

ADDIS ABABA UNIVERSITY  
SCHOOL OF COMMERCE



DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ASSESSING THE PERCEIVED PERFORMANCE OF SUPPLY CHAIN  
MANAGEMENT - THE CASE OF TWO BREWERY COMPANIES IN ADDIS  
ABABA

BY

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STATEMENT OF DECLARATION

THIS IS TO CERTIFY THAT SINTAYEHU ASMAMAW ARGAW HAS CARRIED OUT HIS RESEARCH WORK ON THE TOPIC ENTITLED, *INVESTIGATING THE PERFORMANCE OF SUPPLY CHAIN MANAGEMENT PRACTICES IN THE CASE OF BREWERY COMPANIES IN ADDIS ABABA.*

THE WORK IS ORIGINAL IN NATURE AND IS SUITABLE FOR SUBMISSION FOR THE AWARD OF MASTER DEGREE IN LOGISTICS & SUPPLY CHAIN MANAGEMENT (M.A IN LSCM).

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## LIST OF ABBREVIATIONS/ACRONYMS

AMF: Assela Malt Factory

B2B: Business to Business

EDI: Electronic Data Interchange System

ERP: Enterprise Resource Planning

ICT: Information and Communication Technology

SCM: Supply Chain Management

SCOR: Supply Chain Operation Reference Model

SPSS: Statistical Packages for Social Science

## Abstract

*In this thesis, the researcher assessed the perceived performance of supply chain management in the case two brewery companies in Addis Ababa. The study focused on eight supply chain performance variables, integration with suppliers, integration with customers, ICT utilization in the supply chain management, supply chain reliability, supply chain responsiveness, supply chain agility, supply chain operational cost and inventory management Practice. The main objective of this paper is to get in-depth insight about the supply chain performance in the case breweries. The research strategy of this study is a multiple case study and the brewery companies were the unit of analysis. Moreover, the study included first tier local strategic suppliers and their first and second tier customers of the case breweries to ensure the reliability of the research output. The research design applied was mixed approach. The quantitative data was analysed using SPSS for descriptive statistics and the qualitative data was used to further explain the findings of the quantitative data. The finding of the study indicates that the downward supply chain is more reliable and flexible than the upstream supply chain. The supply chain operation of the case breweries was perceived high. The study also found the gap related to joint planning, forecasting and sharing of supply chain information of the case breweries with their suppliers and customers. This study also identified gaps in managing supply chain inventories in relation to visibility of the inventory status along the supply chain.*

*In conclusion, the breweries focus on responsiveness and reliability with high operational cost. The case brewery companies collaborate with their chain partners only on limited areas. The level of trust is also minimal due to high completion with rivalries. Consequently, long term demand forecast or sales forecast are very rarely shared with channel partners. The inventory management practice also shows potential risk of holding overstock or understock due to lack of using standard inventory management tools consistently. The upstream supply chain is less reliable and flexible due to limited local suppliers' capacity as well as long import process than the downward supply chain and that the supply chain operational cost along the chain was considered high.*

**Keywords:** *Supply Chain management performance in the brewery companies.*

## CHAPTER ONE: INTRODUCTION

### 1.1. BACKGROUND OF THE STUDY

Supply chain management (SCM) links a firm with its customers, suppliers and other members of the supply chain system, including transportation, freight forwarding and warehousing service providing companies. The management of the supply chain is basically management of the relationships and activities among the members of organisations (system) in the supply chain and the goal of supply chain management is for member organisations to work together as a system and build a partnership with each other to gain or create a competitive advantage and improved performance for the supply chain as a whole over competing supply chains (Mentzer, 2001).

Organizations used to view customers, suppliers and other supply chain actors as independent entities in their business process rather than considering them as an integral part of their business as well as their decisive business partner. In the modern business world, competition is no longer between organizations, but among supply chains (Trkman et al., 2010). Companies must compete against one another in order to survive. As the global economy continues to grow, companies are no longer competing independently but rely on their supply chain systems. Business management has entered the era of inter-network competition. In this emerging competitive environment, the ultimate success of the single business will depend on management's ability to integrate the company's intricate network of business relationships with different supply chain actors. Strictly speaking, the supply chain is not a chain of businesses with one-to-one, business-to-business relationships, but a network of businesses and relationships.

Supply chain management offers the opportunity to capture the synergy of intra - company and inter-company integration and management. In that sense, supply chain management deals with total business process excellence and represents a new way of managing the business and relationships with other members of the supply chain (Cooper et al., 1997). Effective supply chain management (SCM) has therefore become a potentially valuable way of securing a competitive advantage and improving organizational performance (Li et al., 2006). Efficient supply chain management is indispensable for a company to survive and is a competitive weapon with rivalry companies. Appropriate performance of supply chain plays an important role for the success of a company from different aspects including but not limited to its profitability, agility, responsiveness, reliability, cost reduction, supply chain assets management. Suppliers are confronted by increasing pressures on flexibility, variety, and time and

value basis. Performance measurement in supply chain is a process of analysis to reduce costs, risks and ensures reliable and delivery of products and associated information to the ultimate customer creating value and improving operational excellence (Ahmadi, 2005). Supply chain management is an integrated management of business links, information flows (Themistocleous et al., 2004).

Supply Chain integration can be viewed at two levels of analysis in operations management: (i) internal integration with other functional areas inside the organization; and (ii) external integration, especially with direct suppliers and customers (Pagell, 2004). Supply chain management literatures emphasize on the importance of supply chain integration among intra or inter-organisation processes (Flynn et al., 2010) and the cost-benefit analysis and performance metrics of supply chain (Zhou et al., 2011). According to the studies and findings of (Bakker et al., 2012), several barriers still exist to ensure inter-company and intra - company supply chain integrations and hence, businesses are struggling to adapt various supply chain integration models to suit their needs. While supply chain integration is being attempted to some extent with a goal to combine supply chain functions to improve efficiencies and effectiveness. A broader supply chain management cross-functional integration is required with a holistic approach and the problems in supply chain management integration need to be identified. Over the past decades, there has been an increasing emphasis on Supply Chain Management as a vehicle through which firms can achieve competitive advantage and superior performance in competitive market environment (Cooper et al. 1997). Supply Chain Management is the systemic and strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain for the purposes of improving the long-term performance of the individual companies and that of the member of a given Supply Chain as a whole (Mentzer, 2001).

Efficient supply chain enables upstream and downstream supply chain firms to compete better. A customer focused supply chain strategy requires a total systems view of the linkages in the chain that work together efficiently to create customer satisfaction at the end point of delivery to the consumer. Consequently, costs must be lowered throughout the chain by driving out unnecessary costs, processes, shorten the delivery lead times and focusing on value adding supply chain processes (Mentzer and Gundlach , 2009). As per the aforementioned literatures, one can understand that supply chain integration, system thinking and performance have a significant impact on

the performance and competitiveness of companies. Consequently, the subject of this study is very attractive and under researched.

The brewery industry sector in Ethiopia is at growing stage. As a result of which, the industry is attracting multinational business companies with different mode of entry. Consequently, the number of beer manufacturing companies is increasing from time to time following the growing demand of beer in the country. As a result, the competition for these substitute products seems tough and aggressive promotional and marketing efforts are becoming high. Following the reports of international organizations like IMF and World Bank on the development and the fast economic growth of the country, direct foreign investment is increasing and the government of Ethiopia also opens up the beverage industry to foreign investors. As a result, the world's leading multinational companies are entering this brewery industry through acquisition of the state – owned breweries and building new ones with huge investment in the country. The brewery industry currently supplying for local consumption due to growing demand of beer in the country, but it has a great potential to expand its production and enter the export business. Some of them have already started to export and some still planning to export beers. The state- of- the - art supply chain management plays unreplacable role as a competitive weapon in such a highly competitive and growing brewery industry. Thus, managing the supply chain in this business environment has a major impact on performance of all parties involved in the chain.

Despite the role of supply chain management as a competitive tool, the supply chain operational excellence in the brewery in Ethiopia is under researched and there is knowledge gap how well is the performance supply chain management practice in Ethiopia. Consequently, this thesis will focus on investigating the performance of supply chain management practice in the case brewery companies (Brewery Company A and Brewery Company B) located in Addis Ababa in terms of their collaboration and integration with their suppliers and B2B customers, supply chain reliability, responsiveness, flexibility and supply chain operational cost as well as ICT utilization in supply chain management in this industry with limited scope.

## 1.2. STATEMENT OF THE PROBLEM

Literatures indicate that companies are now seeking to integrate their decisions across the supply chain partners globally as a result of increasing awareness about the financial and non – financial impact of supply chain management processes on business companies in particular. In Ethiopia, the concept of supply chain management and measuring its performance for improvement is at the infant stage except very few multinational and international companies investing in Ethiopia. According to my literature reviews, most of the researches on assessment of supply chain management performance were conducted on manufacturing companies in the developed countries and very few in developing countries, like Ethiopia. Specifically, the researchers conducted on the supply chain process performance on brewery industry were very rare in Ethiopia in particular. As a result, there was little insight about the performance of supply chain management in the brewery companies of Ethiopia. This knowledge gap in the subject of this thesis in this competitive industry caused the researcher to incline for conducting this research study.

In summary, there was less insight about the level of integration and collaboration with supply chain upstream and downstream partners, supply chain reliability, responsiveness, agility, cost effectiveness, inventory management efficiency as well as effectiveness, and ICT utilization in the supply chain management in the case brewery companies.

The intention of this research study is to investigate and analyse the performance supply chain management practise focussing on the level of supply chain integration and collaboration with the chain partners, the responsiveness, reliability, agility, and cost and inventory management efficiency and effectiveness of the supply chain management practices as well as best practices based on SCOR model and other literatures on supply chain management philosophy.

### 1.3 RESEARCH QUESTIONS

This research is guided by the following research questions:

- ✓ What is the level of integration and collaboration between the case brewery companies and their suppliers and B2B customers?
- ✓ How reliable is the supply chain management practices of the case brewery companies?
- ✓ How responsive is the supply chain management of the case brewery companies?
- ✓ How flexible and adaptable is the supply chain management of the case brewery companies?
- ✓ How high the cost of supply chain operation in the case brewery companies?
- ✓ How effective/efficient is the inventory management practice in the case brewery companies?
- ✓ What is the level of ICT utilization in managing supply chain operations?

### 1.4 OBJECTIVE OF THE STUDY

#### 1.4.1 GENERAL OBJECTIVE OF THE STUDY

The general objective of this study is to investigate and measure the perceived performance of supply chain management practices of the case brewery companies located in Addis Ababa and identify gaps based on the literatures reviewed to get better insight about the supply chain operations in the case brewery companies.

#### 1.4.2 SPECIFIC OBJECTIVES OF THE STUDY

The specific objectives of this study are:

- ✓ To investigate and get insight about the level of integration and coordination of the case brewery companies with their suppliers and B2B customers?
- ✓ To investigate and measure the perceived performance of the supply chain reliability and get better insight in the case brewery companies.
- ✓ To investigate and measure the perceived performance of the supply chain responsiveness and get better insight in the case brewery companies.
- ✓ To investigate and measure the perceived performance of the supply chain flexibility and get better insight in the case brewery companies.
- ✓ To investigate and measure the perceived performance of the supply chain operational cost and get better insight in the case brewery companies.

## 1.5 SIGNIFICANCE OF THE STUDY

As different literatures point out, the supply chain management concept and strategy have significant role for any manufacturing company, provided that companies implement the supply chain management successfully. Effective and efficient supply chain management creates value to customer as well as the rest of the supply chain actors and enables the supply chain firms to maintain or gain competitive advantages over their competitors. Besides, in the contemporary business environment, individual firms will not perform and compete independently. There is no more competition among individual firms, but it is among the supply chain network.

Therefore, conducting research on supply chain practices performance and identifying gaps will enable firms to plan improvement actions and to fill their gaps. The finding of this study will give an insight on the performance of the supply chain management practices in case brewery companies in order to plan for improvement by the brewery companies under study in particular. The finding will also give an insight to other supply chain partners (the suppliers, distributors, retail outlets, transporters, etc.) in the chain of the case breweries industry to scrutinize their own supply chain operational performance excellence. As this research study has its own scope limitation, other researchers can also use it as starting point to capitalize on the different aspects of the supply chain performance analysis which have not been addressed in this study.

## 1.6 SCOPE OF THE STUDY

The geographic scope of this study is limited to the case two brewery companies located in Addis Ababa. The topical scope of this study is limited to the supply chain variables including collaboration and integration with strategic suppliers and customers, information technology utilization in SCM, supply chain reliabilities, responsiveness, agility, cost and inventory management practices including vendor managed inventory (VMI), collaborative forecasting, planning and replenishment (CFPR). The other components of supply chain performance indicators like green supply chain, supply chain human resource, integration among the internal functions, the strategic alignment between the supply chain strategy and competitive strategy are out of the scope of this study.

## 1.7 LIMITATION OF THE STUDY

Just like any research study, this thesis also has the following limitations: Since this study is a multiple case study, it lacks external validity or generalizability of the findings to the rest of the brewery companies in the industry. The study focused only on limited supply chain performance variables mentioned above and there are other variables to measure the performance of supply chains like sustainable or green supply chains, strategic alignments, etc. are out of the scope of this study.

