutton and Kellow, 2010).

None of the previous international and local studies focused on the effect of lean and agile supply chain management practice and challenge on pharmaceutical manufacturing firm in Ethiopia and East Africa. Therefore, Ethiopian pharmaceutical manufacturers should examine their supply chain management practice in its agility and leanness to the competitive market to take the advantage and remain in the market. The practice of agile and leanness in the supply chain management in the pharmaceutical industry in Ethiopia is not well studied. There is a knowledge gap in a sense that which technique of the supply chain management implemented for the competitive advantage is not known. Most studies done specifically on the impact of supply chain management on organizational performance not done separately the component of supply chain strategy. Due to this gap the study done on agile and lean supply chain to provide insight about the practice.

All the above challenges in the pharmaceutical sectors in Ethiopia raise the need for supply chain managers to deepen their understanding of what is required to be done to make their value chains both effective (agile) and also efficient (lean). There is also a paucity of information on the implementation status of agile and lean supply chain at Cadila pharmaceutical company. Therefore, this study aimed to close this knowledge gap in the practice of agile and leanness in the supply chain management. The study forwards the coordination mechanism that need to be in place in order to manage the interdependence between agile and lean initiatives in the pharmaceutical sector. Overall, this study aimed to increase further understanding of the practice in lean and agile supply chain initiatives using Cadila Ethiopia pharmaceutical as a case example.

Research Questions

In order to appropriately address the problem statement above, the following research questions were formulated. The research questions were built up to achieve a thorough understanding of the concepts in general, and subsequently approaching the problem statement by linking the results and findings, in a way that new insights can be provided into the lean and agile concepts.

This thesis aimed to answer the following research questions:

1. What is the overall supply chain management practice at Cadila Pharmaceutical PLC?
2. Does agility practice at Cadila Pharmaceutical PLC?
3. Is leanness implemented at Cadila Pharmaceutical PLC supply for pharmaceutical?
4. What are the challenges related to supply chain management in pharmaceutical manufacturing sector?

1.4. Objectives of the study

1.4.1. General objectives

The main objective of this study was to assess lean and agile supply chain practice and challenge of Cadila Pharmaceuticals (Ethiopia) PLC Joint Venture Company in Eastern Oromia region Gelan town, Ethiopia.

1.4.2. Specific objectives

- ↪ To describe the overall supply chain management practices of Cadila Pharmaceuticals (Ethiopia) PLC
- ↪ To examine the agility practice of supply chain management of cadila pharmaceutical Ethiopia PLC
- ↪ To investigate the leanness of supply chain management practice of cadila pharmaceutical Ethiopia PLC
- ↪ To Determine current challenges of manufacturing related to supply chain in terms of agility and leanness at Cadila Pharmaceuticals (Ethiopia) PLC.

1.5. Significance of the Study

- This study analyses the pharmaceutical supply chain agility and Lean in Cadila pharmaceutical Ethiopia P.L.C. The Ethiopian pharmaceutical manufacturing sector will benefit from this study by realizing the importance of agile and Lean supply chain in the advancement of the sector. The Policy makers can learn of the existing gaps in their policies and apply corrective action to ensure that development of local pharmaceutical industries is better. It may also be used as a source of knowledge and reference by future learners and researchers.
- Agility is the fundamental characteristic of a supply chain needed for survival in turbulent markets, where environmental forces create additional uncertainty resulting in higher risk in the supply chain management. Agile supply chain has been noted as a means for handling change, increasing customer responsiveness, and mastering market turbulence. Furthermore, it has emerged as the dominant competitive vehicle for organizations in such an uncertain and ever-changing business environment and has been heralded as the business paradigm of the 21st century.
- The result of the study might be useful for the Cadila pharmaceutical joint venture company. Also, it is useful for other pharmaceutical manufacturing company's owners and managers and government agencies especially For Ethiopian food, medicine, authority. In addition, the study can contribute on the limited knowledge in the area of supply chain strategy like agility and leanness supply chain practice of pharmaceutical manufacturing companies' in Ethiopia.

1.6. Scope of the study

The study was conducted in pharmaceutical manufacturing industry and the study was focused on assessing the practice of agility and Lean supply chain management practice like flexibility to market demand, Elimination of waste, lead time, and customer satisfaction of the company and challenge in manufacturing practice. The participants were those employees within the company at different departments like general manager, Operational department, forecasting department, marketing department and production department.

1.7. Limitation of the Study

Due to resource limitation this study only focuses on assessing lean and agile supply chain management practice of Cadila Pharmaceuticals Eastern Oromia region Gelan town, hence, the conclusion drawn from this study cannot be generalized in a wider context.

1.8. Organizations of the study

This study organized in five chapters. The first chapter presents the introduction chapter where the context of agile and lean supply chain management in relation to pharmaceutical supply is explained. The problem of lack of agility and leans in supply chain is explained in this section. The appropriate research questions and objectives to be attained in the perspective of dimensions are presented. In the second chapter a literature review is done. It begins with Supply chain management and its relevance. Afterwards Lean and Agile historical background and the scientific characteristics of each of the paradigms are emphasized. The third chapter is on methodology that is applied to address the stated objectives. Furthermore, the fourth chapter include the result analysis presentations and discussion of the study findings. Finally, chapter five includes the conclusions and the recommendation of the study.

CHAPTER TWO

LITERATURE REVIEW

This chapter focuses on the theoretical and empirical regarding supply chain management, pharmaceutical supply chain, Lean and agile thinking, lean and agile supply chain management. The remaining parts of the chapter are organized as follows. Section one presents the concept and theories supporting the study and followed by a review of the empirical studies. Finally, section three and four presents summary of literature review and knowledge gap and conceptual framework of the study.

2. Theoretical Literature Review

This section presents concept of supply chain management, evolution of supply chain management, lean and agile supply chain management practice,

2.1. Supply Chain Management

2.1.1. Evolution of Supply Chain Management

In early 1980s, Oliver and Webber (1982) have considered ‘supply chain management’ as a management technique to reduce the stocks held by companies participating in the same supply chains. Prior to this, other terms were used that largely referred to physical transportation and distribution processes (and not the value-adding process), influenced by the work of Forrester (1961) on industrial dynamics. It is perceived that a total cost management approach to the transportation and distribution process (Heckert & Miner, 1940) cultivated the concept of SCM in its current rendition.

2.1.2. Definitions of Supply Chain Management

The known authors Heizer and Render (2011) define SCM as the integration of the activities that procure materials and services, transform them into intermediate goods and final products, and deliver them to customers. These activities include purchasing and outsourcing activities, plus many other functions that are important to the relationship with suppliers and distributors. SCM includes determining transportation vendors, credit and cash transfers, suppliers, distributors, warehousing, and forecasting and production information. Also the Council of Supply Chain Management Professionals (CSCMP, 2012); consider supply chain management encompasses the planning and management of all activities involved in sourcing and procurement and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers.

2.1.3. Pharmaceutical supply chain.

Pharmaceutical supply chain is a network of supplier, manufacturing, distribution and logistics facilities of various pharmaceutical products. Pharmaceutical supply chain (PSC) represents the path through which

essential pharmaceutical products are distributed to the end-users with the right quality, at the right place and at the right time (Gholamhossein Mehralian et al. 2012). The pharmaceutical supply chain (PSC) is very complicated and greatly responsible for ensuring that the appropriate drug is delivered to the right people at the right time and in the right situation to fight against sickness and sufferings (Chandrasekaran and Kumar, 2003). According to Whewell (2009), pharmaceutical industry supply chain covers drug research, development, manufacture; distribution and application through a range of healthcare services, together with all the ancillary businesses that help these different stages function effectively.

2.1.4 Ethiopian Pharmaceutical Manufacturing Industry

The annual pharmaceutical market in Ethiopia is estimated to be worth US\$ 400 to US\$ 500 million and growing at an impressive rate of 25% per annum (Frost & Sullivan, 2012) A 2012 estimate by Frost & Sullivan suggests the Ethiopian pharmaceutical market could witness growth rates of “slightly over 14%” to reach an approximate value of just under US\$ 1 billion by 2018. Steady economic growth, improvements in the delivery of health care and introduction of social health insurance coverage across the country in July 2015 all lead to growing demand. These developments are encouraging international pharmaceutical companies to invest in Ethiopia, as evidenced by activities of Cadila, Julphar, GlaxoSmithKline, Sandoz and Hikma Pharmaceuticals.

There are approximately 200 importers of pharmaceutical products and medical consumables in Ethiopia, with 9 involved directly in the manufacturing of pharmaceutical products. Local manufacturers have limited product portfolios and are thought to be able to supply only 90 of the more than 380 products on the national essential medicines list. (Jicui Dong, Zafar Mirza. (2016). Despite support from the Ethiopian Government, the Ethiopian pharmaceutical industry faces significant challenges, including human resource capacity constraints, limited access to foreign currency, and raw material procurement difficulties and lack of pharmaceutical agile and Lean supply chain practice. Until now, there has been no coherent national vision, strategy or plan to develop the pharmaceutical industry in the long term. Based on the assessment of FMOH for monitoring and evaluation of national drug policy, there was only one local pharmaceutical manufacturing plant in 1993 G.C that is owned by the government. Currently, drug production activity is being undertaken by 13 local pharmaceutical manufacturing plants: One government owned, eleven private (unaffiliated with multinationals) and one private (affiliated with multinationals). In 2015, the Government of Ethiopia in collaboration with WHO has developed a national strategy and plan of action for pharmaceutical manufacturing development in Ethiopia that facilitates the development of the sub-sector and thereby increasing people’s access to quality proven affordable medicines. The pharmaceutical production is at infancy stage and until now there is no research and development of new active substances as well as production of pharmaceutical starting materials.

However, there is formulation from pharmaceutical starting materials as well as repackaging of finished dosage forms. Patents for pharmaceutical products are granted by the Ministry of Sciences and Technology of Ethiopia. Ethiopia is not a member of the World Trade Organization (WTO) and has only an observer status. (MSH, 2012)Ethiopian industry policy focuses on encouraging self-reliance on local production so that essential medicines are affordable in the country. However, most Ethiopian companies are staggering for existence due to compliance with the regulatory standards and other issues. Moreover, dependence on foreign companies for technology and knowledge sources has been one of the shortcomings of the local manufacturers (Tsige Gebre-Mariam, et al. 2015)

2.2. Lean Supply Chain

Lean is defined as a systematic approach to enhancing value to the customer by identifying and eliminating waste (of time, effort and materials) by applying lean principles, practices, and techniques (Mohan and Sharma, 2003).They also defined lean supply chain as a set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce cost and waste by efficiently and effectively pulling what is required to meet the needs of the individual customer (Manrodt and Vitasek (2008).

The lean concept originated from Toyota Motor Company in Japan and it was known as Toyota Production System (Shah and Ward, 2007). Toyota Production System was conceived by Taiichi Ohno, who was trying to ensure survival of the Toyota Motor Company after the post-world war II economic depression (Womack and Jones, 1996). In 1988, John Krafcik, a researcher at Massachusetts Institute of Technology, USA used the term, “lean” to describe TPS, which he explained as a system that makes products with fewer defects and produce according to customer needs (Shah and Ward, 2007).Lean, which was popularized by Womack et al (1990) in their book entitled *The Machine that Changed the World*, was earlier implemented in the manufacturing and usually referred to as ‘lean production’ or ‘lean manufacturing’.

2.2.1. Lean principles

Womack and Jones (1996) propose five principles guiding the lean concept Liker and Meier, which is called the 4Ps model the 4Ps model emphasized more on people and partner developments than Womack and Jones 5 lean principles, the five lean principles are more comprehensive and specifically focused on core lean management issues. (Liker 2004) Due to the comprehensiveness and uniqueness of the five lean principles, many authors concentrate their discussion of lean on them Liker and Meier (2006) are as follows:

Philosophy: Establish a long-term philosophy or thinking upon which the organizations’ operations are based.

Process: Commitment to the development and following of excellent and tested processes in every operation.

People/Partners: Commitment to growth, development and respect for people and partners.

Problem solving: Commitment to continuous improvement and solving of root causes of problem

2.2.2. Lean practices

Lean principles are implemented through some practices which are activities undertaken to bring about improvements in organization, the lean practices are supported by set of tools and techniques (Dean and Bowen, 1998). In lean in supply chain, some activities are identified in the process of transforming a supply chain to lean supply chain, and such activities can be referred to as lean practices. Those lean practices are sourcing of customer need information, demand management, waste elimination, workplace organization, strong and effective relationship, production of exact customer needs only when needed, problem search and problem solving. From the lean practice waste elimination was the one which the research focused (Zarei, 2011).

2.2.4. Types of lean practice

1. Source Information on Customer Needs

Lean has strong emphasis on the importance of focusing on the customers' needs by addressing value adding tasks and non- value adding tasks Considering the importance and complexity of customer needs in business, investigation to ascertain customer needs for specific products need to be thorough. Open minded and market research geared towards in-depth understanding of customer requirement is among the major actions in developing a lean value chain (Shah and Ward, 2007).

2. Waste Reduction/Elimination

The focus of the lean concept is to eliminate all waste i.e. all activities that do not add value. Waste can be measured in time, inventory (Cudney and Elrod, 2011). Most of the activities on the implementation of lean revolve around waste elimination. Suggests that waste can be eliminated by analysis and optimization of transportation method and machining process, adoption of appropriate and improved technology, and proper organization of facilities within the system The early step in the implementation of lean is through identification of waste which include waste of overproduction, waste of waiting, transportation waste, waste from keeping inventories, processing waste, waste of movement, and waste from producing defective products (Ohno, 1988).

3. Demand Management

One of the key principles of Lean is to move to a pull system, in which products or services are pulled (work initiated, services performed, products delivered) only when requested by the final customer. In its purest form, such a system would be developed using data from the point of sale and conveyed upstream to all members of the supply chain, from point to point, without a change in the volume. A Lean supply

chain will work to have products pulled through the channel using customer demand from the point of sale in real time (Manrodt & Vitasek, 2008).

4. Workplace organization

Workplace organization involves proper arrangement of machines, tools and other facilities in the workplace in order to ensure easy and quick access, occupation of less space and avoid obstructions to workflow or material flow. A disorganized workplace or system results in mistakes and delays, while workplace organization which helps to ensure production flow is an important activity towards process improvement (Julien and Tjahjono, 2009).

2.1.4.4. Lean Tools and Techniques

Tools and techniques constitute a detailed approach on how to implement practices effectively (Dean and Bowen, 1994). Some of the widely acknowledged lean tools and techniques include: JIT, Setup time reduction, kanban /pull system, value stream mapping (VSM), supplier involvement/relations, (Cudney and Elrod, 2011). Implementation of lean concepts, tools and techniques are dependent on each other, thus the need to implement some before others (Nicholas and Soni, 2006).

1. Just-in- time (JIT)

JIT is a technique in a flow process where the needed parts, components or materials are delivered to the point of need only at the time of need and only the amount needed is delivered (Ohno, 1988). It is a technique in lean which ensures that materials and components are not stocked on the shop floor or other storage areas when they are not required. JIT which advocates for zero inventories is based on pull production, top management and employee involvement, uninterrupted flow, elimination of wastes, supplier relations, and total quality control (Pheng and Chuan, 2001).

2. Supplier involvement/integration

Buyer-supplier relationship in the past used to be characterized by distrust and competition with each other (Ross, 1998). Then, each player tried to outsmart each other and maximize profit to the detriment of another value chain player. However, lean approach to management contrasts the old mentality and encourages close cooperation between buyers and suppliers. To ensure design for manufacture, reliability and quality of products from early stage, lean advocates for close cooperation between buyers and suppliers (Wee and Wu, 2009).

3. Customer involvement

This is a lean technique which advocates for definition of value in conjunction with the customers. The term, customers in this context can be viewed from two perspectives. The customer to the suppliers (buyers or focal organizations) and end customers who utilize the final value created in the value chain. Through open-minded enquiry, end user requirements can be obtained firsthand, which helps to provide the exact customer need. The old approach and tradition where customers are expected to buy whatever

that was mass-produced and sent into market has changed to a situation where customers desire to be treated as unique individuals (Ross 1998).

2.3. Agile Supply Chain

A number of definitions have been suggested for agility by various authors the most generic definition of agility can be “ability to sense environmental change and respond quickly by providing the appropriate capabilities. Agile supply chain has emerged towards the end of the 1990s. Mason-Jones and Towill (1999) presented a route-map indicating the steps to be taken in achieving supply chain agility in real world. Ranga Ramasesh., et al., 2001 Describe Agility can be considered as the ability to be flexible and fast alongside the capability of being able to change proficiency Several studies have focused on it as a means for improving the production systems inside organizations Subsequently it has been applied to the whole organization and several studies have focused on it as a way of doing business to improve the overall performance of the organization and its ability to react to market conditions. A comprehensive definition of agile supply chain cannot be developed unless the multidimensionality of the concept is fully explored. To facilitate an in-depth understanding of the concept, the sports science and military science theoretical bases are investigated, in addition to the agility-related literature within the business domain. The effort culminates in the identification of five firm agile supply chain dimensions: Market sensitivity, Process integration, flexibility and swift response. The identification and classification of the dimensions of agility enables the development of a comprehensive understanding of agile supply chain.

1. Market sensitivity

Market-sensitive is meant that the supply chain is capable of reading and responding to real demand and in this case the medical supplies done to various parts of the county. This is a key attribute of modern approach from the traditional approach of managing supply chain. Market sensitivity is in total contrast to the traditional practices where majority of inventory was held as finished goods waiting to be sold. Market sensitive supply chains try to hold majority of stock as work in progress inventory awaiting build/configuration information coming from the final customer or market. This is because the insight and information gained from customers would help to resolve problems regarding market uncertainty (Hsieh and Chen, 2005)

Market sensitivity incorporates demand for overall market, individualized products and services with quicker delivery time and fast response to sudden changes in order, quantity and specifications. It dictates that collaborative initiatives should be drive by quick response to customer requirements and requires that the agile supply chain is capable of reading and responding to real customer demands (Christopher and Towill, 2000).

2. Process Integration

Process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information which is a crucial element in agile supply chain. Process integration classified integration in a supply chain context in various different types; these are customer integration, internal integration, material integration, service supplier integration, technology and planning integration, measurement integration and relationship integration. Supply chain agility recommends integration to achieve a long term competitive advantage Bowersox, Closs and Stank (2001) It represents the buyer-supplier partnerships and alliances including joint product development, shared systems and information. Nowadays the need for partnerships is increasing as companies tend to outsource many activities for achieving better results. Process integration triggers the need for information transparency, joint strategies, and open-book accounting (Christopher, 2000).

3. Swift response

Kumar and motwani (1995) defined swift response as the ability to accelerate the activities on a critical path that commences with the identification of a market need and terminates with the delivery of a customized product. In this context swift response should be considered as a concept which is solely customer focused. Today's volatile business environment is characterized by frequent supply chain disruptions from material shortages and drops in production capacity to sudden demand spikes. The responsiveness of supply chains to changing market requirements and their overall efficiency are important issues in supply chain design and management and therefore currently receive wide attention in the scientific community as well as in practice (kumar and Motwani, 1995).

5. Flexibility

Flexibility is the ability of the firm to respond to a variety of customer requirements, which exist within defined constraints. It's multi-dimensional and consist various elements and some are more important in certain environments depending to nature of the product. Some authors distinguish between internal and external flexibilities Supply chain responsiveness as a form of external flexibility, i.e. visible to the customer and triggered by a customer order. Internal flexibility focuses on manufacturing and inbound logistics. Both types of flexibility are key prerequisites to a company's agile capability. Responding to unpredictable market changes (or unforeseen events) and capitalizing on them through fast delivery and lead-time flexibility is the main focus in an ASC (Swafford et al., 2008).

However, SCs with high flexibility are more costly than SCs with low flexibility. Still, SC managers would prefer high flexibility over low flexibility, being the benefits of flexibility in general, obvious. More specifically, to implement ASC successfully, a firm must be able to respond to rapidly changing and continually fragmenting global markets by being dynamic, growth oriented, context-specific, flexible

across the organization and more importantly, driven by customer. In addition, if a company wants to be able to respond better to the changing expectations and requirements of the end-consumers, collaborative relationships with suppliers should be developed (Bruce and Daly, 2011).

Measurement of supply chain agility

It is tempting to assume that concepts about supply chain agility are readily understood and easily measured, but this is not the case. Such concepts are likely to be complex in both definition and measurement. Nonetheless, as organizations continue to develop and adopt management practices to build supply chain agility, the need for valid and reliable instruments to assess supply chain agility increases. However this literature tend to downplay other factors like nature disasters or acts of God that directly or indirectly affects the supply chain agility such as wars, earthquakes floods and fires that tend to disrupt supply chain agility.

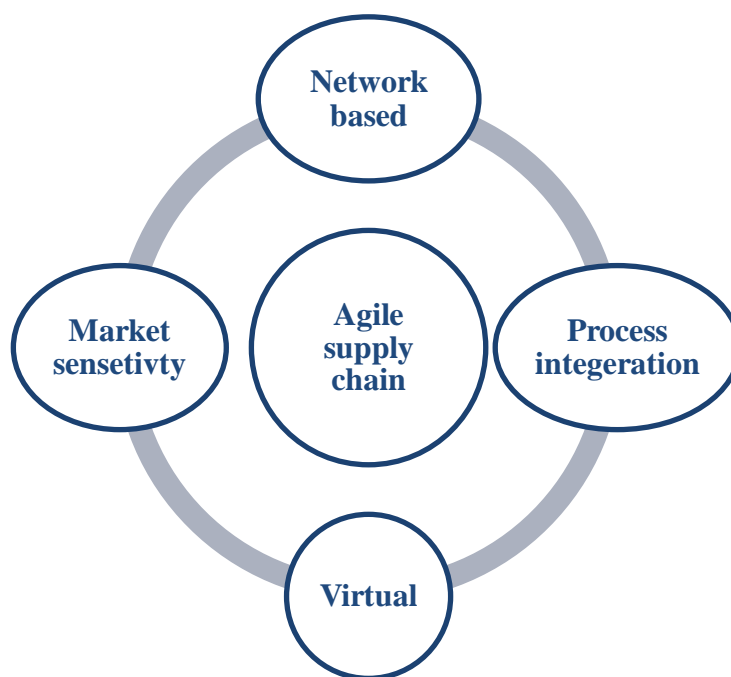


Figure 2.1: Agile Supply Chain Process (Christopher and van hock (1999))

2.2. Empirical review

This section reviews empirical literatures by categorizing those studies in each continent with their time chronological order from the past to the current. There is a focus on the methodologies applied and the major findings of the study reported in each country where the survey is conducted.

2.2.1. African Experience

As to the knowledge of the researcher in Ethiopia, there are few papers that are conducted on supply chain management which only assess the practice in different sub-sectors. For instance, a study made by Berhane (2007) to model supply chain management system in the case of Ethiopian steel manufacturing industry indicate different problems such as Poor strategic alliance, longer lead times (procurement, conversion, distribution) which results in unnecessary inventory and more value is not given to increase customer service level and product expectation, which result in loss of customers that have large economic impact on the organization.

The SCM practices and challenges in different industry of Ethiopia were studied by multiple authors at different times. The findings from these researches in the practices of SCM in different commercial sectors of Ethiopia seemed non-promising. The study by Mesfin (2007) to study the Supply chain management practice and model development study as a case study of Mesfin Industrial Engineering plc the result of this study shows that most of the employees of the company don't have awareness of SCM and the firm use traditional method of performance analysis.

In study by Wainaina (2009) regarding supply chain management key practice in Kenyan private manufacturing firms it was found that lean firms encounter challenge such as inefficient monitoring and control of provider delivery time and commitment, lack of integration and partnership in the distribution network, poor inventory review due to lack of a defined line of responsibility within the supply chain management constraints and poor capacity planning. Another researcher, Admaw (2010) using a case study in Ethiopian textile sector of manufacturing have studied the practice of SCM. The result showed that SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Business managers of the textile firms didn't give attention for SCM theories and practices.

Belay, (2011) studied the practices of SCM in cement industries. There is a consistent finding to other similar studies in the manufacturing sector i.e. the practice of SCM in cement industry is almost negligible. There seems that since the demand outweighs the supply of the cement, which contributes for not using SCM as a competitive strategy. Taking the experience of other African countries a study did by Onyango (2011) in Kenya to assess the supply chain management practice and organizational performance showed that global benchmarking, electronic inventory and creativity satisfactory customer service, zero waste tolerance just in time service related to performance of pharmaceutical companies in Kenya with a 70% variation. A similar study in Kenya by Otilo (2011) studied the supply chain management practices in cosmetics industry in Kenya. According to the study, there is consistent performance measures used across the supply chain in the cosmetic industry and suppliers are involved in production planning this study focused on the cosmetics industry and did not touch on lean supply exclusively.

A study done by Nesrine El-Tawy and David Gallear (2011) to study the Leanness and agility as means for improving supply chains. A case study on Egypt The research has used literature review methods on the supply chain management. The resulted proposed framework deduced from the literature has been applied in the Egyptian Manufacturing Business to show the relationship between the agility principles, lean principles, entity performance and the successful supply chain. Based on the study conducted by management science for health (MSH) to describe the pharmaceutical manufacturing status in the context of Ethiopia, the pharmaceutical production is at infancy stage and until now there is no research and development of new active substances as well as production of pharmaceutical starting materials. However, there is formulation from pharmaceutical starting materials as well as repackaging of finished dosage forms. (MSH, (2012) Additionally, Dereje, (2012) studied the impact of SCM practices on the organizational performances in metal and engineering industries. Similarly, the finding indicates that the implementation of SCM in such industry is not so strong. Furthermore, the SCM practices don't have any relationship with organizational performances except internal lean practices.

Furthermore, Kamaru (2012) studied Lean Supply Chain Practices in Urban Road Construction Projects: A Case of Class "A" Road Construction Companies in Nairobi County, Kenya. Use case study design with a descriptive approach the discoveries show that Class "A" street development organizations in Nairobi have received different inclines inventory network administration hones. These practices include accentuating on appropriate client centre; creating roads for waste lessening in their exercises; honing ceaseless change in their procedures and receiving Just in Time system of stock administration. This study did not specifically focus on lean supply chain practices in addition to focusing on a different sector.

On the research topic Supply Chain Management practice, Adebayo (2012) conducted study on SCM Practices in Nigeria. The study was on pharmaceutical management using the case example of a single private manufacturing firm. The result indicated that SCM practices definitely impacts SCM performance. This study further describes there is significant contextual differences between production and health system and try to analyse in what degree lean is implemented in healthcare.

Kimani (2013) looked into Lean Supply Chain Management in Manufacturing Firms in Kenya. The study findings indicate that the most prevalent practices adopted are preventative maintenance and reduction in the preliminary finishing time. The study shows that the main reason for adoption for these practices was to reduce cost profitability and long-term survival of the firm. This study was not specific to lean supply chain management practices.

Fasika Geber Tsadike.,et al (2014) conducted a study to Identifying the Characteristics of the Supply Chain Processes in Developing Country Manufacturing Industry Perspective The research methodology includes the literature review, questionnaire survey and semi-structured interview. The research data was collected from the Ethiopian manufacturing industries practices. Finally, the research findings reveal the characteristics of the supply chain processes. The identified processes characteristics could be used for the future model adaptation works.Wondmineh (2013) studied the practice of Supply chain management in Ethiopian pharmaceutical companies. the study use a descriptive research approach and there major finding indicate that Supply chain management practices in Ethiopian pharmaceutical firms are weak and not considering Supply chain Management as a strategic tool for competition. In another sector Biruk (2014) tried to measure the performance of SCM in metal and engineering industries. The result of the study shows that the implementation of measuring the SCM in this industry is weak. Also the SCM practices don't have any relationship with organizational performances except internal lean practices

Antony Muse.,et al (2014) conduct a study to Investigation on the Effects of Elimination of Waste Levels in Managing Cost Levels in the Pharmaceutical Industry in Kenya the study use descriptive study design and the Findings from the study revealed that there was a significant correlation between pharmaceutical company's efforts in reducing the waste levels and cost levels. The overall relationship between waste reduction and cost level management was statistically significant Intaher Marcus (2014) studies the Alignment of Supply Chain Strategies and Practices of Locally Made Vehicles in South Africa. The research design employed was a combination of exploratory and descriptive research design using a qualitative approach finally the result of the study shows in some instances there was a mismatch between strategies and practices in the area of product characteristics, manufacturing characteristics, and the decision drivers of the supply chain.