## CHAPTER 2. RELATED LITERATURE REVIEW

### 2.1 INTRODUCTION

The world is becoming a more complex business environment where offshore production, partnership, time to market, customization and cost reduction, risk mitigation, etc. are essential for survival in the competitive market. In the modern era of technology, manufacturing firms are looking forward to increase their efficiencies and performances using advance information technology in supply chain management. Supply chain management is one of the major tools that play a vital role to enhance organizational efficiency in this world of new technology. Supply chain management is focusing on management of activities from raw material sourcing to final product distribution to the end user. It includes the suppliers of raw material, transformational processes, delivery of final product to the end user. Supply chain management includes the activities inside and outside the manufacturing companies that are done by the supply chain partners to deliver values to final customers. It means the management of organisation must create check and balance on internal and external activities of organization. To increase organizational efficiency, the integration among supply chain activities is very essential. Supply chain management includes how a company share information and take action in order to ensure the best flow of product from raw material to end user (Irum, et al., 2013). Nowadays, business companies compete on supply chain management rather than competing individually with internal competencies. Any organization can get a competitive advantage over its competitors through effective and efficient supply chain management (Hassini, 2008). According to this author, supply chain management is the basis for all business organizations to compete with each other. It also means supply chain management enables companies even to survive through supply chain effectiveness and efficiency. Supply chain practices include information sharing, facilities management, transportation, sourcing, distribution and linkages with partners. For a company to perform effectively, it must adopt the ways of information distribution, management of facilities such as logistics, transportation and warehousing (Richey, et al., 2009). To improve the overall performance of supply chain, the members of supply chain may behave as a part of a unified system and coordinate with each other. Thus “coordination” comes into focus for successful supply chain performance and firm’s competitive advantages.

## 2.2 SUPPLY CHAIN MANAGEMENT

A Supply Chain is an interconnected set of relationships from customer to supplier, through a number of intermediate stages such as sourcing, manufacturing, and warehousing and distribution and it is a network of companies which influence each other (Agarwal & Shankar 2002). Therefore, a supply chain consists of three or more organizations or individuals that are directly involved in the upstream and downstream flow of demand information, cash, products and services (Mentzer, 2001). SCM is a set of approaches that efficiently integrate and coordinate the materials, information and financial flows across the supply chain so that merchandise is supplied, produced and distributed in the right quantities, to the right locations, and at the right time, in the most cost-efficient way, while satisfying customer requirements (Hugo, et.al, 2011). The objective of SCM is to achieve a sustainable competitive advantage (Handfield, et al., 2009).

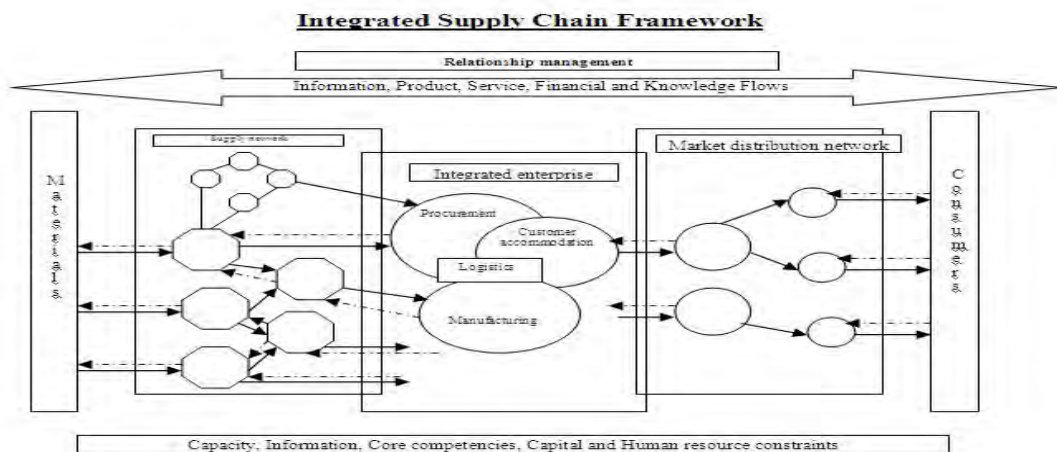
Focus has been increased regarding the business relationships and more particularly when it comes to long-term collaboration between customers and suppliers in the supply chain and demand chain (Giunipero, et al., 2008). More importantly, supply chain management creates value for companies, customers and stakeholders whom interacting effectively and efficiently throughout the supply chain (Estampea, et al., 2013). Supply chain can be considered as a single chain for the reason that the flow of material, money and information can be effectively managed to meet the business requirements (Agarwal & Shankar 2002). Supply chain management consists of collaborating firms of upstream and downstream to improve operating efficiency and effectiveness of the chain. The supply chain relationship among the firms involved reflects strategic choice. Supply chain operations require managerial processes that span across functional areas within individual firms and link trading partners and customers across organizational boundaries.

Logistics, in contrast to supply chain management, is the work required to move and position inventory throughout a supply chain. As such, logistics is a subset of supply chain management and occurs within the broader framework of a supply chain. Logistics is the process that creates value by timing and positioning inventory. It is the combination of a firm's order management, inventory, transportation, warehousing, materials handling, and packaging as integrated throughout a facility network. Integrated logistics serves to link and synchronize the overall supply chain as a

continuous process and is essential for effective supply chain connectivity (Bowersox et al., 2000). Supply chain management can be viewed as a systemic and strategic coordination of operational functions both within a given company and also between supply chain partners working within a chain, with a view towards improving the long-term performance of each company that is part of the chain and of the whole of the chain itself (Mentzer, et al., 2001).

The Global Supply Chain Forum identified eight key processes that make up the core of supply chain management (Cooper, et. al., 1997): customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, procurement, product development and commercialization and returns management. The general concept of an integrated supply chain is typically illustrated by a line diagram that links participating firms into a coordinated competitive unit in Figure 2.1 below. An integrated supply chain is multi-firm relationship management within a framework characterized by capacity limitations, information, core competencies, capital, and human resource constraints. Within this context, supply chain structure and strategy results from efforts to operationally link an enterprise with customers as well as the supporting distribution and supplier networks to gain competitive advantage. Business operations are therefore integrated from initial material purchase to delivery of products and services to end customer. Value to the partners results from the synergy among firms comprising the supply chain with respect to five critical flows: information, product, service, financial, and knowledge (Bowersox et al., 2000).

Figure 2.1 Integrated Supply Chain Framework. Source: Adapted from supply chain faculty of Michigan State University (Bowersox et al., 2000).



Each firm engaged in a supply chain performs logistical activities. Such logistical activities should be integrated within that firm and within overall supply chain performance. The generalized supply chain arrangement illustrated in Figure 2.1 above, logically and logistically links a firm and its distribution and supplier network to end customers. This means that the integrated value-creation process must be managed from material procurement to end-customer product and/or service delivery. The integrated supply chain perspective shifts traditional channel arrangements from loosely linked groups of independent businesses that buy and sell inventory to each other toward a managerially coordinated initiative to increase market impact, overall efficiency, continuous improvement, and competitiveness (Bowersox et al., 2000).

### 2.3 SUPPLY CHAIN STRATEGY

Supply chain management (SCM) is a critical success factor for today's businesses (Duarte & Machado, 2011). A supply chain strategy specifies how a firm will achieve its competitive advantages through its supply chain capabilities, such as cost efficiency, response speed and flexibility (Ismail & Sharifi, 2006). A supply chain strategy also specifies how the manufacturing, purchasing, marketing, and logistics functions work together to support the desired competitive strategy (Qi, Zhao & Sheu, 2011). Therefore, companies should understand customers' needs, and to choose and implement the appropriate supply chain strategy to satisfy customer demands.

Deciding on using an optimal supply chain strategy requires a trade-off between key variables (Ambe & Badenhorst-Weiss, 2011). A supply chain strategy is part of the overall business strategy, designed on the basis of competition (innovation, low cost, service, quality) (Hugo, et.al. 2011). It is integrated with the marketing strategy, customers' needs, the product strategy, and power position (Hugo, *et al.*, 2011). Supply chain strategies are essential to the success of most contemporary businesses (Hines, 2006). For a company to be effective, its supply chain strategy must align with its competitive strategy (Chopra & Meindl, 2010).

There are two generic strategies in supply chain management, namely the lean and agile strategies (Pandey & Garg, 2009). Leanness means developing a value stream to eliminate all waste, including time, and to enable a level schedule. Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile Marketplace (Manson-Jones *et al.*, 2000). (a) A lean supply chain is concerned

with cost reduction by operating the basic processes with a minimum of waste (Qi *et al.*, 2009). The primary objective of a lean supply chain can be realised by using the most basic forms of data communication on inventories, capacities, and delivery plans and fluctuations within the framework of just-in-time (JIT) principles (El-Tawy & Gallear, 2011). The key features of a lean supply chain strategy are predictable market demand; a lowest-price criterion; product supply based on forecasts; a long product life cycle; and long order lead time (Gattorna, 2006). Many organisations have successfully implemented and are benefiting from lean strategies (Duarte & Machado, 2011). (b) Agility is a comprehensive response to the business challenges of profiting from rapidly changing, continually fragmenting global markets for high-quality, high-performance, customer-configured goods and services (Iskanius, 2006). The main objectives of agility are based on competition, business practice, corporate structures, strategic response, adaptability, building defences against competitors, a paradigm shift, a step towards innovation, and the promise of a business world based around cooperation (El-Tawy & Gallear, 2011). Hence, agility is an appropriate strategy when coping with turbulence and reconfiguring operations to enable individual customer specifications to be accommodated in high-volume manufacturing. Agility not only responds to changing market conditions, but also to exploiting changing opportunities (Baker, 2008). Agility in a supply chain is the ability of the supply chain as a whole, and its members, to rapidly align the network and its operations to dynamic and turbulent requirements of the customers (Duarte & Machado, 2011). The main focus is on running businesses in network structures with an adequate level of agility to respond to changes while proactively anticipating changes and seeking new emerging opportunities (Sharifi, *et al.*, 2006). Agility measures how well the relationships involved in the processes can be enhanced and widely accepted as a winning strategy for growth (Ismail & Sharifi, 2006). The key elements of an agile supply chain include: being information driven; having market sensitivity or demand-driven; having integrated processes; and being network-based (Amir, 2011). (c) A leagile supply chain is a hybrid of lean and agile strategies. It is a system in which the advantages of leanness and agility are combined' (Krishnamurthy & Yauch, 2007). Leagile supply chains aim to infuse competitiveness in an organisation in a cost-effective manner (Amir, 2011). The combination of lean and agile paradigms within a total supply chain strategy enable the positioning of the decoupling point so as to best respond to a volatile demand downstream, and yet still provide a level schedule upstream from the decoupling point (Rahimnia &

Moghadasian, 2010). In this hybrid strategy, lean focuses on waste elimination, achieving low-cost delivery of a standardised and stable product, while agility responds to complexity brought about by constant and unpredicted changes (Duarte & Machado, 2011). A company can choose a supply chain strategy based on the nature of its products, and by matching the strategy to the unique characteristics of different products or markets (Sebastiao & Golicic, 2008). The important factors to determine a supply chain strategy include: the nature the products (standard or special); the nature of the demand (stable or volatile); replenishment lead times (short or long) (Christopher, Peck & Towill, 2006). There exists a trade-off between efficiency and responsiveness is required to determine a supply chain strategy (Chopra and Meindl 2010).

Therefore, there are several factors that can be considered deciding on an appropriate supply chain strategy (Ambe & Badenhorst-Weiss, 2011). Among the determining factors, the product characteristics are more important (El-Tawy & Gallear, 2011). In addition to the product characteristics, factors like as core competencies of the organisation; capabilities of the supply chain members; and decision drivers are significant to decide on an optimal supply chain strategy (Chopra & Meindl, 2010). Therefore, one can understand that implementing appropriate supply chain strategy enables to achieve a better supply chain performance in terms of responsiveness and efficiency over that of rivalries in a given industry. Using mismatched strategies and supply chain strategies based on a one-size-fits-all strategy often fails.

## 2.4 SUPPLY CHAIN PERFORMANCE AND SCOR MODEL

### 2.4.1 DRIVERS OF SUPPLY CHAIN MANAGEMENT PERFORMANCE

To increase a firm's performance, the drivers of supply chain management are much valuable (Soni and Kodali, 2010). Drivers of supply chain performance management are facilities, logistic management, transportation, inventory management, information distribution, pricing and sourcing. The better management of all these activities leads to increase a firm's performance. Sunil Chopra and Meindl (2007) identified six drivers of supply chain performance. A company can enhance its responsiveness (effectiveness) and efficiency by the good management of the six drivers of supply chain performance. They elaborated following six drivers of supply chain performance as facilities, inventory, transportation, information, sourcing and pricing.

(a) Facilities: factories warehouses and storerooms are the facilities in supply chain

management. The better management about the location, capacity and flexibility of these facilities has a positive effect on supply chain performance. Managers face a trade-off between responsiveness and efficiency (Taylor, 2004) to be resolved. If factories and warehouses are built with a lot of excess capacity, they can be very flexible and respond quickly to swings in product demand (Nel & Badenhorst-Weiss, 2010). In contrast, capacity costs money, and excess capacity is idle capacity not in use and not generating revenue. So the more excess capacity there is, the less efficient the operation becomes (Ambe & Badenhorst-Weiss, 2011). In facilities management a company proved to be more responsive or more efficient but not at same. A company having many warehousing facilities show responsiveness of distributor but at the same time his efficiency becomes low due to high cost for warehousing. In contrast, if it has fewer warehouses only at main points then, it becomes more efficient due to low cost of warehouses but its responsiveness is very low. Therefore, there is a trade-off between supply chain effectiveness and efficiency following warehouse facility decision. (b) Inventory means the flow of all material in supply chain activities such as from raw material to finished goods. Retailers can be more responsive by storing large inventory but efficiency becomes low owing to high inventory cost (Sunil Chopra and Meindl, 2007). In inventory management, there exist a trade-off between responsiveness and efficiency (Nel & Badenhorst-Weiss, 2010). Holding large amounts of inventory allows a company or an entire supply chain to be very responsive to fluctuations in customer demand (Bowersox *et al.*, 2010). However, creating and storing inventory is a cost and to achieve high levels of efficiency, the cost of inventory should be kept as low as possible. An organisation can be responsive by stocking high levels of inventory for a wide range of products (Chopra & Meindl, 2010). Vendor-managed inventory (VMI) is efficient for manufacturers. Authors found that that the efficiency and responsiveness of vendor managed inventory is higher than that of organization's self-managed inventory (Tanskanen *et al.*, 2009). (c) Transportation is the means of mobilizing the inventory flow from one place to another place. By using fast transportation service we can increase responsiveness but efficiency becomes low due to high cost of fast transportation and more chances of damage and the vice-versa (Sunil Chopra and Meindl, 2007). In terms of transportation, the trade-off between responsiveness and efficiency is manifested in the choice of transport mode (Taylor, 2004). Fast modes of transport are very responsive but also more costly. Slower modes are very cost efficient but not responsive.