Kennedy O.Moenga (2016) study the Supply Chain Management Practices and Challenges for the Small and medium enterprise in Kenya, by using study method a Case Study with The main objective of the paper is to explore the nature of supply chain management practices and challenges. The major finding of the paper state that small scale tea sector appreciates good supply chain management practices; the same has not been fully incorporated in the operations of the sector.

According to the study conducted by (Bogale Alemu Refu, 2016) with the aim of this research was to study the supply chain management performance and challenges of Anbessa shoe manufacturing company in Ethiopia the researcher applied case study method. As it has been revealed in the study major challenges mentioned by the respondents in the supply chain management system were low customer service quality, cost controlling problems, poor planning and risk management, supplier/partner relationship management, lack of skilled labour /expert and technology.

Grace Muthoni (2018) on his study to assess adoption of lean supply chain management practice by pharmaceutical manufacturing firm in Kenya and their effectiveness toward organizational performance the study use across sectional survey design the study finding established that several lean supply chain management practice were applied. Other study conducted by Lydia Nyambura, et al (2018) in Kenya to establish the impact of lean supply chain management practices on the procurement performance with a focus on the leading supermarkets in Nairobi. The study utilized a descriptive research design approach from the study findings, it was established that a majority of the leading supermarkets in Nairobi utilized different lean supply chain management practices.

2.2.2. American experience

The study done by (Melton, 2005) to study the implementation of lean supply using a survey method, a lot of companies already implemented elements of lean years ago whereas others are still on their way to implement them. Particular industries, like the pharmaceutical industry and process industries in general, are lacking behind in adopting lean. In another study by Deloitte consulting survey (Li et al, 2005) has found that although 91% of the manufacturing companies undertaking the survey are determining the importance of their supply chains, 2% only are considering their supply chains as world class. The paper in (Li et al., (2005) have suggested that most of the failure related or associated with supply chain management is due to its complexity, and due to the lack in the research literature that help companies to guide and manage effectively and efficiently their supply chains.

Cox and Chicks in 2005 suggested that lean can assist in achieving better utilization of space and equipment. An additional advantage of lean in Pharmaceutical industry is that it results in lead time reduction. Finally, Shah and Ward (2008) reported that lean tools are widespread in all industries regardless of its type. Wee and Wu (2009) studied a case from the Ford Motor Company in US to describe a lean supply chain (LSC) through value stream mapping. They also demonstrated lean supply chain affects product cost and quality. Lo and Power (2010) carried out a survey of Australian manufacturing companies and found that even though some companies match to the theoretical model, there are significant companies which mismatched with the model.

A study by Boddy et al 2012 has showed that about more than half of their survey companies were not successfully in forming successful partnerships with members in their supply chains. However, Avinash (2015) argued that it is essential to examine whether adoption of lean in process industries (e.g. Pharmaceutical) is significantly beneficial for the business or not. For instance, Pharmaceutical Companies have continuous process; non discrete materials that cannot be conducted without containerization. Thus, Pharmaceutical Companies cannot apply some lean techniques such as just-in-time (JIT) since these companies have long term setups with large batch sizes.

Magretta (2006) conduct a research in the USA in Dell Computer Company with aim of to determining on effectiveness of the supply chain management system used by Dell Computers manufacturing systems. A survey method was applied and the study found that Dell's inventory is equivalent to ½ a week of inventory and this contributes to a shorter order to cash circle which is a key measure of financial performance of a company. Thus means a highly effective supply chain system

2.2.3. European experience

According the paper by Nightingale, (2005) Lean supply chain management is a new approach for supply chain management in health care. This study in UK aimed to assess the use of lean in health care is eliminating the waste which is costly and bothersome in hospitals and other health care facilities. Manrodt 2005 research framework on level of lean supply chain practices seems to the perfect match and suitable to be used in order investigate the extent of lean supply chain practices towards performances in Malaysia. Over the last decades lean has become an often-used term in operations management and several studies have shown that the implementation and use of lean practices leads to superior performance compared to competitors that do not implement such practices.

A study conducted by Abdallah, A., and Matsui, Y.2009 in France describe the reason why researchers are increasingly paying attention to the concept of Lean supply chain management as an effective way to improve operations and eliminate waste along the Supply chain. Lean Supply chain means also applying steps to eliminate all types of waste across the Supply chain, guided to minimize the production lead time and SC-related costs. Nevertheless, Azevedo, S.G., Govindan, K, 2012 argued that lean paradigms are deployed for the intention of SC improvement and company performance. Tortorella, G.L, et, al, 2017, Empirically validated four bundles of LSCM practices, namely, elimination of waste and continuous improvement, logistics management, top management commitment, and customer supplier relationship management.

Margaret Bruce and Lucy Daly (2004) conduct a study in textile industry in UK Lean or agile A solution for supply chain management in the textiles and clothing industry. The overall aim of the research is to consider the supply chain management approaches used in the textiles and apparel sector this is addressed through case studies of companies at different points of the textiles the finding of this case study shows of textile and apparel companies, different approaches to supply chain management are illustrated

2.2.4. Asia Pacific experience

According to Christopher and Towill (2001) in India and Van Hoek et al. (2001) in Pakistan, the agility of a SC is dependent on quality improvement, cost minimization, lead time reduction and service level improvement. The study made in 2007 by Ashish Agarwal et al. in India, confirmed that SC agility depends not only on these variables but also on customer satisfaction, delivery speed and new product

introduction. In this article, the author claims that literature hasn't taken into account the influence of interrelationships among the variables. According to Lassalle (2005), the best practices in lean supply chain management include: demand management that involves giving products and administrations when asked for by the client, cost and waste decrease, Process institutionalization which empowers consistent stream, industry institutionalization, and social change and cross undertaking coordinated effort. Other distinguished incline practices are sourcing of client need data, Value Stream Analysis (VSA), end clients centre, work environment association, solid and compelling relationship, generation of correct client needs just when required, issue inquiry and critical.

Furthermore, Shah and Ward (2007) identified, through a reliable empirical test, the ten dimensions of lean production, including internal and external constructs (supplier, customer and internal). They argue that every one of the ten dimensions is an important contributor and that none should be eliminated, due to their inter-relations. These dimensions allow researchers to test the lean implementation in companies.

The same manufacturing paradigm was also investigated in China by Shahram (2008). Under that study, manufacturing practices related to inventory; team approach; processes; maintenance; layout suppliers; setups; quality; and scheduling and control were evaluated. The result showed that different manufacturing firms have different levels of leanness depending on the industry type. It was found out that plants that emphasize more of lean related systems gained higher performance and competitiveness than others.

Lo and Power (2010) carried out a survey of Australian manufacturing companies and found that even though some companies match to the theoretical model, there are significant companies which mismatched with the model. According to the authors, two-thirds of the companies follow mismatched strategy, and at the same time their operation is successful. They argue that it is difficult to generalize the classification into efficient and responsive alone for many years pharmaceutical companies were in the favourable position of having a stable environment with excellent profit opportunities (Kickuth, 2005) further secured by patents.

Alireza Alihamadi, et al. (2011) conducted study on Malaysia Electronic Industry to present a model for supply chain performance by employing supply chain design, supply chain information sharing, and flexibility and delivery components as independent variables influencing supply chain performance. The results from this study depicted that supply chain design influences supply chain performance through delivery and information sharing. Furthermore, information sharing, and delivery have a direct influence on supply chain performance. The findings also showed that flexibility influences supply chain performance through delivery. Information sharing affects supply chain performance directly and has also an indirect impact on supply chain performance through flexibility. This study elaborates the significant

effect of the design of the supply chain on its performance while considering the impact of information sharing.

Sundinet (2011), in turn, applied lean production principles on recycling centre operations in Chinese manufacturing firms and concluded that existing flow problems could be decreased. For instance, they stated that these recycling centres have to be managed in a better way in terms of choosing a suitable layout, signs, and opening hours. In addition, they concluded that considering lean production engineering philosophy, several improvements were achieved, e.g. shorter visiting times and cleaner waste fractions

Manimay (2013) also examined lean adoption in Indian manufacturing plants and its impact on operational performance. The survey made on 400 firms in four geographic regions in India show that approximately 80 percent of the firms implemented dimensions of lean. Among these dimensions, focus on customer needs, pull system, setup time reduction, total productive maintenance, supplier performance, statistical process control, and cross-departmental problem solving were frequently applied. In an attempt to investigate how these operational metrics, improve productivity, some of the pointed benefits included reduced manufacturing lead time and improved first-pass correct output.

Moslem et al. (2013), identified impact of supply chain management practices on operational performance in manufacturing companies of Khuzestan province (Iran) by using strategic partnerships with supplier, customer relationship, outsourcing, quality of information sharing and internal lean practices as independent variables affecting the operational performance. The result from the study indicated that there is a positive and significant relationship between SCM practices and performance. Singh M.P, et al (2016) conduct a survey on the adoption of lean practices in Indian manufacturing sector the study use a survey types of research design The current study comprise of a survey of Indian manufacturing industries The survey will be useful to explore the current status of lean initiations in Indian manufacturing industries and to prioritize lean practices which are highly useful.

Zahra Lotfi (2013) conduct study the effect of Information Sharing in Supply Chain Management The purpose of this study is to investigate and overview the effectiveness of information sharing in Supply chain management, in order to increase the efficiency of the organizational performance in the manufacturing sector This study elaborates the benefits and barriers of information sharing leading to enhanced supply chain integration among enterprises, as a result. The study use structured literature review approach in the context of Malaysia. Dunay, A and A. Shaban (2017) study the to diagnose the practices of lean supply chain management in mineral water factories with the aim of to examine availability of Lean Supply Chain Practices in mineral water producing factories in Dohuk province, Iraq. The paper use a survey study method the finding revealed that the reality of the efficient supply chain

management practices and the challenges of their application in the investigated factories were identified and there was a practice of lean supply chain management.

2.2.5. Middle East experience

Marianne Khlat, et al(2014) study Lean Manufacturing Implementation and assessment in the Lebanese Pharmaceutical Industry The aim of this Article is to assess and explain, through a survey method, to which extent lean tools are implemented in a Lebanese pharmaceutical industry and to find out if there is any relationship between the application of these tools, the paper finding state that lean tools are somehow applicable in the production cycle; standardization is among the tools the most used and Just-in-time is the tool that employees are not adopting very well due to lots of documentations and delays in the process.

Zu'bi M. F,(2015) conduct a survey by Examining the Impact of Lean Practices on Flexibility Performance The Moderating Effect of Environmental Dynamism in Jordan This paper examined the effects of four core and internal lean practices on flexibility performance in Jordanian manufacturing companies' Lean practices included setup time reduction, continuous improvement, synchronization of operations, and pull system, this paper use literature review methods and their final findings of this study highlighted the important role of synchronization of operations, a widely neglected lean practice in the literature, in improving flexibility performance

2.2.6. Challenges related to pharmaceuticals supply chain management practice

Pharmacy is a challenging industry for supply chain management. The companies should be able to provide medicines in the right quantity, with acceptable quality, to the right place and customers, at the right time and with optimum cost that meet health system's objectives. And like in any business, it should also bring benefits for its stockholders as well. What makes the industry so challenging is that the products of it are of life-value for its customers and the products are subject to many risks right from manufacturing until reaching the end customer. (D.Patel 2018)

When a drug is launched into the market, there are various set of different objectives, drivers and constraints that a supply chain faces. There are also many different key stakeholders included: multiple government agencies, hospitals, clinics, drug manufacturers, drug distributors, pharmacy chains, retailers and research organizations. The stakeholders often have very different business objectives which make managing supply chain all the more difficult. Furthermore, nature of pharmaceutical industry is much regulated, and companies do numerous mergers and acquisitions to increase their R&D expertise. The supply chain network has grown so enormously that planning for optimal performance is very complicated. (D.Kapoor, D.Patel 2018)

What is very typical for modern supply chains, not only in pharmaceutical but many other industries as well is a need for speed. Modern consumers are very demanding: they want products more personalized and high-tech care, delivered in-home and when convenient for them. They require direct contact with the providers in the care of continuum in a way which is unprecedented in the pharmaceutical industry.

The companies are seeking ways to accelerate their speed to market but making rapid technological changes is difficult against strict regulatory requirements. Costs are another huge barrier to achieving the needed changes. Drug development alone requires so much time and money that companies simply can't afford rapid changes. There is a huge pressure on pharma companies to deliver through their R&D budget, but not many have liquidity to do that. (J.R. Livingstone2017)

2.3 Summary of Empirical Review and Gaps

The main aim of presenting this literature review is to assess the two SCM paradigms, Lean and Agile. SCM is without a doubt, a crucial asset of a company willing to survive in today's competitive market. The lean and agile paradigms are two 'philosophies' or mind-sets belonging to SCM. Neither of them can be considered the best, instead they are both efficient if implemented in the right context or marketplace (Christopher, 2000; Mason-Jones et al., 2000). Generally, the aim of a literature review is to identify research gaps in terms of agility and leanness in pharmaceutical supply chain management. It is quite evident that pressuring factors for SCM in pharmaceutical sector (lean and agile) were not well defined conceptually, and the actual empirical evidence on the paradigms was lacking from literature.

There is an international experience in the application of agility and leanness in supply chain by giant pharmaceutical companies. For instance, Bayer, one of the largest pharmaceutical companies in the world, successfully improved its manufacturing process at the company's biotech manufacturing centre in Berkeley, California by using Lean principles. During the three years implementing Lean tools at Bayer, the project first started as a pilot but after seeing the positive results it brought, the entire site started to implement this approach. Before the pilot began, the company was stuck in a very outdated management model. The organization was very hierarchical and bureaucratic. It took time for information flow to move from management to plant floor. The employees were much soloed in their own departments and communication between them was sparse. The operators' concerns were addressed very slowly if at all. The results show how significant improvement the project brought. At the start of the program, Bayer's technical proficiency matrix measurement was 70%. After the training it rose to 93-95%. Before the project people did not understand why productivity was lagging. After a task force including representatives from all departments, they could identify bottlenecks. People felt empowered and included and it showed: productivity increased by more than 50%. Errors on batch records also lowered notably in the same approach (Saulye Sheller, 2014).

Accord Healthcare, subsidiary of INTAS Pharmaceuticals, was born through acquisition of Actavis UK and Ireland Ltd. With the acquisition the company aims for a stronger pipeline of new generic medicines entering into market, more investment into R&D and general business growth. Acquisition is always a risk for business and Accord is looking to handle it with continuing being what the company prides itself for; the agile supplier in the markets (Dale Benton, 2017).