Since transportation costs can be as much as one - third of the overall operating cost of a supply chain, these decisions are very important (Jonsson, 2008). A better transportation approach for manufacturing firms is joint routes planning. To enhance efficiency and responsiveness, the manufacturing firms must continue their transportation function in collaboration with the firms outside internal environment. Joint route planning can be achieved by two ways that are outsourcing transportation function (contracting with third parties to distribute the final product to customers at low cost) or horizontal cooperation with other firms (contracting with the firms of same type for collaboration to distribute the products) to achieve the economies of scale by decreasing the distribution cost. Joint route planning concept save 30.7 percent costs in comparison with traditional transportation system (Crujssen et al., 2007). (d) Information refers collection, analysis and sharing of relevant supply chain information among supply chain partners. Information provides customers' taste and requirements to supplier that leads supplier's responsiveness and efficiency because supplier forecasts customer demand and only supplies required product (Sunil Chopra and Meindl, 2007). Information Technology enables supply chain members to establish partnerships for better supply chain performance (Fawcett et al., 2007). Accurate and timely information allows a firm to minimize inventories, improve routing and scheduling of transportation vehicles, and generally improve customer service levels (Barve, 2011). Modern information technology makes possible the fast and safe transmission and processing of extensive amounts of data, both internally for users within the company, and externally for suppliers and customers (Shukla *et al.*, 2011). High levels of responsiveness can be achieved when companies collect and share accurate and timely data generated by operations (Nel & Badenhorst-Weiss, 2010). End-to-end visibility of information is a key enabler for an agile supply chain (Duarte and Machado, 2011). This means, information sharing in the supply chain, enhances the efficiency and effectiveness of the firms of the supply chain partners. (e) Sourcing refers to the set of business processes required to purchase goods and services (Hines, 2006). It also means how and by whom different activities of supply chain management to be performed such as manufacturing, storing and transportation. Sourcing decision affects the level of efficiency and responsiveness of the supply chain. Outsourcing certain processes to other parties may increase a supply chain's efficiency, but may reduce its responsiveness due to possibly longer lead times to achieve economies of scale (Nel & Badenhorst-Weiss, 2010) or due to longer distances. (f) Pricing is the process by which a firm decides how much to

charge customers for its goods and services. Pricing affects the customer segments that choose to buy the product, as well as customer expectations. This directly affects the supply chain in terms of the level of responsiveness required, as well the demand profile that the supply chain attempts to serve (Chopra & Meindl, 2010). Customers expect low prices and steady prices also ensure that demand stays relatively stable for price elastic demand. Therefore, pricing affects the behaviour of the buyer of the product and the performance of the supply chain. Customers who value responsiveness will pay more for higher levels of customer service (Nel & Badenhorst-Weiss, 2010). If a transportation company charges high and low costs for quick and late delivery respectively, then efficiency oriented customers demand quick delivery and responsiveness oriented customers demand late delivery (Sunil Chopra and Meindl, 2007). This means, the price of a product varies with transportation cost in line with responsiveness and efficiency as well as customers' demand.

#### 2.4.2 SUPPLY CHAIN PERFORMANCE

Supply chain performance can be measured both in terms of customers' level of satisfaction and the costs incurred (Estampea, et al., 2013). Customer's satisfaction level is a sign of the required standard service level of a company, which is closely related to the whole performance of its supply chain (Chan, 2003). Evaluating supply chain performance is a complex process as it involves several actors collaborating and interacting each other to achieve a given strategic supply chain objectives (Estampea, et al., 2013). Companies to improve the overall supply chain performance and to track the supply chain operations, they share supply chain information among the partners to reduce the lack of demand visibility as it goes from downstream end customer to upstream partners in the chain, work closely with customers and suppliers in order to improve information and product flows, and reduce surprises from demand fluctuations, enhance internal processes integration, work with suppliers to reduce lead times, reduce risk of supply disruption, mitigate the bullwhip effect, reduce supply chain cost of all members through collaboration and trust. (Krajewski, et al., 2010). Supply chain performance is influenced by several factors like sourcing strategy, distribution strategy and, inventory management strategy, collaboration with partners, information technology, etc.

According to Jonsson (2008), strategic sourcing and the development of the supplier relationship is really significant for the company's and supply chain performance. The efficiency and the competitiveness of the company's supply chain can be affected by the choice of, sourcing strategy, collaboration strategy with suppliers. Suppliers are as equally important as the customers for a company's performance and competitiveness. The level of relationship and collaboration between the suppliers and a company has been summarised as shown below:

Table 2.1. Three levels of customer-supplier relationship (Jonsson, 2008, p. 184)

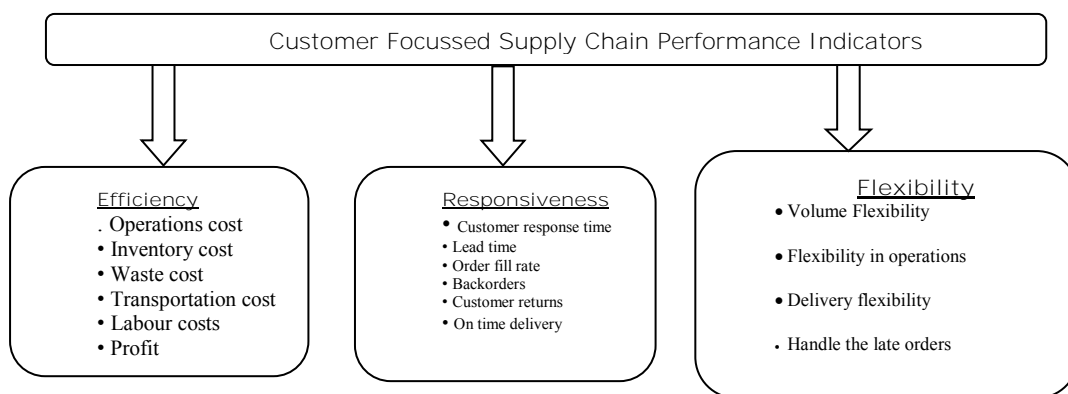
S/N	Level of Company-Supplier Relationship	Description
1	Partnership suppliers	<ul style="list-style-type: none"> <li>• Long –term relationship exists.</li> <li>• The highest level of relationships with suppliers.</li> <li>• Relationship also includes joint product development, frequent exchange of information on products, delivery, inventory, demand forecast, replenishment and quality issues.</li> </ul>
2	Associated suppliers	<ul style="list-style-type: none"> <li>• Relationships are long term and reviewed periodically.</li> <li>• Suppliers guarantees quality of supplies and no need to carry out quality controls on deliveries.</li> </ul>
3	Conventional Suppliers	<ul style="list-style-type: none"> <li>• Lower level relationship due to single order.</li> <li>• Price is one of the selection criteria.</li> <li>• low frequency and the evaluation and selection takes place for each procurement</li> </ul>

Therefore, developing and maintaining partner relationships with few dependable suppliers will reduce risk, save time, cost and resources (Jonsson, 2008). A firm's quality management approaches and supply chain management practices complement each other and need to be integrated to achieve superior financial and business performance (Mellat-Parast, 2013). This means, the higher the supply chain performance, the greater will be its contribution for quality management and organizational performance. Practices such as supplier relationship and information sharing facilitate the integration of quality management and supply chain management.

The supplier's quality practices have a significant effect on the quality performance of the firm (Mellat-Parast, 2013). According to (Lo et al., 2007), customer focus, continuous improvement and total involvement of suppliers would improve supply chain performance. Supply Chain Management is a key strategic factor for increasing organizational effectiveness and efficiency (Gunasegaram, et al., 2001). Organizations achieve their goals by satisfying their customers with greater efficiency and effectiveness than their competitors (Neely, et al., 1995). Effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilized when providing a given level of customer satisfaction. Improving supply chain performance is one of the critical issues for gaining competitive advantages for companies (Cai, et al., 2009). Supply chain performance measurement is the process of quantifying the efficiency and effectiveness of the upstream and downstream supply chain processes. A performance measure is a set of metrics used to quantify the efficiency and/or effectiveness of the supply chain operation. The main challenge is to identify the key performance measures for value-adding supply chain processes and the factors that will affect the core business processes that create wealth to customers (Gunasekaran & Kobu, 2007). Many organizations endeavour to capture the benefits of shorter lead times, flexibility in production, shorter product development time and win-win approaches (Gopal & Thakkar, 2012). Designing and implementing the supply chain performance measurement system is a challenging task and companies may encounter the following problems (Gopal & Thakkar, 2012): lack of connection with strategy, focus on cost neglecting non-cost indicators, lack of a balanced approach, insufficient focus on customers and competitors, lack of a clear distinction between metrics at strategic, tactical, and operational levels. Studies indicate that supply chain performance system are not in harmony with the organisation's strategy and also there is a biased focus on financial metrics (Holmberg, 2000). A set of supply chain performance metrics needs to be determined in order to measure maximum effectiveness and minimum operating cost (Gunasekaran & Kobu, 2007). When the Supply Chain performance measures developed, managers should identify the KPIs that have to be enhanced and figure out the relationships between the different key performance indicators and the priorities to improve in the supply chain operations (Cai, et al., 2009). There are different performance indicators that companies use to assess the performance of the supply chain.

The following parameters can be used to evaluate the performance of the supply chain (Rejewski & Ritzman, 2002): (a) Lead time – the time interval between placing purchase order and delivery of the product to the customer. (b) Cost of order processing, shipping and delivery. (c) Capacity-including warehousing, transportation and shipping capacity. (d) Quality of suppliers - the ability to meet quality standards set by manufactures. (e) Delivery has three dimensions including delivery speed, production lead time & delivery reliability (Coyle *et al.* 2003). (f) Flexibility (ability to adapt to their changing environment). Flexibility has four dimensions (Chopra & Meindl , 2004): (I) Customer service flexibility-refers to the ability to provide the special customer requests or inquiries. (II) Order flexibility- means the ability to adjust order size, volume or composition during logistics operation. (III) Location flexibility refers the ability to service customers from alternative wholesaler locations or supermarket outlets (IV) Delivery time flexibility refers to the ability to provide delivery times for customers. Non-Financial supply chain Performance Measures include the following: (a) Customer service level -there are four types of customer service level in manufacturing such as order fill rate, stock out rate, back order level and delivery probability. (b) Cycle time or lead time is the end-to-end delay in a business process for every organisation. (c)Inventory Levels. (d) SC Resource Utilization. The below diagram represents the summary of customer –focussed supply chain performance indicator.

Figure 2.2 Customer –focussed supply chain performance indicators



Gunasekaran, *et al.* 2004

There are several methods of measuring and evaluating the performance of supply chain. The most common methods are SCOR (Supply Chain Operations) model and the Balanced Scorecard (BSC). As this thesis is focusing on the performance variables of the SCOR model, the performance metrics, processes of supply chain management supply chain practices and collaboration have been discussed.

### 2.4.3 SUPPLY CHAIN OPERATION REFERENCE (SCOR) MODEL

Supply chain performance measurement is essential for competitiveness as it provides information about strengths that need to be maintained and on weaknesses that need to be addressed. The Supply Chain Operations Reference model (SCOR) is the product of Supply Chain Council, Inc. (SCC). SCC established in 1996 and developed the SCOR process reference model for evaluating and comparing supply chain activities and performance. It provides a unique framework that links business process, metrics, best practices and technology into a unified structure to support communication among supply chain partners and to improve the effectiveness of supply chain management and related supply chain improvement activities (<http://supply-chain.org/scor> ). SCOR consists of standard supply chain processes, standard performance attributes and metrics, standard practices and standard job skills (Alomar and Pasek 2014). The main supply chain processes are *plan, source, make, deliver, return and Enable*. In terms of performance, SCOR enables to assess reliability, responsiveness, agility, costs and assets management of a given supply chain. In order to identify, measure and improve supply chain management processes, SCOR model can be used. The SCOR model provides a common process for communicating among supply-chain partners (Huan, et al., 2004). The SCOR-model has been developed to describe the business activities associated with all phases of satisfying a customer's demand. The model has been able to successfully describe and provide a basis for supply chain analysis and improvement. These processes are defined in increasing levels of details beginning with a description of the overall process. The processes are further divided into process elements, tasks, and activities. Each basic supply chain is a “chain” of source, make, and deliver execution process. Each interaction of two execution processes (source-make-deliver) is a “link” in the supply chain. Planning sits on top of these links and manages them (Huan, et al., 2004).

Figure 2.3 SCOR's six major management processes. Source: SCOR MODEL, Version.11 (2012).



The model spans: all customer interactions (order entry through paid invoice), all physical material transactions (supplier's supplier to customer's customer, including equipment, supplies, spare parts, bulk product, software, etc.) and all market interactions (from the understanding of aggregate demand to the fulfilment of each order). The SCOR reference model consists of 4 major sections:

- (a) Performance: Standard metrics to describe process performance and define strategic goals.
  - (b) Processes: Standard descriptions of management processes and process relationships.
  - (c) Practices: Management practices that produce significant better process performance.
  - (d) People: Standard definitions for skills required to perform supply chain processes.
- However, this study will focus on the supply chain management processes integration and performances as well as practices. The SCOR performance section consists of two types of elements: performance attributes (characteristics) and performance metrics. A performance attribute is a grouping of metrics used to express a strategy.

Table 2.2 The SCOR Performance attributes, metrics and definition.