Accord is still a young, growing company and in the generic medicines field, the immaturity can make it difficult to try to establish a solid footing in a crowded market. Before the acquisition Actavis was already a leading supplier in the UK and the parent company INTAS Pharmaceuticals is one of the top 10 Indian pharmaceutical companies. Having these pharma giants as base, Accord is one of the fastest growing medicine companies in Europe. The most important traits for an agile supplier are market intelligence, forecasting and predicting the gaps that emerge in the market. The ideal is that when another supplier goes out of stock, Accord will fill in that gap and have products in stock when customers need them. To attain this Accord needs to create a responsive and agile supply chain. This can be achieved through strategic relationships with key partners and suppliers. The company won't just sit and wait for order to happen instead they are proactive through exchange of data between all parties. One such partner is UK's Department of Health with whom Accord maintains a regular link with to keep up with what is happening in the market. And as the company continues to grow and launches number of products in larger quantities, it seeks out suppliers that can be as agile and responsive as them (River Jesson 2016). Another research gap related with pharmaceutical SCM is there are few publications linking SCM with the pharmaceutical industry in lower-and middle-income countries including in Ethiopia. More recent publications show an evident focus on SCM practices and respective measures or Key Performance Indicators (Azevedo et al., 2012). In the older publications, SCM clearly focuses on reducing waste throughout the chain and in extending the company beyond the focal one. Yet, the fact that it's the SCs that compete and not companies, has become obvious. The main conclusion drawn upon the facts of the present literature review, is that literature will focus more and more in empirical investigation linking measures and practices considering the aim of achieving enhanced SC performance and consequently, high level of profitability and competitiveness.

2.4 Conceptual framework of the study

As depicted in figure 2.2 below agility and leanness of supply chain management in the pharmaceutical sector are affected by sets of factors. The supply characteristics affect agility/leanness by delivery speed, product availability and outsourcing. This means creating unnecessary activities during movement of products in supply chain and smoothly adjusts to the current transportation needs.

The demand characteristics both predictable and unpredictable affects the agility/leanness; if predictable there is organized flows of goods in the supply based on pre-specified schedule as well as to respond to current needs and ensure high level of product availability. Network integration affects the agility/leanness through information sharing system to optimize transportation routes mainly from the point of view of the cost. Process integration affects the agility/leanness through recruiting qualified human resources to reduce the cost of warehousing and infrastructure service in the pharmaceutical supply chain management. The presence of national drug policy that enforces policy of lean supply chain creation affects favourably the agility/leanness of the pharmaceutical supply chain management.

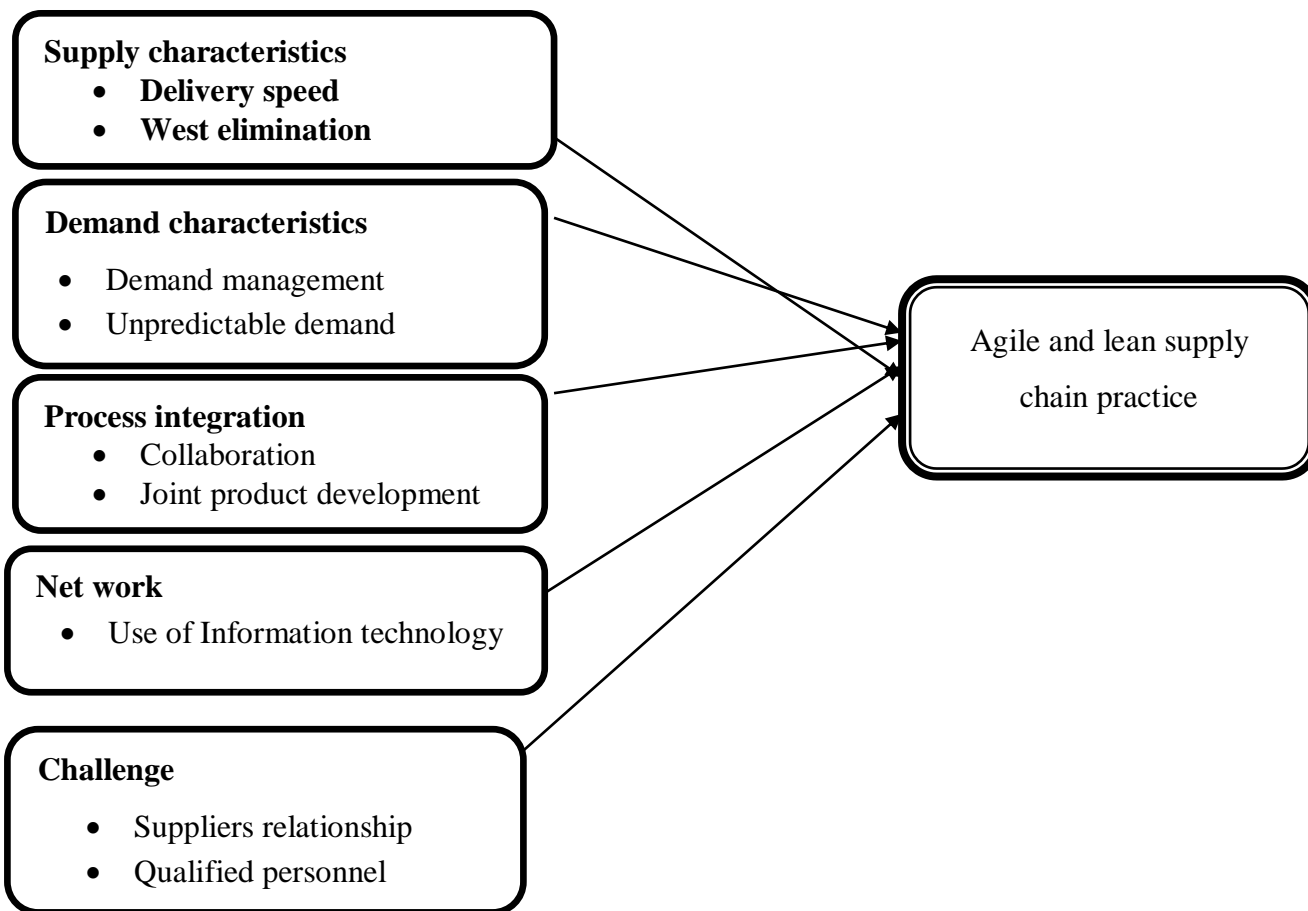


Figure 2: conceptual frame work of agile and lean supply chain practice and challenge developed by researcher after reviewing relevant literature

CHAPTER FOUR

RESULT PRESENTATION AND ANALYSIS

4. 1. Introduction

This chapter presents a summary of results, data analysis and discussions. The results were presented on the lean and agile supply chain management practices at Cadila Ethiopia pharmaceutical manufacturing company. A total of 165 questionnaires were distributed to participants at Cadila Pharmaceuticals. Fortunately, 152 out of 165 questionnaires were fully answered and returned making the response rate of the study as 92%.

4.2. Socio Demographic Characteristics of Study Participants

The background information of the participants include age, sex, section of the work, level of education, specific professional involvement in the manufacturing company and their length of stay as measure of experience level in the firm. The researcher considered the background information are meaningful to the study as it helped to understand the logic of the responses of the study participants; it also laid the basic foundation on which the interpretation of the study is to be based and would enable both the researcher and the readers to have a trust in the findings of the study.

A total of 152 individuals participated in this study and from this 131(86.18%) were males while the rest were females. More numbers of participants were found in the age group of (41-45 years) with 28.29% followed by those found in (36-40 years) age groups, which is 27.63%. From this we can infer that the company is a male employee dominated manufacturing firm and with equal proportion of young and adult workforce.

Regarding their educational status majority of participants are completing their bachelor's degree level which comprise 51.32% followed by those already got their master's degree 31(20.39%). Their profession in charge in the company showed that 33(21.71%) are pharmacists followed by 25(16.45%) as production engineers. Many of the participants 53(34.87%) are from the production department, while 15(9.87%) are from procurement and tender department of the company. Majority 69(45.39%) of them were with 3-5 years of work experience, while 19(12.50%) of participants were with more than ten years in their work experience (**Table 4.1**). This indicates that the majority of the employee are working with bachelor level of education and the company is using a multidisciplinary approach in the supply chain management that other professionals have involvement that ranges from production to procurement and tender departments.

Table .4. 1 Socio-demographic Characteristics of Study Participants at Cadila Pharmaceuticals

Variable	Number	Percent (%)
Age in years		
20-40	73	48.03
41-49	64	42.11
>50	15	9.87
Sex		
Female	21	13.82
Male	131	86.18
Section of work		
Sales and Marketing	36	23.68
Production department	53	34.87
QA/QC department	16	10.53
Supply chain department	16	10.53
Procurement and tender department	15	9.87
Logistic and transport department	16	10.53
Education Level		
Certificate	16	10.53
Diploma	27	17.76
BA/BSc	78	51.32
MBA/MSc	31	20.39
Profession in charge		
Pharmacist	33	21.71
Chemist	19	12.50
Engineers	15	9.87
SCM	20	13.16
Marketing	22	14.47
Production engineers	25	16.45
Lab. Technicians	18	11.84
Length of stay in the company		
1-3	27	17.76
3-5	69	45.39
5-10	37	24.34
More than 10 years	19	12.50

*source; survey, 2020

The in-depth interview with key informants showed that the needs professionals with skills on agility and leanness of supply chain management than other higher degree qualification. This is reflected in the above table that majority of the employee are with BA/BSC level of education followed by MBA/MSc degree qualifications. In the words of one participant it is explained as:

... Our problem can't be solved by having professionals with master's degree, since these individuals can only work at the central level and most of our problems are on the lower level. Therefore, we need professionals who have a skill on agility and leanness of supply chain management. (no. 9)The firm has no low level supply chain professionals these hinder the practice of the agile and lean practice at cadila.

4.3. Descriptive Statistics result on Supply Chain Management (SCM) Practice

The study first examined supply chain management practices used by Cadila. Accordingly, respondents were given questionnaire with some variables to look at supply chain management practices in an organization and told to rate how they perceived application of the given variables in the management of supply chain in Cadila.

The variables were supplier relationship management, information sharing, and customer relationship management. In which respondent were told to rate their opinions on the Likert scale ranging from strongly disagree (1) disagree, Neutral, Agree, strongly agree (4).

4.3.1. Strategic supplier partnership

Table 4.2: Strategic Supplier Partnership practice at cadila pharmaceutical PLC

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Inclusion of key customers in planning and goal setting activities	25(5.3%)	65(13.2%)	19(67.1%)	23(14.5%)	20(7.2%)	3.72	0.084
Regulatory solve problem jointly	0(0%)	55(27.6%)	25(16.4%)	42(27.6%)	30(19.7%)	2.69	0.093
Help suppliers to improve their product quality	20(13.2%)	23(15.1%)	19(12.5%)	65(42.8%)	25(16.4%)	2.65	0.104
Active involvement of key customers in new product development process	36(23.7%)	54(35.5%)	22(14.5%)	15(9.9%)	25(16.4%)	2.59	0.112
Quality as priority in selection of suppliers has role in pharmaceutical Industry	75(49.3%)	67(44.1%)	6(3.9%)	4(2.6%)	0(0%)	1.59	0.056

*source: survey, 2020

The above table has five question developed from literature review to determine the practice of strategic suppliers partnership at cadila was secondary type manufacture throw which all supplies for the production was supplied from Asia especially from India and chain due to this there relationship practice easement was important. The responses with mean value of 1.59 indicated that, the company uses supply quality as criteria of supplier selection. Standard deviation of 0.056 indicates that there is a variation from

the mean that the respondents have common agreement on quality is important criteria in supplier selection. This result was not similar with study done by Asamoah *et al.*, (2012) found that the criteria used to select supplier by some pharmaceutical companies are quality which is the most favoured, followed by reliability capacity and price.

According to Tahriri *et al.* (2008), “supplier selection problem has become one of the most important issues for establishing an effective supply chain system.” Indeed, supplier selection and evaluation represents one of the significant roles of supply management functions. According to the study done by Lin *et al.* (2005) explaining the importance of quality in selecting suppliers based on this study Quality of raw material and component requirements are very vitally important given that the pharmaceutical industry is the most regulated industry.

Strategic partnership helped the company to solve problems jointly with suppliers. Responses with mean value of 2.69 indicated that the company not jointly solving problems with suppliers. Commonly solving problems is another benefit of strategic partnership. Since strategic partners work as a single company, the problems are solved jointly. This implies that Cadila pharmaceutical and its strategic partners have a poor coordination in solving problems jointly.

The mean value of responses for key suppliers’ inclusion in planning and goal setting activities is 3.72 suggesting that the respondents are agreed on involvement of key suppliers. The interview also supports that, during the planning activity the company assesses the performance and willingness of key suppliers to set goals. In addition, new product development is highly dependent on performance of strategic suppliers. When the company plans to develop new product, it identifies the ability of suppliers to provide supplies for new products.

This finding has similarity with the finding described according to Lee, (2002) Coordinating operational activities through joint planning with suppliers and customers results in inventory reduction, smoothing production; improve product quality, reducing supply uncertainty and lead-time Generally, strategic supplier partnership with mean value of 2.64 suggests the respondents agree that there is strategic partnership with suppliers. This implies that the strategic supplier partnership is less practiced in Cadila pharmaceutical P.L.C Ethiopia. Study by (Tsai, 2007)

Vereecke and Muylee (2006) highlighted that strategic partnerships between suppliers and manufacturers have a significant impact on supply chain performance and various aspects of competitive advantage.

4.3.2. Customer Relationship

Table .4.3.Customer relation practice at Cadila pharmaceutical (Ethiopia) PLC

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Periodic evaluation of importance of relationship with customers	15(9.9%)	19(12.5%)	10(6.6%)	84(55.3%)	24(15.8%)	2.45	1.18
Measure and evaluate frequently customer satisfaction	8(5.3%)	12(7.9%)	26(17.1%)	44(28.9%)	62(40.8%)	2.07	1.17
Frequently determine future customer expectations	39(25.7%)	46(30.3%)	18(11.8%)	29(19.1%)	20(13.2%)	3.36	1.38
Frequently interact with customers to gather feedback for future improvement	16 (10.5%)	21(13.8%)	3(2%)	55(36.2%)	57(37.5%)	2.23	1.36
Capacity to regularly monitoring and evaluation of customer satisfaction	20(13.2%)	28(18.4%)	3(2%)	62(40.8%)	39(25.7%)	2.52	1.39

**source: survey, 2020*

Table 4.3 above presents the practices of customer relationship in the company respondent response indicate that firms determining future expectation of the customers have mean value of 3.36 suggest that there is practice of determining future customer expectation. This implies that Cadila pharmaceutical focuses on demand-based selling. The interview response finds out that, the company does not directly sell to customers but there are agents and retailers that distribute the products. The company focuses on expectations of end users by analysing their needs using market intelligence.

The mean value for statement ‘the company frequently measure and evaluate customer’ satisfaction is 2.52 suggesting that the respondents are neutral in their notion that the company is evaluating the customers’ satisfaction. This helps the company to evaluating the customers’ helps to access the acceptance of the product and existence of the competitors. This implies that CPE is evaluating the market based on the customers’ satisfaction using market intelligence. Mean value for ‘the company periodically evaluates the importance of relationship with customers’ is 2.45 suggesting that the respondents are undecided on the notion that the company evaluates relationship with customers.

As many of the respondents are neutral in their opinion for the frequent measure of customer satisfaction, the company did not actively perform on customer relationship till it is recognized by its employee. The company need to actively work on the customer relationship to evaluate its service and improved on the weaknesses. When customer value the customer service that they receive from suppliers, they are less likely to look to alternative suppliers for their needs. CRM enables organisations to gain ‘competitive advantage’ over competitors that supply similar products or services (Shawen Contreas, 2009).

4.3.3. Information sharing practice

Table .4.4.Information sharing practice at Cadila pharmaceuticals (Ethiopia) PLC

Parameters	Strongly Disagree	disagree	Neutral	Agree	Strongly Agree	Mean	SD
Sharing proprietary information with trading partners	8(5.3%)	0(0%)	30(19.7%)	45(29.6%)	69(45.4%)	1.90	1.05
Trading partners keep fully informing about issues that affect the business	12(7.9%)	8(5.3%)	0(0%)	89(58.6%)	43(28.3%)	2.05	1.09
Sharing business knowledge of core business process with trading partners	16(10.5%)	35(23%)	0(0%)	79(52%)	22(14.5%)	2.63	1.27
Practice of early information sharing to manage unpredictable products	30(19.7%)	29(19.1%)	5(3.3%)	70(46.1%)	18 (11.8%)	2.88	1.38
Existence of reliable and complete information system/information sharing and trust	20(13.2%)	55(36.2%)	0(0%)	55(36.2%)	22(14.5%)	2.97	1.35
Existence of timely information exchange system/ elimination of information delay	15(9.9%)	26(17.1%)	0(0%)	61(40.1%)	50(32.9%)	2.09	2.52

*source: survey, 2020

The level of information sharing with the Supply chain partners is presented in the table 4.4 above. Indicate that The Company exchange information that is important for business planning with Supply chain partners. This is indicated by mean of 2.97. This implies that the strategic partnership with suppliers and customers made information sharing easy to conduct business and exchanging vital information for batter supply chain performance.

The mean response Practice of early information sharing to manage unpredictable products in company was 2.88 this indicates firm practice proper information sharing with partner. Mean value of responses for

information from Supply chain partners about issues that affect business of the company is 2.05 suggesting that the company has a good practice of information sharing. This is indicated by mean of 2.63 that implies the Supply chain partners are not significantly sharing core business knowledge with company informs the company about issues affecting the business of the company. The mean of responses that Supply chain partners share proprietary information with the company is 1.90 suggesting that there is relatively low practice of sharing proprietary information.

To enhance the results of information sharing, organizations should answer four main questions: First, what to share, then whom to share it with, then how to share, and finally when to share. The term ‘Information Sharing’ can also be referred to as ‘Knowledge Sharing’ or ‘Information Integration’. There exists a myriad of information in a supply chain, such as, logistic, business, strategic, tactical and many more. The impact of information sharing on supply chains has become more significant with recent advances in Information Technology (IT). Furthermore, some investigations have been conducted to focus on the impact of information sharing on product quality (Honggeng Zhou, 2007).

4.4. Component of agile supply chain practice (ASCP)

4.4.1. Flexibility practice

Table 4.5. Flexibility practice at Cadila pharmaceuticals

Parameters	Strongly Disagree	disagree	Neutral	Agree	Strongly Agree	Mean	SD
Capacity be flexible in the SC of the firm	16(10.5%)	22(14.5%)	0(0%)	74(48.7%)	40(26.3%)	2.34	1.29
Ability to restore suppliers faster without disturbing manufacturing	15(9.9%)	0(0%)	16(10.5%)	109(71.7%)	12(7.9%)	2.32	0.98
The firm can switch between suppliers with getting right quality of supply	9(5.9%)	15(9.9%)	3(2%)	80(52.6%)	45(29.6%)	2.09	1.11
Supply chain swift and able to respond to change in the market	12(7.9%)	19(12.5%)	4(2.6%)	65(42.8%)	52(34.2%)	2.17	1.24

*source: survey, 2020

The company has a capacity to be flexible in the supply chain system as the mean for participants response showed (Mean=2.34). The ability to restore supplies faster without disturbing manufacturing has a mean score of 2.32. The capacity to switch between suppliers in getting right quality of supply is a mean score of 2.069. Respondents were asked as to the swiftness of the supply chain and ability to respond to changes in the market and the mean score is 2.17.

The overall mean score for flexibility practice showed that 2.23 which is the company have a good agility in its supply management system (Table 4.5). Flexibility will provide to the company a chance to meet unexpected challenges without buckling. There are many reasons that production might be delayed, or a

key employee is absent from work. With flexibility built into a manufacturer’s system of operation, those emergencies or setbacks can be overcome, simply because the company has more options to work with (Mark Dohnalek, 2018).

4.4.2. Market sensitivity

Table 4.6.Market sensitivity analysis practice at Cadila pharmaceuticals

Parameters	Strongly Disagree	disagree	Neutral	Agree	Strongly Agree	Mean	SD
Company responds to customer requirement quickly	4(2.6%)	20(13.2%)	14(9.2%)	44(28.79%)	70(46.1%)	2.34	1.29
The firm has always remained alert to change that might affect the operation	7(4.6%)	20(13.2%)	18(11.8%)	40(26.3%)	67(44.07%)	2.32	0.98
There is efficient customer response form(CRF)	13(8.6%)	87(57.2%)	0(0%)	36(23.7%)	16(10.5%)	2.09	1.11
Information flows from marketplace and customer	30(19.7%)	97(63.8%)	7(4.6%)	10(6.6%)	8(5.3%)	2.17	1.24

*source: survey, 2020

The findings portray that majority agreed that their organization undertakes a market sensitivity analysis in its supply chain management practice. Overall mean for undertaking of a sensitivity Analysis was (M =2.7). Selene and Soliman (2002) also declares that market sensitivity analysis is the most recently introduced approach and it still evolves and lacks a consensus of its defining characteristics. Whereas some proponents define it as a set of practices aimed at managing and coordinating the whole supply chain, starting from end customer and working backward to raw material supplier (Selen and Soliman, 2002) (Table 4.9).

In supply chain management, the average time from the placement of an order to a product’s delivery has emerged as a key performance indicator (KPI), signifying how effective and efficient a supply chain network is and providing a valuable metric as to the time a product spends in the system.

4.4.3. Information integration

Table 4.7 Information Integration Practice at Cadila Pharmaceuticals

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Company uses IT to share data with suppliers	56(36.8%)	19(12.5%)	17(11.2%)	40(26.3%)	20 (13.2%)	2.38	1.42
Information and data sharing among suppliers and buyers through internet	51(33.6%)	71(46.7%)	14(9.2%)	10(6.6%)	6(3.9%)	3.99	1.02
Information and data sharing among suppliers and buyers through electronic data	34(22.4%)	65(42.8%)	9(5.9%)	27(17.8%)	17(11.2%)	3.47	1.31
There is continuous information exchange and open communication with suppliers and customers	19(12.5%)	27(17.8%)	5(3.3%)	47(30.9%)	54(35.5%)	2.40	1.43

*Source: survey, 2020

The respondent strongly agreed that the company use of information technology to share data with suppliers, but the means of sharing information was not through internet and also the respondent strongly agree there was continues information exchange and open communication with suppliers and customers. The respondents were further requested to show the degree to which they concur with the statement on the level of information integration practice as they apply to their organization. The findings are as shown in table 4.7. The findings illustrate that means for integrating information is the IT applications. The overall mean (M=3.06) with a standard deviation of about 1.02 point, the researcher found information and data sharing among suppliers and buyers are through internet communication (M=3.99) (Table 4.7). Information integration in today's business flows between internal organizational functions and across partner firms and it is widely acknowledged as a contributor to organizational competitiveness.

The performance outcomes of information integration are contingent on both external environmental conditions and internal operational characteristics. in many supply chain management practices information integration improves firms' ability to perform, particularly when they operate under favourable environmental conditions—a highly open-handed and a less uncertain environment—and when they offer durable and complex products. This information sharing practice provides managers with empirical insights on the effects of information integration on the cost and customer-oriented operational performance of SCM. Although information integration is considered essential to streamlining in SCM, it is not necessarily related to SC cost reduction, and it may even be detrimental to efficiency in interorganizational coordination and customer service performance. These mixed results suggest that the contribution of information sharing to firms' ability

to create value in their SCs is highly dependent on firms' business environmental conditions and operating characteristics (Wong Lai et.al, 2011).

4.4.4. Process integration

Table 4.8.Process integration at Cadila pharmaceutical

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Organization has good relationship with suppliers and customers	49(32.2%)	66(43.3%)	10(6.6%)	20(13.2%)	7 (4.6%)	2.14	1.14
Organization can collaborate with suppliers and customers	61(40.1%)	33(21.7%)	20(13.2%)	10(6.6%)	28(18.4%)	2.41	1.51
There is joint product development	1(0.7%)	52(34.2%)	30(19.7%)	2(1.3%)	67(44.1%)	4.19	0.84
There is use of information technology between customers and suppliers	13(8.6%)	13(8.6%)	14(9.2%)	52(34.2%)	60(39.5%)	3.87	1.26

*Source: survey, 2020

As participants response indicates the company has good relationship with suppliers and customers (mean=2.14). This is further evidenced by the collaborate work of the company between suppliers and customers (mean=2.41). There is a joint product development (mean=4.19) and there is also high-level information technology use between customers and suppliers. The researcher found that the joint development (M=4.19) is the most determining factors for process integration in the supply chain at Cadila Pharmaceuticals. This is consistent with other study findings in the literature that a typical lean application entails a preliminary value in process integration of the practice.

It is the followed by application of high level of information technology use between customers and suppliers (M=3.87) which could involve flexible work structure most especially in the modern digital world. Successful companies are characterised by a certain level of integration among their business process. The increased global market competition forces companies to evaluate further the opportunity and challenge of utilizing flexible organization with integrated processes and information. A proper management of the information system allows managers to formulate better strategic decisions for the successful operation of businesses (Wiederhold, 2000) (Table 4.8).

4.4.5. Supply chain responsiveness

Table 4.9.Supply chain responsiveness at Cadila pharmaceutical

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
The firm can respond quickly to unplanned change in demand and supply	18(11.8%)	3(2%)	13(8.6%)	68(44.7%)	50(32.9%)	2.15	1.24
The company supply chain can cope with unplanned market change	16(10.5%)	31(21.7%)	20(13.2%)	53(34.9%)	32(21.1%)	2.64	1.30
The company can respond to transportation delay	1(0.7%)	52(34.2%)	30(19.7%)	2(1.3%)	67(44.1%)	2.69	1.21
Company rapidly adjusted its production capacity to address demand change	13(8.6%)	13(8.6%)	14(9.2%)	52(34.2%)	60(39.5%)	2.25	1.22
Finished goods are sometime delivered direct to customers	9(5.9%)	24(15.8%)	12(7.9%)	59(38.8%)	48(31.6%)	2.25	1.22
The company can have the capacity to carryout activity in shortest possible time	19(12.5%)	48(31.6%)	19(12.5%)	37(24.3%)	29(19.1%)	2.94	1.35
The company have minimum lead time developed and used	11(7.2%)	41(27%)	19(12.5%)	50(32.9%)	31(20.4%)	2.67	1.26

**source: survey, 2020*

Responsiveness supply chain is one that is sensitive to meeting customer requirement. Average of the respondent strongly agree the firm can respond quickly to unplanned change in demand and supply and the company supply chain can cope with unplanned market change (mean=2.15). The researcher found that the company has the capacity to carry out activity in shortest time (M=2.94) is the most determinate of supply chain responsiveness practice and the company responded to transportation delay has the next mean value (M=2.69).The company supply chain cope with market change (M=2.64) but the company not rapidly adjust its production capacity to address demand change has lowest mean (M=2.25).

From this, we can infer that the company has to invest more on to respond to the supply chain through order-fill accuracy, scalable fulfilment of customer demand, and customer satisfaction. Nowadays, customer responsiveness in the supply chain is becoming increasingly important as a result of enhanced variety and customization requirements. Responsiveness was divided in three dimensions (including time-horizons), volume (operational), and product (tactical) and process (strategic); each dimension was accompanied by a supply chain solution (Table 4.9).

4.5. Components of Lean supply chain practice

Table 4.10: Lean Supply Chain Practice of Cadila Pharmaceutical Ethiopia plc

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Is there Lean transportation practice in the firm	19(12.5%)	31(20.4%)	2(1.3%)	61(40.1%)	39(25.7%)	2.53	1.39
Firm has ensured there are effective transportation systems	21(13.8%)	18(11.8%)	11(7.2%)	37(24.3%)	65(42.8%)	2.29	1.46
Production is pulled by the shipment of finished goods	31(20.4%)	59(38.8%)	17(11.2%)	20(13.2%)	25(16.4%)	3.33	1.37
Is there a Just in Time (JIT) technique in your organization	24(15.8%)	69(45.4%)	13(8.6%)	15(9.9%)	31(20.4%)	3.26	1.39
Demand driven supply-chain use of pull system	22(14.5%)	75(49.3%)	6(3.9%)	28(18.4%)	21(13.8%)	3.32	1.31

*source: survey, 2020

The company has lean transportation practice (mean=2.53) and they believe that the firm has ensured the effective transportation system (mean=2.29). Correspondingly, the production is pulled by the shipment of finished goods (mean 3.33) and there was just in time lean supply chain practice (mean=3.26). The overall mean for the component of lean supply chain practice at the company is low (mean=2.94) (Table 4.11). The company has to provide a due emphasis in the lean supply chain management. It is about removing waste or unwanted components from a process.