Supply Chain Performance Attribute/Variables /Characteristics	Definition
Reliability	The ability to perform tasks as expected. Reliability focuses on the predictability of the outcome of a process. Typical metrics for the reliability attribute include: On-time, the right quantity, the right quality.
Responsiveness	The speed at which tasks are performed. The speed at which a supply chain provides products to the customer. Examples include cycle-time metrics.
Agility	The ability to respond to external influences, the ability to respond to marketplace changes to gain or maintain competitive advantage. SCOR Agility metrics include Flexibility and Adaptability.
Costs	The cost of operating the supply chain processes. This includes labour costs, material costs, and management and transportation costs. A typical cost metric is Cost of Goods Sold.
Asset Management Efficiency (Inventory Management).	The ability to efficiently utilize assets. Asset management strategies in a supply chain include inventory reduction and in-sourcing vs. outsourcing. Metrics include: Inventory days of supply and capacity utilization.

*SCOR Model Version.11 (2012)*

Reliability, Responsiveness and Agility are customer-focused performance characteristics. Cost and Asset Management Efficiency are internal-focused performance characteristics. Each performance attribute has one or more strategic performance metrics as indicated in the above table. SCOR supply chain processes are

unique processes a supply chain requires to execute in order to support its primary objective to fulfil customer orders. SCOR provides a set of processes most companies perform to effectively execute their supply chains. The six macro-level SCOR processes: Plan, Source, Make, Deliver, Return and Enable are well-known and widely adopted. (i) The Plan processes describe the activities associated with developing plans to operate the supply chain. The Plan processes include the gathering of requirements, gathering of information on available resources, balancing requirements and resources to determine planned capabilities and gaps in demand or resources and identify actions to correct these gaps. The processes associated with determining requirements and corrective actions to achieve supply chain objectives ([www.supply-chain.org/Scor](http://www.supply-chain.org/Scor)).

(ii) The Source processes describe the ordering (or scheduling of deliveries) and receipt of goods and services. The process is associated with ordering, delivery, receipt and transfer of raw material items, subassemblies, product and/or services. The Source process expresses the issuance of purchase orders or scheduling deliveries, receiving, validation and storage of goods and accepting the invoice from the supplier ([www.supply-chain.org/Scor](http://www.supply-chain.org/Scor)). (iii) The Make processes describe the activities associated with the conversion of inputs into finished products for customers. The most common manufacturing strategies are *make-to-stock*, *make-to-order*, *configure-to-order*, and *engineer-to-order* (Webster, 2008). Make-to-stock (MTS) strategy is the best strategy for standardised products that sell in high volumes (Cohen & Rousell, 2005). Make-to-order (MTO) is the preferred strategy for customised products or products with infrequent demand. Companies following this strategy produce a shippable product only with a customer order in hand (Taylor, 2004). Configure-to-order (CTO) is a hybrid strategy in which a product is partially completed to a generic level, and then finished when the order is received (Cohen & Rousell, 2005). This is the preferred strategy when there are many variations to the end product, and the manufacturer wants a lower finished-goods inventory and shorter customer lead time (Bowersox *et al.* 2010). Make-to-stock products are intended to be shipped from finished goods or 'off the shelf'. They are generally produced to a planned schedule in accordance with a sales forecast. Make-to-Order products are completed, built or configured only in response to a customer order. (iv) The Deliver processes describe the activities associated with the creation, maintenance and fulfilment of customer orders. The Deliver process expresses the receipt, validation and creation of customer orders, scheduling order delivery, pick, pack and shipment and invoicing the customer.

The Deliver Retail process provides a simplified view of Source and Deliver processes operated in a Make-to-Stock-only retail operation. Deliver- the processes associated with performing customer-facing order management and order fulfilment activities. (v)The Return processes describe the activities associated with the reverse flow of goods. The Return process represents the identification of the need to return, the scheduling of the return and the shipment and receipt of the returned goods. The Return processes is associated with moving material from a customer back through the supply chain to supplier for different reasons. (vi)The Enable processes is associated with the management of the supply chain. Enable processes include management of business rules, performance management, data management, resource management, facilities management, contract management, supply chain network management, managing regulatory compliance and risk management. This process is associated with establishing, maintaining and monitoring information, relationships, resources, assets, business rules, compliance and contracts required to operate the supply chain. Enable processes support the realisation and governance of the planning and execution processes of supply chains. (SCOR Version.11, 2012). A SCOR practice is a unique way to configure a process or a set of processes. The uniqueness can be related to the automation of the process, a technology applied in the process, special skills applied to the process, a unique sequence for performing the process, or a unique method for distributing and connecting processes between organizations. All practices have links to one or more processes and one or more performance metrics. There are several different types of practices within any organisation like: *emerging practices*, *best practices*, *standard practices*, etc. Emerging practices introduce new technology, knowledge or radically different ways of organizing processes. Emerging practices may yield a step change in performance by 'redefining the playing field' within an industry. Emerging practices require advanced technology, or special knowledge to adopt. Among other things, the SCOR emerging practices include demand planning and forecasting, supply network planning, demand management, long-term supplier agreement and relationship, supply chain optimization, etc. which have significant impact on the performance of a given supply chain network. Best practices are current, structured and proven practices. Best practices have a positive impact on supply chain performance. Among other things, the SCOR best practices include the issues of supply chain risk management, inventory management, delivery performance evaluation, etc. which are key to the performance of a given supply chain process network.

The following table summarizes the five performance attributes and SCOR strategic supply chain metrics.

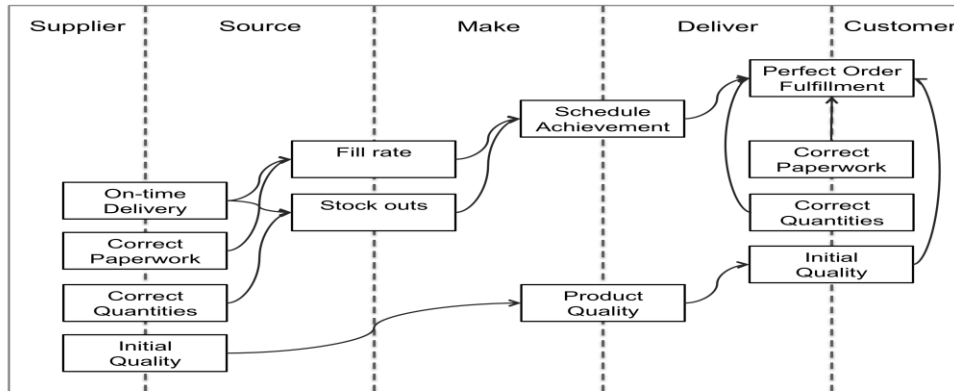
Table 2.3. Strategic supply chain performance variables and metrics.

Source: SCOR Version.11, (2012)

Supply chain Performance Variables	Strategic Supply Chain Performance Metrics
Reliability	Perfect Order Fulfilment
Responsiveness	Order fulfilment Cycle Time
Agility	Flexibility and Adaptability
Cost	Total Cost SC operation
Assets	Efficient supply chain asset utilization.

Defining the supply chain metrics at strategic level, then operational metrics should be derived from the strategic metrics for each SCOR supply chain process as shown in the below diagram.

Figure 2.4 SCOR operational supply chain performance metrics and process.



## 2.5 SUPPLY CHAIN INTEGRATION & COLLABORATION

The paradigm of supply chain management has gone through huge developments efforts to enhance the benefit out of it. Supply chain management seeks to enhance competitive performance by integrating the internal cross-functional units within a company in the supply chain and effectively linking them with the external operations of suppliers, customers, and other channel members to be successful (Otchere et al., 2013).

The objective of supply chain management is to maximize the overall value generated by the supply chain rather than profit generation by a single member company. Although the importance of supply chain integration is widely acknowledged, seamless coordination is rarely achieved in practice owing to several challenges (Hussain and Nassar, 2010). In recent years, there has been a great deal of empirical evidence to show that successful supply-chain integration can improve a firm's performance and competitive advantage (Wiengarten et al., 2010). Internal integration involves cross functional teams of specialists working together, sharing information, making product and making manufacturing decisions jointly and simultaneously (Otchere et al. 2013). Internal integration is a process of inter-functional interaction, collaboration, coordination, communication and cooperation that bring functional areas together into a cohesive organization (Zhao et al, 2011). Companies with a low internal integration strategy will achieve low level of external integration and companies implementing the full internal integration strategy will have the highest levels of external integration. Generally, it is believed that firms achieve a relatively high degree of internal integration before they attempt to develop a higher degree of external integration (Otchere et al. 2013).

According to (Otchere et al, 2013), external integration is the other aspect of supply chain integration among the supply chain partners to gain competitive advantages over competitors. As the competitive environment is becoming increasingly challenging, companies are undertaking efforts to compete along multiple fronts. Nowadays, many firms find it difficult to compete in the competitive market environment by relying on their internal resources and competencies alone. They are becoming aware of the importance of collaboration with their customers and suppliers to obtain information and complementary resources so as to build competitive advantages. External supply chain integration reveals two major areas of emphasis: (a) customer integration (CI) and (b) supplier integration (SI). Customer integration is also known as forward integration which refers to the process of interaction and collaboration between an organization and its customers to ensure an effective flow of products, information and resources to customers (Zhao et al. 2002). Customer integration involves sharing demand information which enables the manufacturer to understand better the customer needs and to forecast better customer demand, as well as collaborative involvement of customers with respect to product design, provision of better quality products at lower cost and more flexibility in responding to customer

demand (Flynn et al. 2010). Supplier integration is also known as backward integration which refers to the process of interaction and collaboration between the manufacture and its suppliers to ensure an effective flow of input supplies (Zhao et al, 2011). Supply chain management executives face unique challenges in the endeavour to integrate supply chain strategies with the overall corporate business (competitive) strategies and hence, coordination is rarely achieved in practice (Otchere et al, 2013). Most supply chain integration challenges emanate either from uncertainties or inability to co-ordinate several activities and partners. Customers are demanding better quality products, higher levels of service and reduced prices (Sweeney, 2011). Studies indicates that there is no blueprint for integration and aggregate measure of overall supply chain performance from which a firm could compare performance with other industry members (Fawcett & Magnan, 2002). The supply chain operations reference (SCOR) model provides a common supply chain framework, standard terminology, common metrics associated benchmarks, and best practices, the approach seems rigid (Soni and Kodali, 2010).

To increase a firm's supply chain performance the drivers of supply chain management play insensible roles. Drivers of supply chain performance management include facilities, logistic management, transportation, inventory management, information distribution, pricing and sourcing. The better management of all these activities leads to increased performance of firms (Soni and Kodali, 2010).

The integration process should start from functional integration within each company through internal integration to external integration (Supplier & Customer). Authors argue that performance improvements are not assured with just one aspect of supply chain integration. Implementing integration with upstream and downstream supply chain members as well as internal functional integration is essential for effective and efficient supply chain performance (Otchere et al, 2013). Furthermore, it is confirmed that, the best integration strategy must involve "complete integration" (Otchere et al, 2013). A number of researchers have also found that higher levels of integration generally lead to better supply chain performance (Gimenez and Ventura, 2005). Some researchers used all three integration variables in assessing the effect of supply chain integration on performance and found that supply chain integration directly relates to the firm's performance and that internal and external integration influence each other along with performance. However, internal integration's impact on performance depends on the functional areas that are being integrated and the level of external integration (Flynn et al. 2010).

Firms have realised that enhanced market competitiveness requires complete integration of companies within a network of organizations in the supply chain. It is the extent to which organisations integrate with their supply chain “partners” that determines their competitiveness (Christopher, 2011).

From these different findings, we understand that company’s complete integration with the supply chain partners has significant impact on the performance and competitiveness of the case supply chain in this study. Supply chain integration with upstream and downstream partners can be reflected through the implementation of collaborative planning, forecasting and replenishment (CPFR) scheme as well as vendor managed inventory (VMI) arrangement. Accordingly, for the purpose of this study, the researcher reviewed literatures on CPFR and VMI as discussed in detail below.

### 2.5.1 COLLABORATIVE FORECASTING, PLANNING & REPLENISHMENT

CPFR is a process which stands for collaborative planning, forecasting and replenishment in the supply chain. The idea behind this process is to make collaborative actions by all members of the supply chain to come up with a shared vision and objective. Supply Chain partners along the chain share information based on customer trends and needs to create a single forecast that is visualized at all times by its members to react accordingly to sudden changes in demand (Cassivi, 2006). Retailers have the advantage of knowing the latest trends and customer’s behaviours. Large manufacturers are implementing CPFR as a model to forecast and plan actions based on collaboration with retailers (Fliender, 2003). CPFR process generates cost reductions in large manufacturers due to short lead times and specially controls on the inventory levels in the supply chain (Caridi et al., 2006). Efficient consumer response is a strategy where retailers and suppliers work together in a cooperative manner to bring products to the final customer in a more efficient, faster, less expensive but still profitable way to the members of the supply chain (Corsten and Kumar, 2005). CPFR is the integration of all the members of the supply chain including the retailers and all the distributors involved. The potential benefit of this process is seen with the sharing of the information throughout the supply chain if they are effectively coordinated (Fliender, 2003). The use of electronic methods such as advanced software facilitates sharing of information.

Category management and efficient replenishment need to implement collaborative forecasting and planning in order to establish win-win situations of trading partners (Holmstrom, et al., 2002).

A push-pull system is followed in a CPFR process. The push part of the supply chain is followed by upstream suppliers which work in a make-to-stock process in a just in time basis. Collaborative forecasts are used to determine lot sizes and stock level. This will ensure a low inventory on downstream companies. Downstream companies work in a make-to-order process or “pull” process. Based on historical data, they trigger the orders to the upstream suppliers to meet demands. The main objective of the system is quick response to rapid changes. CPFR increases level of relationship among the supply chain partners, improves the communication channels by jointly managing the process and sharing of information (Cassivi, 2006). Collaborative planning is a fundamental part of supply chain management. It is the first step of CPFR with two fundamental stages: front-end agreement and joint business plans. Partners also develop collaboration initiatives and terms (Cassivi, 2006). Absence of collaborative planning with supply chain partners leads to significant negative impacts on supply chain performance (Attaran, 2004). Trust and the quality of information, with advanced IT infrastructure, shared between companies has a significant impact on effective collaborative planning and the performance of a supply chain (Petersen, et al., 2005). Collaborative Forecasting reduces bullwhip effects and improves supply chain performance (Eksoz and Mansouri, 2012). According to (Voudouris, et al., 2008), the overall objective of collaborative forecasting is “to synchronize demand forecasts between all customers and suppliers”. Collaborative forecasting increases the accuracy of the aggregate forecasts. The potential benefits of collaborative forecasting reduces inventory holding cost and shortage cost, optimizes the use of production capacity and adhere to production plans (Aviv, 2004). With all the challenges, collaborative forecasting enables to overcome inherent problems with traditional forecasting.

Owing to the complex nature of collaborative forecasting schemes, the challenges are categorized by Voudouris et al., 2008 as follow: human interactions and biases, traditional behaviours, communication and defining accountability among the partners. The importance of information technology to launch collaborative forecasting by supply chain partners has been addressed by many scholars (Aviv, 2007). Collaborative Replenishment is the third stage of CPFR, which includes making and fulfilling orders.

In the “replenishment” stage, it is required to generate orders according to sales forecast in order to connect collaborative replenishment directly to a forecasting activity (Liu and Sun, 2012). Collaborative replenishment spreads replenishment activities across the supply chain and facilitates collaborative inventory management in the supply chain operations. The benefits include improved customer service levels, increased order accuracy and decreased inventory. Transportation is also a key element in collaborative replenishment arrangements. There is relationship between collaborative transportation and CPFR. Collaborative transportation management (CTM) requires a conversion of order forecasts developed via CPFR into shipment forecasts, and insuring accurate fulfilment through collaboration (Esper and Williams, 2003). Companies should combine CTM and CPFR in order to integrate customer procurement forecast processes and logistics demands (Chen and Chen, 2009).

According to Panahifar et al., 2013, successful collaboration arrangement need key enablers. These enablers for CPFR implementation vary due to the differences of industries and characteristics of the supply chain. The important enablers include: the creation of a high level of trust (Panahifar et al., 2013) and the importance of information (Petersen et al., 2005), reduced information distortion in the supply chain (Nishat Faisal et al. 2007). Senior management support, commitment and a clear communication/business plan are also two key prerequisites for successful collaboration (Panahifar, et al., 2013). Significant inhibitors (barriers) to the successful implementation of CPFR include: absence of shared targets; lack of budget for collaborative software; lack of partner trust; difficulties to calculate benefits; executive support obstacles; lack of real time coordination of information exchange; no adequate information technology and expertise (Min and Yu,2008). According to Chung and Leung, 2005), lack of adequate collaborative software is one of the barriers to collaborative schemes. Fear of losing competitive information (financial reports, manufacturing schedules, inventory values, intellectual property issues and information sharing by adversaries), lack of technical expertise, the availability and cost of technology have been cited as some of the main obstacles to CPFR implementation (Cassivi, 2006). CPFR implementation challenges are of two levels: fundamental and technical consisting of lack of trust, lack of mutual incentives and the need for security protocols in order to safeguard both buyers and sellers from leaks of proprietary information (Attaran and Attaran, 2007).

Companies implementing CPFR successfully ensure the following benefits: forecasting accuracy, reducing the amount of exchanged information, reducing the bullwhip effect, increased responsiveness, enhanced customer service quality, improved inventory management, operational efficiency, product availability assurance, improving design process, stronger relationship between partners, decreased supply chain cycle time, increased customization capability, reduced replenishment cycle time, increased revenues and earnings, increased margins, increasing shareholder wealth, decreasing cost of production, planning and deployment, maximum efficiency of members, a reduction of inventory in the supply chain, decreasing working capital, reduction in production and inventory costs, reduced overall costs, increasing the sales of products and reduction in stock-outs (Kim and Mahoney, 2010). According to Larsen et al., 2003 , CPFR , as a collaboration initiative among two or more parties in the supply chain with joint planning like promotional activities ,synchronized forecasting, and undertaking joint replenishment processes, generates the following benefits: increased sales, higher service levels, faster order response time, lower product inventories, faster cycle times, reduced capacity requirements, reduced number of stocking points, improved forecast accuracy and lower system expenses.

### 2.5.2 VENDOR MANAGED INVENTORY (VMI)

Vendor Managed Inventory (VMI) is a collaboration strategy where sales and inventory level information are usually shared by the customer with the supplier. In a typical VMI agreement, the supplier is given the authority and responsibility to make inventory replenishment decisions for their customers. Generally, the customer is not involved in decision making activities, but is responsible for sharing accurate and timely sales and inventory level information with the supplier. One of the earliest VMI agreements was pioneered by Wal-Mart (retailer) with Procter & Gamble (manufacturer) in the late 1980s. This agreement, originally known as Continuous Replenishment Program (CRP), gave Procter & Gamble the authority and responsibility to make appropriate inventory replenishment decisions for Wal-Mart. Vendor-managed inventory (VMI) is a family of business models in which the buyer of a product provides certain information to a supplier of that product and the supplier takes full responsibility for maintaining an agreed inventory of the material usually at the buyer's consumption location (usually a store).

A third-party logistics provider can also be involved to make sure that the buyer has the required level of inventory by adjusting the demand and supply gaps. VMI makes it less likely that a business will unintentionally become out of stock of a good and reduces inventory in the supply chain. One of the keys to making VMI work is shared risk. In some cases if the inventory does not sell, the vendor (supplier) will repurchase the product from the buyer. In other cases the product may be in the possession of the buyer but is not owned by the buyer until the sale takes place, meaning that the buyer simply houses and assists with the sale of the product in exchange for a predetermined commission or profit (sometimes referred to as consignment stock). VMI helps foster a closer understanding between the retailer and manufacturer by using Electronic Data Interchange formats EDI software and to forecast and maintain correct inventory in the supply chain ([www.scor.org](http://www.scor.org)). VMI is a supply chain initiative whereby a supplier assumes responsibility for maintaining inventory levels and determining order quantities for its customers. A number of benefits from VMI adoption have been reported in literature: reduction in inventories, shorter order intervals and more frequent deliveries. A VMI program typically involves the use of a software platform, the sharing of demand forecasts and/or cost information, timely communications, set liability levels, and risk-sharing parameters and common goal sharing between the buyer and the supplier. VMI can be particularly beneficial in the products with high demand variance and high outsourcing costs (Cheung and Lee 2002).

This literature review indicates that CPFR is one of the most important supply chain collaboration scheme out of which all the partners of the chain benefits as a result of the financial and non- financial supply chain performance. With the same talken, VMI is another important supply chain collaboration arrangement which has a significant impact on the performance of the supply chain as a whole. Therefore, this study will focus on the assessment of these two supply chain collaborative schemes with the case supply chain.

## 2.6 SUPPLY CHAIN COORDINATION MECHANISMS

The dependencies between supply chain members can be managed by some means and mechanisms of coordination. By using coordination mechanisms, the performance of supply chain may improve. There are different types of coordination mechanisms discovered by different authors. Supply chain contract is the main coordination mechanism. Supply chain members coordinate by using contracts for better management of supplier-customer relationship and risk management. The contracts specify the parameters (like quantity, price, time, and quality) within which a customer places orders and a supplier fulfils them. The objectives of supply chain contracts are: increasing the total supply chain profit, reducing overstock/understock costs and sharing the risks among the supply chain partners (Tsay, 1999). The contracts counter double marginalization that is by decreasing the costs of all supply chain members and total supply chain costs when they coordinate as against the costs incurred when the SC members act independently. In case of quantity flexibility contract, the customer is allowed to modify the order within limits agreed to the supplier as demand visibility increases closer to the point of sale. The buyer modifies the order as s/he gains better idea of actual market demand over time (Tsay, 1999). In revenue sharing contract, the supplier charges the customer a low wholesale price and shares a fraction of the revenues generated by the buyer (Koullamas, 2006). In the case of quantity discount contract, the seller offers discounts to the buyer based on quantity of goods purchased in order to improve the volume of sales (Weng, 2004). In the case of sales rebate contract, the sales rebate agreement provides a direct incentive to the retailer to increase sales by means of a rebate paid by the supplier for any item sold above a certain quantity to maximize sales.

## 2.7 ICT UTILIZATION IN SCM SUPPLY CHAIN MANAGEMENT

Information technology is used to improve inter-organizational coordination (Saunders, 2008) and in turn, inter-organizational coordination has been shown to have a positive impact on firm's performance measures, such as customer service, lead-time, and production costs (Vickery et al., 2003). Information technology helps to link the point of production  $y$  with the point of delivery or purchase. It allows planning, tracking and estimating the lead times based on the real time data. Advances in Information Technology (internet, electronic data interchange, enterprise resource planning, e-business, etc.) enables firms to rapidly exchange products, information, and funds and

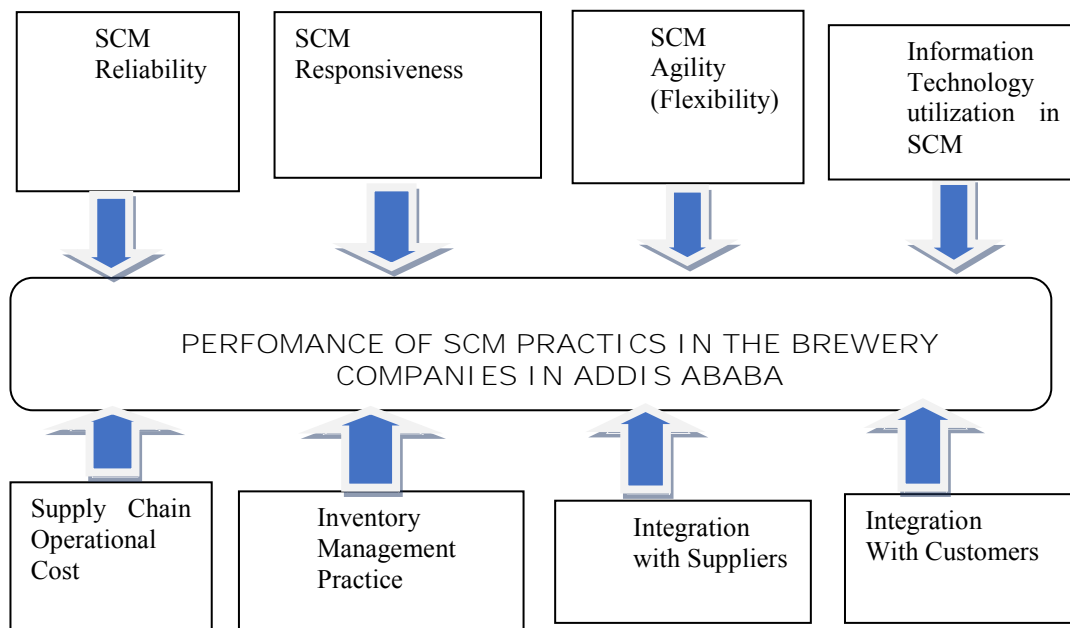
utilize collaborative methods to optimize supply chain operations. It has been discovered that electronic data interchange (EDI) has a direct relationship on three performance levels: operational, financial and strategic (Fin, 2006). E-commerce can be used to support processes such as sales, distribution, customer service processes, sourcing, procurement, tendering and order fulfilment processes (Swaminathan and Tayur 2003). E-business capability supporting supply chain technologies such as customer orders, purchasing and collaboration between suppliers and customer enhances the production information integration intensity, which in turn improves the supply chain performance. (Li, et al., 2009) carried out an empirical study to explore relationship between IT, supply chain integration and supply chain performance of Chinese manufacturing organization. According to this study, supply chain integration mediates the relationship between IT implementation and supply chain performance. Hence, IT can be a good enabler to integrate supply chain. The supply chain members coordinate by sharing information regarding demand, orders, inventory, shipment quantity, etc. Timely demand information or advanced commitments from downstream customers helps in reducing the inventory costs by offering price discounts and this information can be a substitute for lead time and inventory (Reddy and Rajendran 2005). The supplier may take advantage of the retailers' inventory information in allocating the stock to retailers optimally. Therefore, the higher the level of information sharing, the more important the effective supply chain practice is to achieve superior performance (Zhou and Benton 2007).

## 2.8 THE CONCEPTUAL FRAMEWORK OF THIS STUDY

The researcher will focus mainly on the SCOR model framework for this study as discussed below. Globally SCC has over 800 Member Organizations employing SCOR model. Countries like North America and Europe take the line share of the member distributions. Other member countries include China, Australia, South Africa, Latin America, Southeast Asia and Japan also employ the SCOR model of SCC in their organizations. SCOR is a supply chain process reference model containing over 200 process elements, 550 supply chain performance metrics, and 500 best practices. The Supply Chain Operations Reference model (SCOR) is the world's leading supply chain framework, linking business processes, performance metrics, practices and people skills into a unified structure. SCOR is organized around the six primary supply chain management processes of Plan, Source, Make, Deliver, Return and Enables, and five

core supply chain performance attributes or characteristics: Reliability, Responsiveness, Agility, Costs, and Supply Chain Asset Management Efficiency. The researcher will analyse and evaluate the performance of supply chain management practices in terms of Reliability, Responsiveness, Agility, Costs, and Supply Chain Asset Management Efficiency, collaboration with upstream and downstream supply chain partners and SCOR best practices as shown in the diagram below.

Fig 2.5 A conceptual framework of supply chain performance indicators of this study.



## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 INTRODUCTION

In this chapter the research design and methodology used in the study has been described. The geographical area where the study will be conducted, the research design, the research approach, the subject of the study, the case companies, the participants of the study, the type of data source, the type of research, the research instrument used to collect the data, the methods of data collection, method of data analysis, validity and reliability of the instrument, the limitation of the research, and the ethical consideration have been discussed in this part of the research. Determining an appropriate research methodology is considered as an important element in this research study. Establishing the research methodology involves approach to the entire process of a research study, starting from the theoretical underpinnings and spanning to data collection and analysis, and extends to developing the solutions for the research problems being investigated.