Most often this process is applied to manufacturing, where supplies can be ordered as they are needed rather than back stocking a lot of inventory. With a lean approach, it is important for organizational leadership to identify the value and non-value parts of the supply chain. By identifying what is of value in the supply chain, a determination can be made on how to focus the business on those valued parts. Equally, non-valued parts can be eliminated to keep cost and inefficiency at a minimum. Non-valued parts are those parts in the process that have zero or negative return on investment. The elimination of non-valued parts has positive or no impact on the outcome of the process (R Lamming, 2013).

4.5.1. Waste elimination practice

Table. 4.11. West elimination practice of Cadila pharmaceutical Ethiopia plc.

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Is there Waste management system in your firm	6(3.9%)	13(8.6%)	9(5.9%)	51(33.6%)	73(48%)	1.86	1.10
The organization ensures minimal wastes in its operations processes	17(11.2%)	19(12.5%)	13(8.6%)	59(38.8%)	44(28.9%)	2.38	1.32
The firm practices of grouping similar parts in families to eliminate movement and queue	15(9.9%)	23 (15.1%)	18(11.8%)	54(35.5%)	42(27.6%)	2.44	1.30
Is there Overproduction: (Producing too much or too soon)	29(19.1%)	70(46.1%)	8(5.3%)	30(19.7%)	15(9.9%)	3.44	1.27
Is there Defects(Frequent errors in paperwork or material/product quality problems)	22(14.5%)	75(49.3%)	6(3.9%)	28(18.4%)	21(13.8%)	3.19	1.51
Is there Unnecessary inventory:(Excessive storage and delay of information or products)	29(19.1%)	66(43.4%)	2(1.3%)	16(10.5%)	39(25.7%)	3.38	1.48
Are there Inappropriate processing procedures	39(25.7%)	59 (38.8%)	6(3.9%)	17(11.2%)	31(20.4%)	2.10	1.22

*source: survey, 2020

The employee agrees the company has waste management system (mean=1.86) and the organization ensure minim waste in operational process (mean=2.38), but significant number of respondent disagree there was no overproduction which is one of types of waste in supply chain (mean=3.44).There is no unnecessary inventory (excessive storage and delay of information or products) is agreed with a mean score of 3.38 (Table 4.12). Eliminating waste or overburden and creating value in products is the concept of lean management (Womack & jones, 1996).

The company has a waste management system even though it is not acknowledged by its employees. There practice should be designed in a systematic approach to identify and eliminate wastes (non-value-added activities) through continuous improvement by following the product at the pull of the customer in pursuit of perfection. Simply lean means to create more value for customers with fewer resources, in other words, the fundamental ideas is to maximize customer value while minimizing waste (Buzy, Gersternfeld, 2002).

4.5.2. Demand management

Table 4.13: Demand management practice at cadila pharmaceutical (Ethiopia) PLC

Parameters	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Products delivered only when requested by the final customer	6(3.9%)	23(15.1%)	14(9.2%)	51(33.6%)	58(38%)	2.13	1.19
The firm has invested time and money in collaborative demand planning	30(19.7%)	62 (40.8%)	17(11.2%)	24(15.8%)	19(12.5%)	3.39	1.30
The firm always conduct annual demand forecasting	13(8.6%)	33 (21.7%)	7(4.6%)	37(24.3%)	62(40.8%)	2.32	1.41
The firm always communicate its demand forecast to its supply chain partners	29(19.1%)	70(46.1%)	8(5.3%)	30(19.7%)	15(9.9%)	3.14	1.46
Demand management in our Factory is accurate and there has never been an increase in production over the required supply	27(17.8%)	61 (40.1%)	4(2.6%)	27(17.8%)	33(13.821.7%)	2.76	1.49
Factory manages demand and invests time and money in achieving it.)	29(19.1%)	66(43.4%)	2(1.3%)	16(10.5%)	39(25.7%)	2.01	1.15

*Source: survey, 2020

According to the study findings, it was established that the firm has invested time and money in collaborative demand planning was to a great extent (mean of 3.3), the firms always conducts annual demand forecasting was to a less extent (mean of 2.3), the firm always does product positioning, pricing and promotion of its products was to a moderate extent (mean of 3.6) the firm demand management was less accurate and there has never been increase in production (mean of 2.7),the company was not produce what is demanded by their customer need with (mean of 2.0) the study deduced that demand management is concerned with balancing the requirement of internal and external customers with supply chain capabilities according to Lysons and Farrington (2006).

4.6. Challenges of SCM at Cadila Ethiopia Pharmaceuticals PLC.

The researcher conducted an in-depth interview to analyse the challenges of SCM at Cadila Ethiopia Pharmaceutical plc. Based on the interview with key informants at the manufacturing company to identify those challenges related to the supply chain management practice, it is obvious that many setbacks were expressed. First and foremost, the majority of interviewees agreed that there should be appropriate and flexible chain management practice in the firm. Several interviewees mentioned that the higher management should recognize the importance of agile and lean SCM and related issues in the company. In the words of one of the participants:

There is willingness of higher officials in the firm to work on the agile and lean supply chain at all levels.

According to many of the respondents, creating or sustaining awareness of Agile and lean SCM in the company is seen as a very important, especially commitment from the higher-level managers. However, some interviewee saw recent development in their company as only the start of a long process.

At this time, we are not talking about sustainability issues, rather we are talking about how to initiate and implement SCM, said one interviewee.

The interviewees were asked to explain the overall supply chain practice in the company. They emphasize on the need to focus on strategies and coordination with regard to infrastructure development for SCM and this was mentioned by many; in the words of one participant:

There is much work to be done on SCM. This can be done by building strategies, coordinating partners that work in this area, building trusted relationship with customers and also in particular a logistic partnership.

There are several areas where interviewees point to possibly manage their supply chain that includes close partnerships with suppliers, outsourcing and subcontracting. They also have ideas regarding what is needed to make the system sustainable. One of the areas mentioned most often by interviewee was finance with particular concern regarding the assurance of SCM for the future.

Regarding the concept of the two-supply chain strategy as agile and lean supply practice, respondents have heard the term previously before coming to the company. However, the number of professionals working and practicing the SCM with respect to such has to be focused. There is a need for more people trained in and working with supply chain management in pharmaceuticals. One solution is not to focus so much on pharmacists. In the words of one participant:

... Involving other professionals like logisticians in the supply chain rather than focusing on the pharmacists will lead to the wider application of agile and lean in the supply chain.

It was also pointed out that this is already happening.

People now understand that the supply chain should be managed by supply chain personnel who have the required skills and knowledge. And these skills differ at each level in the system.

Several respondents pointed out problems and possible solutions to the question of what challenges faced by Cadila pharmaceutical from their division perspectives. For example, a person within the production said:

... our problem can't be resolved by having professionals with a master's degree, since these individuals can only work at the central level and most of our problems are on the lower level. Therefore, we need professionals who have a skill on agility and leanness of supply chain management. (no. 9)

One of the challenges the company faced was product damage. Pharmaceuticals require even greater attention to sanitation and safety than do most consumer products. One respondent replied that:

A damaged box is grounds for discarding its contents even if they are still safely in individual bottles or blister packs. The dangers posed by tampering with or contamination of pharmaceuticals are serious enough that there cannot be any question as to how the product was handled. Logistics and warehouse employees must always err on the side of caution.

The need to increase the motivation of the staff for the supply chain management in place was mentioned by many and is seen as crucial step in order to encourage skilled people to stay longer and to develop and maintain commitment to the continuous improvement of the agile and leanness of the supply chain system. Suggestions about how this could be done include economic incentives for working in the logistic areas, and formal job recognition - including coordinating and systematizing the various education and training programs. Continuous on-the-job training on supply chain management and peer support systems were frequently mentioned as potential improvements to have a sustainable SCM with agile and lean practice.

Stock shortage avoidance is the other challenge the factory is facing. Probably the greatest difficulty facing the pharmaceutical supply chain is making sure that the supply of pharmaceuticals meets the demand of doctors and their patients. The possibility of theft, damage, contamination, and other supply chain disruptions make this a constant challenge. To ensure an uninterrupted supply of pharmaceuticals, the company is implementing best practices more consistently through steps such as keeping a backup inventory on hand and having secondary sources of necessary raw materials available.

4.6. Discussions

Different researchers use different aspects as a supply chain practice. Donlon, (2006) in his study considered outsourcing, supplier partnership, information sharing, cycle time compression, and continuous process flow as SCM practices. Tan et. al. (2008) in his empirical study used quality, purchasing, and customer relations to represent SCM practices. This research considers strategic supplier partnership, customer relationship and information sharing practice as supply chain management practice.

This study assessed the supply chain management practice (supplier relationship management, customer relationship management, level of information sharing), lean and agile supply chain practice and challenge of supply chain the firm faced. A survey instrument tool (questionnaire) was developed and distributed to employees of the companies. Then the result of descriptive analysis implies that the companies are implementing some of the supply chain management practices (supplier relationship management, customer relationship management, level of information sharing). One of the objectives of the study was to determine Cadila supply chain management practice those practice. Based on this the firm consider quality as selection criteria for suppliers. But the firm not invite the suppliers to solve problem jointly and the firm invite suppliers in planning and goal setting activity.

The study revealed that the firm selecting their suppliers based on the quality of the suppliers but most research indicate that selection criteria of suppliers are not only quality. The selection process represents a multi-criteria decision making problem affected by different tangible and intangible attributes such as the traditional attributes, including quality, cost, service, flexibility, and delivery performance reported in the literature (Weber & Ellram, 1992).

Peter et al (2005) which states that strategic partnership enables the buyer to get quality product based on long term relationship between the companies. Similar to this study the CPE focusing on quality issue in selecting the supplier that have both long term and short-term implication on operational performance of the company. The respondents concur with the literature, according to Halldorsson, (2007). To develop lean suppliers, organizations should include suppliers in their value stream. They should encourage suppliers to make the lean transformation and involve them in lean activities. This will help them fix problems and share savings. In turn, they can help their suppliers and set continually declining price targets and increasing quality goals. Strategic partnership helped the company to solve problems jointly with suppliers. Commonly solving problems is another benefit of strategic partnership. Since strategic partners work as a single company, the problems are solved jointly. Supply chain management (SCM) has nowadays become a crucial strategy for firms to enhance their profitability and stay competitive (Li *et al.*, 2006). Suppliers have been acknowledged as the best intangible assets of any business organization (Muralidharan et al. 2002). Based on this the firm has selecting their suppliers to work together. Several researchers have suggested that the understanding and practicing of SCM is an essential prerequisite for staying competitive in the global race and for enhancing profitability (Ragu-Nathan, and Rao, 2006). However, selecting the right suppliers for a long term relationship is a relevant for better performance.

According to Tahriri et al. (2008), “supplier selection problem has become one of the most important issues for establishing an effective supply chain system.” Indeed, supplier selection and evaluation represent one of the significant roles of supply management functions.

According to (Tsai, 2007) Strategic supplier partnership in SCM has been reported to yield organization-specific benefits in term of financial performance Weber, Current, and Benton, (1991) affirm that firms cannot successfully produce low cost, high quality products without judicious selection and maintenance of a competent group of suppliers. This was similar to that of the study finding Cadila choice their suppliers based on the quality. The study by (Tan et al, 2008) indicate that Strategic partnerships with suppliers enables organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products. Suppliers participating early in the product design process can offer more cost-effective design choices, help select the best components and technologies, and help in design assessment.

Based on the study by Balsmeier&Voisin, 2006 and Noble, 2007 strategically aligned organizations can work closely together and eliminate wasteful time and effort an effective supplier partnership can be a critical component of a leading-edge supply chain. The second parameters to determine the supply chain management practice was firm customer relationship practice the result suggest that there is practice of determining future customer expectation. This implies that Cadila pharmaceutical focuses on demand-based selling. The interview response finds out that, the company does not directly sell to customers but there are agents and retailers that distribute the products. The company focuses on expectations of end users by analysing their needs using market intelligence. The company frequently measure and evaluate customer' satisfaction.

The CRM measure was used to determine the extent to which an organization developed a business process that provides the structure for how relationships with customers of that organization will be developed and managed. In case customer relationship the firm periodically evaluating customer relationship and periodically evaluating customer satisfaction on the product they produce and the service they provide to their trading partners and interact with customers to gather feedback for future improvement in the service it provides. This finding is in line with Sahay et al. (2006) who found that customer service was the most critical supply chain process in Indian organisations.

Likewise, focusing on customer relationship creates loyal customers and results on better sales (Adebayo & Toyin, 2012). There is efficient customer relationship management in the company through improved distribution management and market intelligence end customers' expectation assessment. Finding of this study has similar result with finding of (Magretta, 2008) that, efficient customer relationship gives improves operational performance, competitive advantage over competitors and improves economies of scale.

The findings of this study are also supported by a study by Lee *et al.* (2007), customer relationship management is “concerned with planning, implementing, and evaluating successful relationships between providers and recipients either upstream or downstream of supply chain” .Customer relationship management mainly refers to activities such as sharing product information with customers, interacting with them to manage demand and satisfy their wants and needs, accept customer orders, having an order placing system, sharing order status with customers during order scheduling, and the product delivery phase (Lee *et al.*, 2007).

customer relationship practice of Cadila pharmaceutical was not use advanced technology to hand customer data but a study conducted in Ralston et al. (2015) to also have a positive relationship with customer and supplier integration. The study also revealed that EDI and RFID are widely used as supply chain practices by Small and medium enterprise MEs. This has made them more flexible and responsive to customers’ requests by enabling them to monitor movement of inputs and finished products all along the supply chain. Customer relationship management has been widely studied in the academic literature as it is considered a core and key element of successful SCM (Lee *et al.*, 2007; Li *et al.*, 2006; Li *et al.*, 2005; Tan *et al.*, 1998).

From the findings, majority of the respondents agreed thattheir organization sources for customer need information by defining a strategy and rationale that can be used to lower costs. Overall mean for information sharing practice was good. Likewise, in relation to existence of reliable and complete information system/information sharing and trust, the company has a good mean score. The study revealed that there is strong proprietary information sharing practice with trading partner and the firm has the practice of keeping trade partners fully informed about issues that could affect the business. Holmberg, 2015 state that Information sharing is very important, however, its impact on SCM depends on what information is shared, when and how it is shared, and with whom.Information sharing serves as an essential approach for the survival of enterprises and enabler of supply chain integration. Nowadays, with the advancement in information and communication technology, information sharing has become more conceivable.