Research methodology in essence is focused around the problems to be investigated in a research study and therefore varies according to the problems investigated. It is important to have consistency between research questions, the research methodology and theoretical approaches. Research strategy is one of the components of research methodology. Research strategy provides overall direction of the research including the process by which the research is conducted (Churchill and Sanders, 2007). . The different components of the research methodology used in this study are discussed below.

### 3.2 RESEARCH DESIGN

There are two basic research designs in research, quantitative and qualitative design. The third is mixed research design which is formulated by combining the two approaches mentioned above to get the advantages of both. Quantitative approach involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis using statistical tools and qualitative approach is concerned with subjective assessment of attitudes, perceptions, opinions and behaviour.

Generally, qualitative techniques including focus group discussion, key informant semi structured interviews and unstructured in-depth interviews are used for data collection (Kothari, 2004). Quantitative research as a formal, objective, systematic process are used to describe and test relationships and examine cause and effect interactions among variables. Surveys may be used for descriptive, explanatory and exploratory research. A survey is used to collect original data for describing a population too large to observe directly (Kothari, 2004). A survey obtains data from a sample of the population and infers that the population will have the same characteristics as that of the population.

Again according to Creswell (2013), there are three research approaches: qualitative, quantitative, and mixed methods. Mixed research methods are used when it incorporates elements of both qualitative and quantitative approaches and the findings are also more reliable using one of the approaches. Mixed research design is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone.

The most appropriate research design for this study is mixed research design. The researcher collected quantitative data using self-administered questionnaires with five points Likert scale distributed personally to the subjects by the researcher to measure the perceived performance of supply chain management practices in the case brewery companies. The researcher also designed and used semi-structured interview questions to collect qualitative data from the first tier local suppliers, the brewery companies and the first and second tier B2B customers of the brewery companies.

### 3.3 THE RESEARCH STRATEGY

Each research strategy mentioned below can be used for exploratory, descriptive and explanatory research purpose. No research strategy is superior or inferior to any other. What is most important is whether the strategy enables you to answer the research question(s) and meet the research objectives. The researcher's choice of research strategy is guided by research question(s) and objectives. It is quite possible to use the survey strategy as part of a case study (Yin, 2003). There are five research strategies in social science: experiment, survey, archival analysis, history and case study (Saunders et.al, 2007).

Experiment research strategy is rarely used in management research. Survey strategy is usually associated with the deductive approach and is a popular and common strategy in business and management research. It is mostly used to answer who, what, where, how much and how many questions. It therefore tends to be used for exploratory and descriptive research.

Archival research is conducted using archival data originally generated for reporting and often kept for legal requirements in the organization. This study used secondary source of data.

Historical research is a specific type of scientific research and investigation of elements based on historical data. It is also is one of the basic approaches of qualitative research. Historical research as critical investigation of events, development and experiences of the past, careful consideration of past testimonies from the perspective of information sources validity and subsequent interpretation of the concerned testimonies.

Case study research strategy involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (Robson, 2002). In a case study, the boundaries between the phenomenon being studied and the context within which it is being studied are not clearly evident (Yin, 2003). The case study strategy enables to gain a rich and in-depth understanding of the context of the research and the processes being enacted using semi structure interview and or questionnaire (Morris and Wood 1991). The case study strategy also has considerable ability to generate answers to the question 'why?', 'what?' and 'how?' questions, although 'what?' and 'how?' questions tend to be more the concern of the survey strategy. For this reason the case study strategy is most often used in descriptive, explanatory and exploratory research. The data collection techniques employed may be various and are likely to be used in combination. In case study strategy, it can be a

single case or a multiple case study. The researcher can conduct an in –depth study of a single case. If a study contains more than a single case then a multiple-case study is required. According to Yin (2003), a multiple or collective case study will allow the researcher to analyse within each setting and across settings. Besides, a multiple case study enables the researcher to describe differences within and between cases. In case study, the data collection techniques includes semi-structured interview for qualitative data and questionnaire for quantitative data within one study in order to ensure reliability of the findings. The goal is to replicate findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory (Yin, 2003).

Based on the above literature review on research strategies, the appropriate research strategy used for this thesis is a multiple case study to investigate “what “the perceptions of the respondents are about the level performance of the supply chain management practices , to get insight about “how much” the case brewery companies in Addis Ababa implement the supply chain management philosophies. The other justification for the selected strategy is that the purpose of this study is descriptive and determining the level of perceived performance, the researcher will generate answers to “what” and “how “research questions. Moreover, the researcher also determined the differences and similarities in the level of supply chain management performance using hypothesis testing.

### 3.4 POPULATION AND SAMPLING DESIGN OF THE STUDY

The total population size of this study is six (6) brewery companies which are operational at the moment in Ethiopia. Namely, brewery companies are: BGI Ethiopia, Heineken Brewery SC, Dashen Brewery S.C, Habesha Brewery S.C, Meta ABO Brewery S.C, and Raya Brewery S.C.

In this study, non-random sampling technique was used to select BGI Ethiopia and HEINEKEN Brewery S.C located in Addis Ababa as the case companies of this study. In non-probability (also known as purposive sampling) sampling technique, the researched determines as to which subject of the population to be included in the research study. Since this study is a multiple case study, the researcher applied purposive sampling (non-probability sampling technique) based on time and resource

constraints. In this study the major limitation is the non-generalizability of the findings to the total population.

The target respondents within each company are Managers whose responsibilities are directly related to supply chain management practices from departments including Sourcing, Production, Transportation, Sales & Marketing, Distribution & Channel management, Warehouse & Inventory Management. In order to insure reliability of the findings additional respondents are purposefully selected by the researcher from 3 local strategic suppliers, two distribution agents and ten retail outlets.

### 3.5 DATA SOURCE AND DATA COLLECTION INSTRUMENT

The type of data used for this study were primary data collected originated by the researcher directly from the respondents for the specific purpose of addressing the research problem. The data used for this study are primary qualitative and quantitative data from the respondents using five point Likert scale questionnaires and semi-structured interview questions designed by the researcher for self-administration. The questionnaires were designed based on the conceptual framework and the research questions to investigate and analyse the performance of supply chain management practices in the case brewery companies under study. For quantitative data, the respondents were asked to indicate their level of agreement and disagreement using a five-point Likert scale (1 = strongly disagree 2= disagree, 3= neutral 4=agree and 5 = strongly agree) about the performance of the supply chain management practices. A set of questions on each aspects of the supply chain management performance attributes and best practices are derived from extensive literature review including the SCOR model version 11. The questionnaire consists of three set of questions; the first section contains demographic profile questions such as, number of employees, and position of respondent in their organisation. The second section is about the supply chain performance of the companies in each dimension of supply chain management as detailed in the conceptual framework in chapter two of this study.

## .6 VALIDITY AND RELIABILITY

Reliability and validity are terms that refer to the quality of the measures used in a research study. Reliability refers to the internal consistency and validity refers to the accuracy of the measure.

### Validity

According to Kothari (2004), the respondents, the situations, the interviewer, and the data collection instrument can be sources of error in research. Error may arise because of the defective measuring instrument (E.g. questionnaire in this study). The use of complex words, beyond the comprehension of the respondents, ambiguous meanings, poor printing, inadequate space for replies, response choice omissions, etc. are some of the things that make the measuring instrument defective and may result in research measurement errors.

Validity is concerned with two main issues: whether the instruments used for measurement are accurate and whether they are actually measuring what they want to measure. The two different dimensions to the concept of validity (Winter, 2000) are: internal and external validity. Internal validity ensures that the researcher investigates what s/he claims to be investigating. Internal validity is the extent to which the measurements of the questionnaire provides the data needed to meet the purpose of the study or validity refers to the extent to which the questionnaire measures what the researcher intends to measure to ensure internal validity. External validity concerned with the extent to which the research findings can be generalised to wider population.

In this study, the questionnaire is developed based on intensive related literature review and well documented and periodically reviewed supply chain operation reference (SCOR) model.

Therefore, the researcher believes that the data collection tool will measure what it is intended to measure. This means, internal validity is achieved. As this study is a multiple case study whose findings cannot be inferred for the total population. Therefore, external validity is the common gap in case studies.

## Reliability

Reliability test is another important test of measurement tools in research. A measuring instrument (questionnaire) is reliable if it provides consistent results. A reliable data collection questionnaire provides consistent result with repeated measurements of the same subject of the study and with the same instrument. This reliability can be tested by comparing the results of repeated measurements. Reliability is the degree of consistency with which an instrument measures the constructs it is designed to measure. Reliability is known as to what extent the research findings can be replicated, if another study is undertaken using the same research methods (Ritchie and Lewis, 2003). This means the measure (data collection tools) should provide the same answer on another occasion or similar result should be obtained by another researcher using the same measuring instrument (Saunders et. al., 2007). There are four treats for reliability including participant error, participant bias (may not tell the truth for fear of top managements), interviewer error (when different people undertake the interview), and researcher's bias during interpretation (Robson, 2002).

During data collection for this study, the researcher officially requested with support letters from the Addis Ababa University School of Commerce to the aforementioned case companies for data collection for the respondents to have convenient condition and 20 minutes to respond to the questionnaires. Therefore, the researcher believed that the respondents' error and bias is minimal to affect the reliability of the findings. The researcher's error and bias will not affect the reliability of the study due to the fact that the data collection instrument is a well-structured and self-administrated questionnaire and the data will be analysed objectively using statistical tools (SPSS). Besides, the researcher conducted a pilot test by collecting data from sample four respondents from the case brewery companies and reliability test has been done using SPSS. Cronbach's alpha coefficient is a measure of internal consistency. It is considered to be a measure of scale reliability. Technically speaking, Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency).

According to George and Mallery (2003), Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003) suggested that Cronbach's alpha coefficient greater than 7.0 is acceptable. Accordingly, a pitot test of the internal consistency (reliability) of the data collection instrument for

all the variables was conducted on four respondents that did not participated in the case study research and the test results are depicted below.

Table 3.1: Cronbach’s Alpha Reliability Coefficient Result

S/N	Supply chain performance variables	Cronbach’s alpha result
1	Integration & Collaboration With Strategic Suppliers	0.878
2	Integration And Collaboration With Strategic Customers	0.853
3	Supply Chain Reliability	0.747
4	Supply Chain Agility	0.709
5	Supply Chain Operation Cost	0.877
6	Information Technology Utilization In SCM	0.701
7	Supply Chain Responsiveness	0.708
8	Inventory Management Practice	0.710

### 3. 7 TRIANGULATION FOR RELIABILITY

Triangulation is a strategy that can be used to strengthen the confidence of the research findings. Triangulation is attempting to get a true ‘fix’ on a situation by combining different ways of looking at the findings. For example, data triangulation involves the use of a variety of data source. Triangulation can reduce or eliminate personal and methodological biases and increase the probability of generalising the findings of a study as the data is gathered from different angles and by different methods (Decrop, 1999). There are multiple triangulations that can be used in the same research including: methodological triangulation- the use of multiple methods of data collection, data triangulation- the use of a variety of data sources in a study , respondents triangulation-the use of a broad range of informants.

This study will also employ informant (respondent) triangulation which simply involves considering a broad range of informants from different units of supply chain management processes. By combining data sources and Informants triangulation opens the way for more credible interpretations (Decrop, 2004).

In this study, the researcher collected data from primary sources of different respondents including suppliers and customers, and qualitative and quantitative data. Therefore, respondent's triangulation and methodological triangulation was used in this study to ensure reliability of the findings.

### 3.8 DATA ANALYSIS METHOD

In this study the quantitative data analysis was done using descriptive statistics to compute mean and standard deviation using a statistical tool known as SPSS version 20. The findings of each variable has been presented using tables. The qualitative data collected from the case breweries, local suppliers, distributors and retail outlets were used to further explain and get in-depth insight about the findings of the quantitative data. Moreover, the findings of the qualitative data have been summarized using a table.

### 3.9 ETHICAL CONSIDERATIONS

Ethics is becoming an increasingly prominent issue for all researchers. Researchers are encouraged to employ knowledge of research ethics in practice. Ethical issues were prominent throughout this research process, including during the data collection, during the analysis and writing up of the final report.

The researcher clarified to the respondents about the objectives of the study and explain that the information would be used only for research and academic purposes. During conducting data collection, both honesty and respect for the rights of the respondents were in place. Again, the researcher respected the rights to anonymity, confidentiality and informed consent of the respondents. The researcher also requested the consent of the respondents to conduct the research study with official letter and finally permission was given.

## CHAPTER FOUR: RESULTS AND DISCUSSIONS

In order to undertake this study, the researcher collected both qualitative and quantitative data. The analysis was also done one after the other. Both quantitative and qualitative data were collected from 10 (ten) manager in the case brewery companies whose responsibilities are directly related to supply chain operations. In order to triangulate the findings of the study for more reliable output, additional qualitative data were collected from three strategic local supplier, two distribution agents and 10 retail outlets.

### 4.1 RESPONDENTS' DEMOGRAPHY

Table 4.1 RESPONDENTS' PROFILE IN THE CASE BREWERY COMPANIES

S/N	Respondent's Position	Respondent's Qualification	Respondent's Experience
1	Import Manager	5-10 YEARS	B.A / B.SC
2	Deputy Sales Director	ABOVE 10 YEARS	M.A / MBA
3	Sourcing Manager	2-5 YEARS	B.A / B.SC
4	Transport Manager	5-10 YEARS	B.A / B.SC
5	SC Customer Service Expert	5-10 YEARS	B.A / B.SC
6	Distribution Manager	5-10 YEARS	B.A / B.SC
7	Production Manager	ABOVE 10 YEARS	MA / MBA
8	Planning Division Manager	2-5 YEARS	B.A/B.SC
9	Deputy Planning Division Head	5-10 YEARS	B.A/B.SC
10	Import Manager	ABOVE 10YEARS	MA/MBA

Table 4.2 RESPONDENTS' DEMOGRAPHY UPSTREAM AND DOWNSTREAM SUPPLY CHAIN PARTNERS

S/ N	PARTICIPANT COMPANIES	NUMBER OF RESPONDENTS	BUSINESS RELATIONSHIP	RESPONDENT'S POSITION
1	Assela Malt Factory	1	Sole Local Malt Supplier	Planning Division Director
2	Addis Ababa Bottle & Glass Factory	1	Sole Local Bottle Supplier	Deputy Operation Manager
3	Universal Plastic Factory	1	Plastic Crate Supplier	Operation Manager
4	Distribution Agents	2	Customers	Managers
5	Retail outlets (Bar , Hotels & Restaurants)	10	Customers of Customers	Supervisors

## 4.2 QUANTITATIVE DATA ANALYSIS

Considering the existing supply chain management experiences, respondents were asked to indicate the level of their agreement about supply chain management related to their respective companies from the alternative questions arranged in five point Likert scale method, where 1 stands for strong disagreement (the worst performance) and where 5 stands for strong agreement (the best performance). For the purpose of the analysis three (average) was used as a cut-off point. Where, more than three is considered as better level of performance while less than three was considered as low level of performance which needs improvement and management concern. In addition, three (average level) was also considered by the researcher as an indication of the area where improvement action plan and attention is needed. Mean performance score 4.0 and above are considered by the researcher to be high level of performance.

Table 4.3 SUMMARY OF RESULTS INTEGRATION AND COLLABORATION WITH SUPPLIERS

Supplier's Integration & Collaboration Performance Indicators	N	Mean	Std. Deviation
Have a long term framework agreement with key strategic suppliers	10	4.40	0.516
Encouraging and developing the capacity of local strategic suppliers	10	3.80	0.422
Sharing long term production and raw material requirement plans with our key strategic suppliers	10	3.80	0.919
Joint forecasting of demand and planning inventory with our key suppliers	10	2.40	0.516
Trust key suppliers to share supply chain information.	10	3.80	0.422
Valid N	10		

As indicated in the above Table 4.3, 80% of the mean performance score is above 3.0 which is considered high level of performance and only 20% of the mean score is below 3.0 which is low level of performance. The case brewery companies work with their strategic suppliers based on contractual agreements. The result also indicate limited effort of the brewery companies in areas of local capacity development, sharing

of long term material requirement plans and joint planning of inventory with suppliers. The level of trust between the suppliers and the brewery companies is considered low.

The findings from the semi structured interview further elaborated that even though there is contractual agreement between the strategic suppliers (E.g. Raw Malt Barley Suppliers) and the brewery companies, it was not enforceable and side selling of the barely grain was common for higher prices. The brewery companies also usually share short term plans of material needs and rare joint planning of inventories due to the fear for their competitors as they share same suppliers locally and abroad. Related to local suppliers' capacity development is very limited to providing technical expertise for quality control, financial and technical support to raw malt barley supplier (farmers) and advance payment to the factories. Local strategic suppliers like Assela Malt Factory and Addis Glass Factory are not able satisfy the needs of the brewery companies due to capacity limitation that can be expanded.

There is limited effort of establishing partnership agreement and financing their production expansion instead of looking at foreign suppliers with limited hard currency reserve in the country.

Table 4.4 INTEGRATION AND COLLABORATION WITH STRATEGIC CUSTOMERS (B2B)

Customer's Integration & Collaboration Performance Indicators	N	Mean	Std. Dev
Trusting key strategic customers (B2B) to share supply chain information.	10	4.30	0.483
Involving key customers (distributors) in demand forecasting process.	10	4.10	0.568
Involving key customers (retailers) in demand forecasting process.	10	1.70	0.675
Integrate with key customers (Retail outlets) in inventory carrying decision	10	2.20	0.422
Integrate with key customers(distributors) in inventory carrying decision	10	4.60	0.516
Sharing real time inventory information for automatic replenishment.	10	2.30	0.483
Valid N	10		

According to the above Table 4.4, 50% of the mean performance score is above 4.0 which is considered high level performance and the remaining 50% of the mean performance score is below 3.0 which is considered low level of performance. According to the data in the table above, the level of performance in relation to trust between the brewery companies and their B2B customers, involving distributors in demand forecasting and inventory carrying decision is high, and the level of performance related to involving retail outlets in demand forecasting, inventory carrying decision and real time inventory information sharing with retailers is considered low.

Moreover, the data collected from semi structured interview also reaffirms the above result. The brewery companies work closely with distribution agents in terms of sharing inventory and other supply chain information. Distributors provide their inventory status report to the brewery companies on daily basis. But neither the brewery companies nor the distributors collect inventory report on daily level in order to have accurate finished product inventory level in all the downstream supply chain partners. The sales forces of the brewery companies visit the retailers in their respective territories to the problems and challenges the retail outlets have, to roughly visit the inventory of their products in the refrigerator and rarely in their storages, checks how much each outlet purchases and reports. The link between the distributors and the retail outlets is loose except asking for their need and delivery. In relation to demand forecasting, the brewery companies do their demand forecast mainly based on the sales record to the distributors and the sales to the outlets but not the sales data of the retailers to the final customers. Therefore, the collaboration between the brewery companies and the distributors is better than the collaboration between the brewery companies and the retail outlets.

The trust among the downstream supply chain partners appear to be limited. The manufacturers do not share their annual sales or demand forecast to their distribution channel partners. They simply set target for each distributor and force them to meet those targets set. Neither the distributors nor the retailers do their own sales / demand forecast and share with the brewery companies. This indicates low level of trust and collaboration and integration between the brewery companies and the distribution channel members.

Table 4.5 INFORMATION TECHNOLOGY UTILIZATION IN THE SUPPLY CHAIN MANAGEMENT

ICT Utilization Performance Indicators	N	Mean	Std. Dev
Employ advanced planning and scheduling software	10	3.30	1.494
Employ Electronic Data Interchange (EDI) system	10	3.20	1.549
Use electronic mail system for data exchange	10	5.00	0.000
Employ Enterprise Resource Planning System or equivalent (ERP)	10	3.50	1.650
Employ forecast / demand management software	10	3.60	1.506
Employ transportation management software	10	3.40	1.506
Employ warehouse/inventory management software	10	3.50	1.434
Brewery companies exchange supply chain data with its distribution channel members using ICT infrastructure.	10	2.10	0.316
Valid N	10		

According to the data in the Table 4.5, 87.5% of the mean performance score is above 3.0 and only 12.5% of the mean performance score is below 3.0. Here the data indicates that the standard deviation is high indicating that there is significant difference between the two case brewery companies in ICT utilization in supply chain management.

Besides, the qualitative data collected via semi-structured interview questions indicate that over 95% the transportation management is not support by transport management system(TMS) except only about 5% of the company owned vehicles that use GPS to track the where about of the vehicles. This has an adverse effect on distribution management and customer order fulfilment. E-mail communication is predominantly used by both the case companies as well as their upstream and downstream supply chain partners. ICT infrastructures like EDI, ERP and advanced planning and scheduling software are used in supply chain management with significant differences between the two cases companies. Heineken uses company specific advanced software equivalent to SAP/ERP, EDI and Advanced Planning, Forecasting and scheduling software). It also automated its warehouses operation to ensure easy coordination between the central warehouses and regional warehouses. BGI Ethiopia mainly uses advanced software in financial managements.

Supply chain management mainly relies on e-mail communication and MS-Office application. Using ICT in exchange of supply chain data between the brewery companies and distributors and retailers is limited to E-mail due to the fact that these distribution channel partners do not have the capacity to invest on advanced ICT infrastructure. The exchange of supply chain information with retailers is mainly through telephone and text message. Distribution agents also use telephone and text message as a means of exchanging data like daily inventory status.

Table 4.6 SUPPLY CHAIN RELIABILITY

Supply Chain Reliability Performance Indicators	N	Mean	Std. Dev.
The brewery company always meet delivery committed date to customers (Distributors).	10	4.80	0.422
The distributors always meet delivery committed/promised date to customers (retail outlet).	10	4.60	0.516
Strategic suppliers meet delivery lead time /delivery schedule with the required standard.	10	1.70	0.483
The brewery company always deliver customer orders at accurate locations.	10	4.60	0.516
Customer orders are fulfilled accurately in terms of quantity and type of product.	10	4.40	0.516
Valid N	10		

According to the data in the Table 4.6 above, 80% of the mean reliability performance score is above 4.0 which is high level of performance and only 20% of the mean performance score is below 3.0 which is low level of performance. The data above depicts that the downstream supply chain is more reliable than the upstream supply chain reliability.

The qualitative data collected using semi structured interview also indicate that the downstream supply chain partners work very hard to avail their products at each retail outlets at the right time and right location regardless of cost of distribution. This is due to the fact that the products are easily substitutable and the customers are less loyal to a given brand of beer and hence customers easily switch to other brand of beer.

The upstream supply chain is less reliable due to several reasons. The strategic local suppliers of brewery companies in Ethiopia, including Assela Malt Factory, Addis Ababa Bottle and Glass Factory, Cork Factory, are single source and also supply to all the beverage industry in Ethiopia. Consequently, they do not perform their contractual agreement in terms of quantity and time agreed due to lack of capacity and unable to expand their production capacity in line with ever increasing demand of the brewery companies as the industry is at growth stage. As a result, the brewery companies look at the foreign suppliers. The brewery companies import Malts, for instance, from European countries like France, Belgium and Netherlands. The sourcing process from foreign suppliers is does not meet the delivery schedule and hence one respondent mentioned that his company rarely experienced stock outs of raw materials. The reasons for less reliability of sourcing from foreign suppliers include variability in hard currency/letter of credit permit from banks, long distance transportation schedule and finalizing customs formality at different stages. The brewery companies filling this gap by holding raw material inventories of up to 6 (six) months to remain being reliable regardless of costs.

Table 4.7 SUPPLY CHAIN RESPONSIVENESS

Supply Chain Responsiveness Performance Indicators	N	Mean	Std. Dev.
The company has short raw material sourcing cycle time	10	1.70	0.483
The company has short products deliveries cycle time	10	4.80	0.422
The company has short production cycle time	10	4.50	0.527
The company has short packaging and sorting cycle time	10	4.50	0.527
The brewery company holds forecasted finished product inventory to quickly respond to demand fluctuation.	10	3.30	1.418
Valid N	10		

According to the data in the Table 4.7 above, 60% of the responsiveness performance score is above 4.0 and still 20 % is above 3.0 and 80% of the responsiveness performance is considered high level and the remaining 20% of the mean respmsiveness performance is below 2.0 which is low level. The data again shows that raw material sourcing cycle time is long which means that the upstream supply chain is less responsive than the downstream supply chain.

The qualitative data the researcher collected using semi-structured interview questions explain the reason for high standard deviation from the mean for the performance indicator 'holding forecasted finished product inventory that Brewery Company A holds inventory at the central warehouse at Addis Ababa production site from different manufacturing plants and at regional warehouse at different locations to respond to demand fluctuations and to be more responsive. Whereas the Brewery Company B does not hold finished product inventory to respond to demand fluctuations at Addis Ababa warehouse. As the demand in Addis Ababa exceeds its full production capacity in Addis Ababa, it satisfies this demand in Addis Ababa by transporting from other manufacturing plants directly to distributors. It has no regional warehouses to respond to the demand fluctuations.

Besides, due to the fact that about 60-70% of the demand for Malt is satisfied from foreign suppliers, it is a long process that takes about 4-6 months of lead time which is long souring cycle time. Even in the case of the local suppliers, sourcing cycle time can be considered long as the breweries wait until AMF supplies based on the quota allocated to the breweries and the turns comes. AMF also sources all the raw malt barley grain from abroad (Birr 44 Mln or \$ 5Mln per annum) due to malt barley shortage both in quality and quantity. All of these affect the responsiveness of the suppliers and sourcing.

Table 4.8 SUPPLY CHAIN INVENTORY MANAGEMENT PRACTICE

Inventory Management Performance Indicators	N	Mean	Std. Dev.
The brewery company set Standard Inventory Replenishment Reorder level as well as Min/Max Inventory Policy	10	1.80	0.422
The brewery company implement Collaborative Planning, Forecasting and Replenishment (CPFR) approach with its partners	10	1.70	0.483
The brewery company implement Vendor Managed Inventory (VMI) system.	10	1.70	0.483
The brewery company coordinate and manage inventories with all the supply chain partners.	10	1.90	0.568
The brewery company implemented automated warehouse and inventory management system that facilitate coordination regional warehouses	10	3.00	1.944
The brewery company implements Just-in-time (JIT) delivery arrangements.	10	1.20	0.422
The brewery company jointly manage raw material inventory with strategic suppliers.	10	1.60	0.516
The brewery company jointly manage inventory with customers (distributors).	10	4.40	0.516
The brewery company jointly manage inventory with customers (retail outlets )	10	1.60	0.516
The brewery company has centrally coordinated regional distribution centers for product distribution.	10	2.80	1.549
Valid N	10		

According to the data in table 4.8 above, 80% of the mean inventory management performance score is below 3.0 which is low level of performance. Only 20% of the mean inventory management performance is above 3.0 which is high level of performance. Generally, the inventory management performance score was considered low. The standard deviation from the mean is high for the inventory management performance indicators of having automated inventory management and having

centrally coordinated regional distribution centers due the difference in inventory management practices between the two breweries.

The qualitative data collected from semi structured interview indicate less practice of managing inventory jointly with suppliers and customers, especially with retailers. The breweries better work with distribution agents by receiving their inventory levels on daily basis, no more no less. Collaboration with retail outlets in managing inventory is minimal. Generally, Collaborative Planning, Forecasting and Replenishment (CPFR) approach with the upstream and downstream supply chain partners is a comprehensive collaborative strategy with the distribution channel partners and its practicality is minimal in the case supply chain management practices. In the case supply chain management practice, neither the distributor nor the retailer does demand forecast to share with the manufacturer (the brewery companies) to come up with shared single demand forecast for the products. The demand/sales forecast is done predominantly by the breweries and assign quota to the distribution agent to push the products to distribute and their performance is measured based on the target set.

Therefore, the practicality of collaborative forecasting, planning and replenishment is minimal in the case supply chain management practices.