In order to survive and compete in today’s global economy, manufacturing sector strongly needs to create, share and disseminate up-to-date and appropriate knowledge and information.in et al represent information sharing as the heart of supply chain collaboration. This means that more attention needs to be given to information sharing. Sharing Information among supply chain members may bring a number of benefits to industries.Nunes M.B, et, al, 2006 Among these benefits, Lee et al. demonstrates the potential advantages of information sharing for the manufacturers in two ways, either expected cost reduction or inventory reduction.

According to Zhao et al, if information sharing issued efficiently, the manufacturers are able to reduce the inventory costs by 5 to 35 presents when the service level may be maintained or increased to the retailers. According to Marshall and Bly, the shared information builds and strengthens relationships and social ties among the information receivers and givers. Organizational efficiency and performance is a couple of the advantages of information sharing. The second objective of this study was to determine agile supply chain practice in CPE agile supply chain is one of the strategies of supply chain management Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace. There is different agile supply chain characteristic based on the literature review this study focused on as A key characteristic of an agile organization like flexibility, Market sensitivity, Information integration, Process integration, Supply chain responsiveness (Agarwal, Shankar and Tiwari).

The study revealed that the company has a capacity to be flexible in the supply chain system is agreed by the study participant. An Agile Supply Chain (ASC) must be responsive to the market. In order to achieve this characteristic, it's required speed and high level of manoeuvrability (Agarwal et al., 2006). Harrison and Van Hoek (2005) mentioned that a company's speed capabilities are elevated when having an agile approach. Heizer et al. (2013) pointed to flexibility performance as the ability to develop products on time, deliver products fast, have reliable scheduling, and flexible performance. They further argued that customers will perceive the value of company's flexibility via its ability to match changes in a marketplace in a timely manner while maintaining smooth processes. ASC is more flexible and responsive for customers need. This support by Iskanius (2006) and Preiss (2005) as noted by Ambe and Badenhorst-Weiss they said agility is a comprehensive response to the business challenges of profiting from rapidly changing, continually fragmenting, global markets for high-quality, high-performance, and customer configured goods and services" More specifically, to implement ASC successfully, a firm must be able to respond to rapidly changing and continually fragmenting global markets by being dynamic, growth-oriented, context-specific, flexible across the organization and more importantly, driven by customer. In addition, if a company wants to be able to respond better to the changing expectations and requirements of the end-consumers, collaborative relationships with suppliers should be developed (Bruce and Daly, 2011).

Christopher (2000) the author also adds that a truly agile SC must possess a few distinguishing characteristics. An ASC must be market sensitive, virtual, and network-based and must embrace process integration. Market sensitiveness it is closely connected to the end-user and must provide daily Point of sale feedback, capture emerging trends and listen to consumers. The findings portray that majority agreed that their organization undertakes a market sensitivity analysis in its supply chain management practice. Selen and Soliman (2002) also declares that market sensitivity analysis is the most recently introduced approach and it still evolves and lacks a consensus of its defining characteristics. Whereas

some proponents define it as a set of practices aimed at managing and coordinating the whole supply chain, starting from end customer and working backward to raw material supplier. This implies that the supply chain cannot be agile if the market forces which include demand and supply are not monitored in a day to day basis.

Market sensitive is meant that the supply chain is capable of reading and responding to real demand. Most organizations are forecast-driven rather than demand-driven. In other words, because they have little direct feed-forward from the marketplace by way of data on actual customer requirements they are forced to make forecasts based upon past sales or shipments and convert these forecasts into inventory. Information integration utilizing advanced practices of information technology/information system (IT/IS) to share data between the supply chain partners (suppliers, customers, and manufacturer). Thus, a virtual supply chain can be created. An advanced decision support system (DSS) is also needed. The respondent strongly agreed that the company use of information technology to share data with suppliers, but the means of sharing information was not through internet and also the respondent strongly agree there was continues information exchange and open communication with suppliers and customers.

The researcher found that the joint development is the most determining factors for process integration in the supply chain at Cadila Pharmaceuticals. This is consistent with other study findings in the literature that a typical lean application entails a preliminary value in process integration of the practice. It is the followed by application of high level of information technology use between customers and suppliers which could involve flexible work structure most especially in the modern digital world.

The researcher found that the company has the capacity to carry out activity in shortest time is the most determinate of supply chain responsiveness practice and the company responded to transportation delay has the next mean value and The company supply chain cope with market change but the company not rapidly adjust its production capacity to address demand .By capturing new market trends, monitoring daily sales and listening to the customers feedback the company would be able to identify the potential market, thus can the subsequent monitoring of consumer demand be achieved (Masson et al, 2007). It is clear that agility in the firm's supply chain requires quick response in order to be able to fulfil market demand as soon as possible.

Quick Response is a strategy that requires accuracy, rapid and cost-effective response to specific markets that are highly dynamic, and leveraging the capability of extensive supply chain and sourcing production through compressed lead time, real time efficiency, management of information systems, pipeline management flexibility and optimization of logistics and distribution systems.

Swift response attempts to merge cost and scale efficiency by sourcing offshore with quick response and accurately to fulfil market demand, information on which it obtains by dynamic planning and strong

logistic management. For effective supply chain agility swift response from various departments must be embraced in order for the organization to be agile. Agile supply chain requires minimum total lead-times defined as the time taken from a customer raising a request for a product or service until it is delivered.

Lead time reduction within the supplier-production-distribution chain is the mechanism for time-based competition. Management of lead time can be competitive advantage. Managing time may be the mirror image of managing quality, cost, innovation, and productivity. The third objectives of the research was determine lean supply chain management practice at Cadilapharmaceutical based on the literature review the lean practice variable used by the research was waste elimination practice and demand management practice. Lean supply chain has been defined as a systematic approach to enhancing value to the customer by identifying and eliminating waste of time, effort and materials through continuous improvement, by following the product at the pull of the customer, in pursuit of perfection (Lassale, 2005). The employee Cadilapharmaceutical agrees the company has west management system and the organization ensure minim waste in operational process. The lean supply chain practices have been revolutionized, leading to a number of success stories from various companies (Borac, Milovanovic & Andjelkovic, 2010).

The implementation of the lean SC approach has become a trend in the global market and is one of the major strategies being adopted by manufacturing companies LSCM refers to the implementation of lean principles across the entire SC Lean SC means also applying steps to eliminate all types of waste across the SC, guided to minimize the production lead time and SC-related costs (Al-Zu'bi, Z.M., 2015)

Achieving perfection through waste reduction is a key aspect of a lean system through the elimination of non-value-adding activities and other forms of waste reduction can be achieved through the implementation of lean principles (Womack, J.P., and Jones, D.T.) Lean focuses on elimination source of wastes that arise in processes. Lean principles are adopted in many enterprises, including Japanese enterprises for controlling the resources in accordance with the customers' needs and to reduce cost through unnecessary waste (including the waste of time). This shows that pharmaceutical companies are still struggling with the implementation of lean maybe because of simply copying the standardised tools of other industries or companies. But to be successful, the initiatives need to be aligned to the particularities of the industry as well as the business strategy of the single manufacturing plants (Dean & Snell, 1996)

The main aim of lean supply chain management is identification and elimination of waste from the whole value chain and supply chain management (Cudney and Elrod, 2011). Most of the activities on the implementation of lean revolve around waste elimination. Shah and Ward (2007) suggests that waste can be eliminated by analysis and optimization of transportation method and machining process, adoption of appropriate and improved technology, and proper organization of facilities within the system.

A lean implementation across multi-levels of a supply chain is extremely difficult to achieve (Bruce et al., 2004; Taylor, 2006). Additionally, at the level of the whole supply chain it may be impracticable to achieve such ideal perfection. However, from the perspective of a specific supply chain echelon, it becomes easier to identify whether or not current practices are lean as well as their level of adoption (Levy, 1997; Mc Cullen and Towill, 2001; Yusuf et al., 2004; Wong et al., 2014). According to the study findings, it was established that the firm has invested time and money in collaborative demand planning was to a great extent, the firms always conducts annual demand forecasting was to a less extent, the firm always does product positioning, pricing and promotion of its products was to a moderate extent.

The firm demand management was less accurate and there has never been increase in Production the Company was not produce what is demanded by their customer need with the study deduced that demand management is concerned with balancing the requirement of internal and external customers with supply chain capabilities according to Lysons and Farrington (2006).

The challenges identified in this study has also showed that many of the study participants believed the company should have a flexible and appropriate supply chain management practice in place. The flexibility of a supply chain would have an enormous advantage to the company implemented to the extent of improving the profitability and existence of the firm in the business. A flexible supply chain organization requires not only a strategic leader, but also input from managers who present the traditional supply chain functions of planning, sourcing, manufacturing, logistics, and also sales and marketing among others. This will make flexibility a top supply chain priority this year. In today's world of competitive business, supply chain management has become the indispensable part of the action management dealing with business improvement and exploring the operational actions that managers and staff need to do to derive better business performance (Satishbhai Patel 2013).

A number of factors have converged to advance supply chain management practice including manager's involvement the current study has examined another area of challenge that the higher management should understand the need for agile and lean supply chain management at all levels. This is for every system if it has recognition by the top-level management, it would have a sustainable effect on the performance of the company by minimizing the waste associated in the supply chain management. This also includes the awareness and commitment by higher level managers.

The infrastructure development for the agile and lean supply chain management is not recognized well by the company at the time of this study as it was evidently showed by the interviewed key informants. Infrastructure is integral to supply chain success as evidenced by many companies worldwide. Because of its importance in maintaining and improving economic competitiveness, transportation infrastructure has become a frequent subject of discussion around the world. In the United States, for instance, those

discussions reflect concerns about whether the country has the necessary infrastructure to compete with expanding economies like China and India. Another concern is whether the transportation infrastructure can handle international trade growth—a major issue considering that the value of exports and imports as a percentage of gross domestic product (GDP) has nearly doubled since 1990 (David Jacoby 2013).

The need for professionals with skill on agility and leanness of a supply chain management is emphasized by the production line department staffs. A short duration course in supply chain management and logistics provides its delegates with knowledge in market needs, planning methods and flow management. These enable them to evaluate logistical accomplishments and execute new logistical procedures. The present study has also identified that one of the challenges the firm encountered is there is frequent product damage. Damage prevention in the supply chain is a high priority for warehouse managers and transportation operators. They strive to reduce their cost of doing business by looking at the root cause of incidents where products are devalued or destroyed.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter gives the summary of finding, conclusion and recommendation of the study. This study sought to assesses the practice of agile and lean supply chain practice in pharmaceutical manufacturing companies in Ethiopia in case of Cadila Ethiopia pharmaceutical manufacturing company.

5.1. Summary of Major Findings

This study is conducted with an objective of identifying Supply Chain Management practice and agile and lean supply chain practice at Cadila pharmaceuticals manufacturing. Based on different literatures and implementations in the company, to measure supply chain management practices, strategic supplier partnership, customer relationship, level of information sharing is used as dimensions of supply chain management. Data regarding Supply Chain Management Practices were gathered through questionnaire and interview.

- ☞ The Supply Chain Management practices of the company were identified by using mean of agreement of respondents Accordingly, based on this the firm has use quality as selection criteria can Cadilapharmaceutical and its strategic partners have a poor coordination in solving problems jointly. Generally, strategic supplier partnership with mean value of 2.64 suggests the respondents agree that there is strategic partnership with suppliers. This implies that the strategic supplier partnership is practiced in Cadila pharmaceutical P.L.C Ethiopia
- ☞ Overall all practice of customer relationship management at Cadila pharmaceutical was Frequently determine future customer expectations and the firm has Capacity to regularly monitoring and evaluation of customer satisfaction. In case of information sharing practice, the firm has practice of sharing of proprietary information with trading partners. There where practice of early information sharing to manage unpredictable products is agreed by majority of respondent and Timely information exchange system/elimination of information delay.From the findings, majority of the respondents agreed thattheir organization sources for customer need information by defining a strategy and rationale that can be used to lower costs. Overall mean for information sharing practice.
- ☞ The company has a capacity to be flexible in the supply chain system is agreedand The respondents were asked whether the company has the flexibility in the implemented supply chain system and the mean score resulted showed that the company has a good agility in its supply management system.The findings portray that majority agreed that their organization undertakes a market sensitivity analysis in its supply chain management practice.

- ☞ The respondent strongly agreed that the company use of information technology to share data with suppliers, but the means of sharing information was not through internet and also the respondent strongly agree there was continues information exchange and open communication with suppliers and customers.
- ☞ The findings illustrate that means for integrating information is the IT applications. The overall mean, the researcher found information and data sharing among suppliers and buyers are through internet communication. The researcher found that the joint development is the most determining factors for process integration in the supply chain at Cadila Pharmaceuticals.
- ☞ The researcher found that the company has the capacity to carry out activity in shortest time is the most determinate of supply chain responsiveness practice and the company responded to transportation delay has the next mean value .The company supply chain cope with market change but the company not rapidly adjust its production capacity to address demand change has lowest mean.
- ☞ According to the study findings, it was established that the firm has invested time and money in collaborative demand planning was to a great extent and the firm demand management was less accurate and there has never been increase in production. Company uses appropriate demand management techniques the firm demand management was less accurate and there has never been increase in production.
- ☞ The in-depth interview applied to identify those challenges the company encountered showed that the top-level managers are volunteer to implement an agile and lean supply chain management. It was also recognized that the company currently emphasized on infrastructure development than sustainability of the supply chain. The need for skilled professionals particularly on agility and leanness of supply chain is highly required by the firm. There is frequent product damage in the company related to supply chain management.

5.2 Conclusions

The purpose of this research was to investigate the SCM practices of Cadila Ethiopia pharmaceuticals manufacturing companies. The main objective of the study was to identify the level of supply chain practice in terms of its agility and leanness. For this the researcher has applied a survey method of data collection together with an in-depth interview to collect the perspectives of employee on the challenges the company has faced so far. Based on the findings the following conclusions are drawn.

- ⇒ From the workforce demographic characteristics, the company is a male employee dominated firm (86%) with mix of young and adult age distribution. Many of the staffs are working at the Production department including pharmacists.

- The overall SCM practices of Cadila Ethiopia are promising as expected due to progressive nature of the strategies the company has designed on SCM. The long-term relationship with suppliers and focusing on the value chain of products are highly favored.
- The strategic supplier partnership indicates that there is no long-term relationship with major suppliers. The company has recognized suppliers for APIs (Active pharmaceutical ingredients) and packing materials. However, there was no a recorded data that compares each supplier based on objective data including supplier's delivery performance. But recently the company starts to collect data to measure the performance of its suppliers since it is important for certification of GMP (Good manufacturing practice).
- The company has good internal information sharing between departments. It helps to decide on the annual need of raw materials, since the actual need of the raw materials are extracted. But there are gaps in collecting actual customers need from the market. Although there is marketing and sales department responsible for it, due to limited human resources the needs of the customers are not collected. Furthermore, there are gaps on-time deliveries to customers' point of use. Company was flexible in delivery schedule to accommodate change and also flexible in delivery and has the capacity to carry out this activity in shortest time is the most determinate of supply chain responsiveness practice. There was a joint development as the most determining factors for process integration in the supply chain at Cadila.
- Use of information technology to share data with suppliers Organization undertakes a market sensitivity analysis in its supply chain management practice. The company has a capacity to be flexible in the supply chain system. The company has very good agility system in supply chain practice. The firms supply chain is highly flexible as they restore suppliers faster without disruption by applying a good inventory management with inventory control. This unit manages all raw materials in the pipeline, in process and in store. The market sensitivity of the company showed there are no interruptions of the products all the time and enough amounts of products are produced as per the demand of the customers except in difficult circumstances in which hard currency is not obtained for raw material import.
- The company has a very exemplary lean supply chain practice evidenced by the lean and effective transportation systems. The waste elimination practice is existed in the company as most employees have agreed. The dominated practice was the firm makes groupings of similar parts in families to eliminate movement and queue. The ccompany has waste management system and the organization ensure minim waste in operational process.

- ↪ There is support by higher level managers to work on agile and lean supply chain management. The primary emphasis given right now is the infrastructure development for agile and lean supply chain management system than addressing the issue of sustainability. Workers who are skilled with agility and leanness of a supply chain management are required than professionals of higher calibres at Master's degree educational level.

5.3. Recommendations

Having analysed, discussed and interpreted the data collected in this study, the researcher therefore recommends the following points as workable solutions to those gaps identified by the study:

The following are key to the success of supply chain agility and leanness:

- ↪ The management of these firms needs to invest more on skill and knowledge acquisition on the practice of lean and agile supply chain practice.
- ↪ The human resource of the firm encouraging the female employee to join the company and recruited skilled marketing personal due the weak marketing activity they have.
- ↪ The study recommends that the companies should invest in time and money in collaborative demand planning, the firms should communicate its demand forecasts to its supply chain partners.
- ↪ The firm has practice of west elimination practice but it should have been standardized and rationalized the range of materials, parts and consumables. On behavioural practices.
- ↪ Firm business activities should be technologically driven in order to have a competitive edge.
- ↪ For being competitive the organization should improve the relationship they have with suppliers and The companies should continue their customer integration
- ↪ The company should improve responsiveness and flexibility, strategic planning includes the decentralization of operations to achieve flexibility and speed. Global outsourcing and strategic alliances with partners help reduce the time to market.

5.4. Suggestion for Further Studies

This study has a limited scope to the agility and leanness of supply chain management practice using the case of single pharmaceutical manufacturing firm in Ethiopia. A further study with wider scope is recommended. To address the problem identified in this study, further research using rigorous methodology on wider representative samples size and including additional firms existed in the country's pharmaceutical supply is suggested. This will provide a chance to examine the issue of pharmaceutical supply chain management and address additional variables such as performance of the company related to agility and leanness of the supply chain management practice. This in turn will bring a platform for experience sharing for other sectors working in supply chain management.

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Appendix

Appendix I: Permission letter

Eskindir Ayalew (MA Student)

Jimma University College of Business and Economics Department of Management

P.O box 216

Jimma Ethiopia

To Cadila Pharmaceutical Ethiopia P.L.C

Re: Permission to Carry Out a Research in Your Firm

I am a Post graduate student at Jimma University College of Business and Economics in partial fulfilment of a Master's Degree in logistics and transport management; I intend to carry out a research in your company cadila pharmaceutical Ethiopia P.L.C. The topic of the research is assessment of agile and lean supply chain practice.

Your manufacturing firm has been chosen for the study and choice is based on the strategic importance in the achievement of the objective of the study. I therefore kindly request your approval of collecting data in the organization through the attached questionnaire.

The research information will be confidential and will only be used for academic purposes.

Thank you in anticipation

EskindirAyalew(MA Student)

+251-09-24-41-57-40

eskindiraya@gmail.com



Jimma University

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Date: 22/01/2020

Ref. No: RGS/065/2020

To: Cadila pharmaceutical (Ethiopia) P.L.C

Subject: Requesting Your Cooperation

Mr Eskindir Ayalew is one of our postgraduate Student conducting research for the partial fulfilment of his/her Master degree under the title:

"Assessment of Agile and Lean supply chain practice The case of cadila pharmaceutical Ethiopia P.L.C"

Research and Post graduate coordinating office of business and Economics College request your esteemed organization to give the necessary data for the aforementioned student as it enables him/her to come up with reliable research outcome. Thank you for your cooperation in advance.

With regards,



Marketing
Supporting Students to
this regard to one of our
Corporate Social Responsibility
Give him more data
that would not violate
our Confidentiality
Cadila
2020/01/22

JIMMA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
MANAGEMENT DEPARTMENT

Informed Consent Letter

Dear Participant, Greetings!

My Name is ----- I'm postgraduate student at Jimma University College of business and economics department of management MA in Logistics and transport management program, I'm conducting research for my post graduate study. The research that I have chosen is entitled '*Assessment of Agility and Leanness supply chain practice and challenge at cadila pharmaceutical Ethiopia plc*'the information that will be collecting from this research project will be kept confidential. Taking part in this study you will contribute towards alleviating the problem of supply chain management practice. Then, you will be asked to give your response to the data collector. If you have any question you can contact following individual and you may ask at any time you want.

Thank you very much for your time and cooperation. I greatly appreciate your organizations and your help in furthering this research endeavour

EskindirAyalew

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eskindiraya@gmail.com

Annex-IV: Research Questionnaire

Part I: General Information and Demographic Background of Respondents

Complete this section by checking the correct answer

1. Age in years

2. Sex Male Female

3. Respondent's current position in the company

Procurement manger Production manger

General manger Quality control manger

Supply chain manger Sales and marketing manger

Quality assurance and control manager

Others, please specify _____

4. Qualification /Educational status

Certificate MSc/MA\Diploma BSc /BA Degree Other, please specify-----

5. Profession of in-charge

Pharmacist Chemist Logistics and supply chain Engineers

Other Specify __

6. How many years have you been worked in this pharmaceutical organization? -----

Part II

1. Supply Chain Management (SCM) Practices: Indicate to what extent your company experiences the following supply chain management practices. (Please mark \surd in appropriate box to your opinion) Where; SD = strongly disagree, D = disagree, N = neutral A=agree and SA = strongly agree.

Strategic Supplier Partnership	SD	D	N	A	SA
We consider quality as our number one criterion in selection of suppliers					
We regularly solve problems jointly with our suppliers					
We have helped our suppliers to improve their product quality					
We include our key suppliers in our planning and goal setting activities					
We actively involve our key suppliers in new product development processes					
Customer Relationship	SD	D	N	A	SA
We periodically evaluate the importance of our relationship with our customers					
We frequently measure and evaluate customer satisfaction					
We frequently determine future customer expectations					
We frequently interact with customers to gather feedback for future improvement					
Regularly monitoring and evaluation of customer satisfaction					
Compliance with customer's delivery in- full requirements					
Information Sharing	SD	D	N	A	SA
We inform trading partners in advance of changing needs					
Our trading partners share proprietary information with us					
Our trading partners keep us fully informed about issues that affect Your business					
Our trading partners share business knowledge of core business processes with us					
Early information sharing to manage unpredictable products.					
Reliable and complete information system/information sharing and trust					
Timely Information exchange system/Eliminate information delays					

2: Leanness and Agility from Supply Chain Perspective

2.1. Agile Supply Chain Management (ASCM) Practices assessment

Instruction: Please select either one of the choices based on your evaluation. Please mark √ in appropriate box to your opinion accordingly from number 1-5. Each number designates the following meanings. 1. Strongly agree: 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

Instruments of Supply Chain Agility practice

Supply Chain Agility practice	1	2	3	4	5
The firms' supply chain is highly flexible.					
The firm is able to restore supplies faster without disruption of manufacturing processes					
The firm can easily switch between suppliers and still get the right quality of supplies					
Can supply chain is swift and are able to respond to changes in market					
The companies understand the demand in the market as well as being able to respond to it.					
Market sensitivity	1	2	3	4	5
Does your company respond to real customer requirements quickly					
The firm has always remained alert to changes that might affect the operations					
Is there efficient consumer response (ECR) forms					
direct information flows from marketplaces and customers by using information technologies (IT)					
Information integration	1	2	3	4	5
Can your firm use IT to share data with supplier					
information and data sharing among suppliers and buyers through Internet					
information and data sharing among suppliers and buyers through Electronic data interchange (EDI)					
Can your firm use Internet and Electronic data interchange (EDI)					
Is there Continuous information exchange and Open communication with suppliers and customers					
Is there direct information flows from marketplaces and customers					
Process integration	1	2	3	4	5
Organization relationship with suppliers & consumer					

Number of organization collaborative with suppliers and customer					
Is there a joint product development practice					
Level of information technology usage between consumer, suppliers					
Range of production capacity across which Manufacturing can adjust					
Supply chain responsiveness	1	2	3	4	5
Can the firm responded quickly to un planned change in demand and supply or problem					
Can the company supply chain cope with unplanned market change					
Can a company responded to transportation delay and Increased demand volatility					
company rapidly adjusts its production capacity to address demand changes					
Finished goods are sometimes delivered direct from factory to customer					
The ability to carry out activity in the shortest possible time					
Minimum lead times are developed and used					
Can your firm supply quickly product to their customer					
Flexibility and Adaptability practice	1	2	3	4	5
Company's production is adaptable to meet extra demand of customers					
company is flexible in delivery schedule to accommodate changes					
Flexibility in operation and delivery					
Alter delivery schedule to meet changing customer requirement					
Rotate workers among different business task					
Reduce business throughput times to satisfy customer delivery					
Accommodate change in production mix as required					
Change in order volume capacity when necessary					

3. Lean Supply Chain Practices (LSCM): Indicate to what extent your company experiences the following lean supply chain practices. (Please mark \surd in appropriate box to your opinion. **1**= Not at all **2**= to a small extent **3**=to a moderate extent **4**= To a great extent **5**=Not applicable

Lean Supply Chain practice	1	2	3	4	5
Is there Lean transportation practice in the firm					
Firm has ensured there are effective transportation systems					
Production is pulled by the shipment of finished goods					
Is there a Just in Time (JIT) technique in your organization					

Demand driven supply-chain use of pull system					
Waste elimination practice (elimination of activities that don't add value to customers)	1	2	3	4	5
Is there Waste management system in your firm					
The organization ensures minimal wastes in its operations processes					
The firm practices of grouping similar parts in families to eliminate movement and queue					
Is there Overproduction: (Producing too much or too soon)					
Is there Defects(Frequent errors in paperwork or material/product quality problems)					
Is there Unnecessary inventory: (Excessive storage and delay of information or products)					
Is there Inappropriate processing procedures					
Is there Unnecessary motion in the organization					
Factory uses appropriate techniques to treat waste during supply chains such as JIT, 5S, and withdrew system					
Is there a smooth flow of products, information, and technologies among supply chain partners without waste					
Demand management practice (One of the key principles of lean is to move to a pull system, in which products or services are pulled)	1	2	3	4	5
Products delivered only when requested by the final customer					
The firm has invested time and money in collaborative demand planning					
The firm always conduct annual demand forecasting					
The firm always communicate its demand forecast to its supply chain partners					
Demand management in our Factory is accurate and there has never been an increase in production over the required supply.					
Factory manages demand and invests time and money in achieving it.					
Factory uses appropriate demand management techniques such as forecast and withdrew system.					
The company produces only what is demanded by customers when needed					

Any other lean practiced by the organization please specify -----

Annex IV: Interview question

I. Interview Questions for General Manager, Marketing and Sales Division Head, Supply Chain Manger and Production Manager Of Cadila Pharmaceutical Ethiopia P.L.

Welcome!

I am student at Jimma university business and economics college department of management I am undertaking a research project in partial fulfilment of the academic requirements. My study is on *“assessment Of Lean And Agile Supply Chain Management Practice and challenge In Cadila Pharmaceutical Manufacturing Firms In Ethiopia“*

First of all I would like to thank all of you for your willingness to participate in the face to face interview by scarifying your precious time.

The purpose of this study is to investigate the practices of agile and lean supply chain management of your company. Since you are experts of the company, your ideas and information are crucial for the research. The information you are giving will be used for the partial fulfilment for the master’s thesis.

This research addresses the assessment of agile and lean supply chain management practices of cadila pharmaceutical Ethiopian P.L.C pharmaceutical manufacturing joint venture company. Supply chain management is get higher attention by different firms since it is used by different firms as one of the core competencies. So this discussion mainly focuses on the lean and agile supply chain management practices of your company.

Annex-IV

Interview question

The following questions used as a guideline to probe the interview while gathering information from the selected key informants at Cadila pharmaceutical that are related to the scope of this research undertaking.

1. Could you please tell us briefly about your job role, position, and years of experience?
.....
2. How can you explain the overall supply chain management practices of your company?
3. How do you manage your supply chain? (close partnership with suppliers, out sourcing, subcontracting, few supplier, many supplier, holding safety stock, or use of external consultants)
.....
4. Have you ever heard of the two-supply chain strategy agile and lean supply chain?
.....
.....
5. Can your firm implementing lean supply chain management practice? which type lean transportation, lean procurement.
6. What are the supply chain practice challenges faced by Cadila pharmaceutical from your division's perspective?
.....
7. In your opinion, how do see those challenges affect the supply chain performance of your company?

With this I think, we will wind up the discussion and thanks once again for your active participation, sharing your experiences and the recommendations for the challenge