Vendor Managed Inventory (VMI) agreement between the brewery company/distributors and the retailers does not exist. Vendor Managed Inventory (VMI) is a collaboration strategy between the supplier (the brewery companies) and the customer (the distributors or retailer) in managing and sharing information on sales and inventory level. In a VMI agreement, the supplier is authorized and take responsibility to have access for real time the inventory level and making inventory replenishment decisions for their customers based on accurate and timely sales and inventory level information shared with the supplier. In the case supply chain management practices, the customers do not share their demand or sales forecast ahead of time with the suppliers and the brewery companies also do not replenish the finished product inventory level of their customers automatically without receiving orders from them. The manufacturers even do not fulfil the customer orders unless payment is made and hence there are incidents of being stock outs at the retail stores due to financial capacities of very few distributors, of course. Therefore, VMI is less implemented in the case supply chain management practices.

Just-In-Time (JIT) delivery is totally impractical at all the stages of the case supply chains due to several reason so that the companies in the chain hold inventories.

Moreover, the inventory management tools like setting and implementing standard minimum and maximum inventory levels to held, reorder inventory levels, the economic order quantity for replenishment of inventories, safety stocks for finished products is also minimal in not only in the brewery companies but also in the distribution agents and retail outlets. The distributors and the retailers hold inventory for a period of 2 to 3 days consumption not even based on undertaking time series demand analysis. Due to ever increasing demand of beer in the market, the manufacturers are also holding few or limited inventory. This inventory management practice is prone to the risk of stock outs if the current 24/7 production is interrupted for even a day or a couple of days. Generally, unable to setting the aforementioned inventory management tools will ultimately result in holding overstock or understock and both are unhealthy.

Table 4.9 SUPPLY CHAIN AGILITY (FLEXIBILITY & ADAPTABILITY)

Supply Chain Agility Performance Indicators	N	Mean	Std. Dev.
Suppliers are flexible to accommodate a 25% increase /decrease in raw material demand change above the forecasted quantity.	10	1.40	0.516
The brewery company is flexible in production facility to accommodate a 25% increase/decrease in demand of finished products from the forecasted quantity.	10	4.20	0.4216
The brewery company is flexible in delivery schedule to accommodate changes by 25% earlier/later than the delivery schedule.	10	4.30	0.4830
The brewery company's production is adaptable to meet extra demand of customers through overtime work or outsourcing, to produce more than the normal production and meet the unplanned need.	10	4.70	0.4830
The brewery company rapidly adjusts its production capacity to address demand changes	10	4.50	0.5270
Distributors adjusts transportation capacity to respond to small volume demands of customers	10	1.70	0.4830
Valid N	10		

According to the data in the Table 4.9 above, 67 % of the mean supply chain agility performance is above 4.0 which is high and the remaining 33% is below 3.0 which is low. This shows that the suppliers’ and distributors’ flexibility and adaptability to respond to unplanned increase in demand is low. Whereas, the data indicates that the case brewery companies are flexible and adaptable to unplanned changes in production capacity and delivery schedule.

The qualitative data collected using semi structured interview indicate that distribution agents distribute the products to the retail outlets in Addis Ababa according to the territories assigned once a day in the morning using 5 ton trucks and release their drivers. When they receive call from few retailers for product deliveries in the afternoon may be in the afternoon, the distributor find it uneconomical to respond to small demands using big trucks and tell them to wait until the next day morning due to the fact that they are not using small trucks like 3 tons truck or 1 ton pickup cars to be flexible and adaptable to the demand fluctuations. Especially the local strategic suppliers are less flexible/adaptable to the changes in demand from the brewery companies from their plans due to the existing capacity limitation. However, the foreign suppliers have the capacity to accommodate unplanned changes in demand and hence they are flexible and adaptable to changes.

Table 4.10 SUPPLY CHAIN OPERATIONAL COST

Supply Chain Cost Performance Indicators	N	Mean	Std. Deviation
Order fulfilment and management cost	10	1.80	0.422
Inventory carrying cost	10	1.90	0.316
Transportation and distribution cost	10	1.60	0.516
Defects and returns management cost	10	4.50	0.527
Sourcing cost	10	1.60	0.516
Material landed cost	10	1.50	0.527
Production (Labour , Machine) cost	10	1.70	0.483
Valid N	10		

According to the data in the table 4.10 above, 86% of the mean supply chain cost performance is below 3.0 which is low and the remaining 14% of the mean supply chain cost performance is above 4.0 which was considered high.

The data above shows that the supply chain operational cost related to order fulfilment, inventory carrying, product distribution, sourcing and production is high and the cost associated with product defects and returns was considered low.

The qualitative data collected using semi structured interview indicated that the distribution/transportation management cost and order fulfilment cost is very high due to the fact that the plants are located at 6 locations and the distributors are disbursed throughout the country. And yet, breweries should deliver the products at the distributors' warehouse and their own central as well as regional warehouses.

The distributors also mobilize trucks every day for door to door delivery at the retail outlets without receiving prior orders received. As a result, the trucks go back to the distributors' store or other sales points. Sourcing and inventory carrying cost was also considered high as most of the raw materials are imported and the lead time for import is varies from 4-6 months especially owing to shortage of foreign currency reserve in the country. During this period, the breweries carry raw material inventories, bottles packaging, and spares for maintenance of production machines in order to ensure uninterrupted production. This inventory carrying is also related to cost of tied up capital on the inventory. This indicate that cost of sourcing and inventory carrying are related and high. Production cost is high because the companies produce 24 hours a day without interruption and also use overtime labour force to fill the gap in demand fluctuation. The production machineries do not stop production for maintenance. The broken spare parts are removed and replaced by new once and this increases the cost of parts. Thus, the cost of production in relation with less production interruption was considered high.

### 4.3 QUALITATIVE DATA ANALYSIS

In order to ensure the reliability of the findings of this study and to better explain the quantitative data, the researcher collected qualitative data from the supply chain related managers of the two case breweries, three local strategic suppliers (specifically, bottle factory, plastic crate factory and malt factory) and two distribution agents (one from each brewery in Addis Ababa) and ten retail outlets (one from each sub city) which are purposefully selected by the researcher for this study. The semi-structured interview questions are used to clarify and give more meaning to the quantitative result. It also enables to get in-depth insight about the performance of the supply chain

management practices in the case breweries. The following table summarised the findings of the interview questionnaire.

Table 4.11 SUMMARY OF THE QUALITATIVE DATA ABOUT THE PERFORMANCE OF SUPPLY CHAIN MANAGEMENT OF THE CASE BREWERY COMPANIES.

Supply Chain Performance Variables	Results/Findings
Collaboration and integration with strategic suppliers	<ul style="list-style-type: none"> <li>• Almost no involvement of suppliers in research and development activities on raw material supplies beyond planning to do so.</li> <li>• Brewery Company A provided financial support to farmers of malt barley grain with expert support to broaden the local supply base on contractual agreement even though the suppliers are not loyal and undertake side selling to other competitors at higher price. So, the integration and collaboration were not considered strong.</li> <li>• Low level of joint planning and forecasting of raw material and packaging material inventories and product demand was identified.</li> <li>• Breweries unilaterally plan demands and minimal level of sharing of long term demands and placing fragmented several orders within a year were identified.</li> <li>• Local suppliers' capacity development and partnership arrangement is limited to advance payment and assigning experts to control the quality of inputs to be supplied.</li> <li>• The reason for not sharing long term plans was for fear for leaking the information to their competitors as they share the same suppliers locally and abroad.</li> </ul>

<p>Collaboration and integration with customers (B2B)</p>	<ul style="list-style-type: none"> <li>• The level of involvement of distribution agents in demand forecasting was minimal and limited to sending inventory status once a day.</li> <li>• The role of distribution agents in inventory carrying decision for the brewery companies were considered high.</li> <li>• The level of involvement of retail outlets in demand forecasting and inventory carrying decision was minimal and no way or system to share the demands and the accurate inventory level of the retailers to be shared with their distributors or the breweries.</li> <li>• The brewery companies distribute promotional free products via the distribution agents as part of the collaboration.</li> <li>• The level of trust was the reason for not collaboratively planning, forecasting and sharing data with the downstream partners.</li> </ul>
<p>Information technology utilization in supply chain management.</p>	<ul style="list-style-type: none"> <li>• Brewery Company A uses advanced information technology like EDI, ERP/SAP, Planning and forecasting software in managing supply chain.</li> <li>• Brewery Company B is limited to E-mail and MS-Office in managing supply chain.</li> </ul>
<p>Supply chain reliability</p>	<ul style="list-style-type: none"> <li>• The breweries meet the promised delivery date to deliver at the warehouses of the agents given payment is effected timely.</li> <li>• The distributors transport the products to the doors of the retailers without receiving prior orders on daily basis per allocated territories. However, there were retailers that were not visited due to demand fluctuations every day.</li> <li>• Due to long distance, shortage of foreign currency, customs clearance formalities and production capacity of the local suppliers the upstream supply chain was less reliable than the downstream supply chain in terms of meeting delivery schedule.</li> </ul>

<p>Supply chain responsiveness</p>	<ul style="list-style-type: none"> <li>• The sourcing cycle time of the breweries was long to import due to the fact that the capacity of the local suppliers was limited to satisfy the ever growing demands.</li> <li>• The production cycle time, the packaging and sorting cycle time and delivery cycle time was short and hence it was more responsive delivery of products.</li> <li>• The brewery companies hold input inventories up to 6 months including safety stocks due to long sourcing cycle time to ensure uninterrupted production.</li> <li>• Brewery Company A holds finished product inventory at the central warehouse as well as at the regional warehouse to be more responsive. Whereas, Brewery Company B hold almost no inventory at the warehouses at production sites as it sells to the distributors which implies that this company was less responsive during demand fluctuation and machine breakdown.</li> </ul>
<p>Supply chain agility /flexibility</p>	<ul style="list-style-type: none"> <li>• Local suppliers were less flexible to accommodate unplanned increase of quantity demanded than the foreign suppliers. So, local suppliers were less flexible.</li> <li>• The brewery companies were flexible in to accommodate unplanned increase/decrease of demand.</li> <li>• The brewery companies were flexible in delivery schedule to accommodate unplanned changes in the delivery schedule to deliver earlier or later.</li> <li>• There was limitation with distribution agents to be flexible to transport small orders with small carrying capacity vehicles.</li> <li>• Flexibility with warehouse capacity utilization was minimal in the cases of both the brewery companies and distributors as they use private warehouse and there was no public warehouse that results variable cost of holding inventory.</li> </ul>

<p>Supply chain operational cost</p>	<ul style="list-style-type: none"> <li>• The supply chain operation cost was considered high.</li> <li>• Order fulfilment and management cost was perceived high in relation with transportation.</li> <li>• Raw material inventory carrying cost was perceived high in terms of tied up capital, warehousing cost, labour cost.</li> <li>• Transportation and distribution cost was perceived high.</li> <li>• Sourcing and material landed cost was perceived high as most of the major inputs, spares and packaging materials were imported and the cost increased due to fast transportation cost or holding high inventory with safety stock for long lead time.</li> <li>• Production cost was considered high because to avoid production stoppage due to machine breakdown, replacement of machine parts by new ones were done instead of waiting until maintenance is done.</li> <li>• Cost of defects, returns and reverse logistics was minimal.</li> </ul>
<p>Inventory management practice</p>	<ul style="list-style-type: none"> <li>• Setting Standard Inventory Replenishment Reorder level as well as Min/Max inventory management tool was less practical. It is more applicable for raw material inventories than finished goods inventory.</li> <li>• Collaborative Planning, Forecasting and Replenishment (CPFR) of inventory was less practical.</li> <li>• Vendor Managed Inventory (VMI) was less practical.</li> <li>• The inventory along the supply chain partners was less visible due to limited collaboration and information sharing.</li> <li>• Automated warehouse and inventory management system and coordination between central warehouse and regional warehouses was practical with SAP system only with Brewery Company A.</li> <li>• Just – In - Time Inventory was less practical.</li> <li>• Joint inventory (raw material and finished goods) planning, forecasting and management with the supply chain partners were less practical.</li> </ul>

## CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

### 5.1 SUMMARY

Supply Chain management has become an integral part of companies' business due to increased competition among companies. Supply chain management excellence in terms of cost reduction, responsiveness, reliability, integration and collaboration with supply chain partners, information technology utilization supply chain management, inventory management effectiveness, efficiency, flexibility and customer service creates a competitive advantage to companies in the competitive business environment like the growing brewery industry in Ethiopia. The brewery industry in Ethiopia is at growth stage and it is highly complete among the existing operational six brewery companies in the country. The researcher was interested in assessing and getting in-depth insight about the level of supply chain management performance of two brewery companies located in Addis Ababa due to time and resource constraint. This multiple case study has examined performance of supply chain management of Heineken Brewery S.C and BGI Ethiopia. They were selected based on feasibility in terms of location, availability of data and their large market share in the country (both cover 80% according to the data from the case breweries) to give better insight about the performance of supply chain management in the brewery industry.

The researcher used quantitative and qualitative data for the study. The quantitative data was collected managers of supply chain related responsibilities using five point Likert scale and qualitative data were collected using semi structured interview questions from the same respondents as well as their three strategic suppliers in the country, two distributors and 10 retail outlets in order to triangulate the respondents to ensure the reliability of the findings of the study.

The researcher analysed the quantitative data using SPSS software and descriptive statistics to compute the mean and standard deviation to determine the average perceived supply chain management performance.

Based on the analysis of both qualitative and quantitative data, the researcher discovered the results as discussed variable by variable below. In this study eight supply chain performance variable (indicators) are used. The researcher finally came up with the following summary of findings.

The result indicated that 80% of the mean performance score related to integration and collaboration with suppliers is considered high level and the remaining 20% of the mean performance score is considered low level for both case breweries. 50% of the mean performance score related to integration and collaboration with customers (B2B) is considered high level by the researcher and the remaining 50% of the mean performance score is considered low level for both breweries. 87.5% of the mean performance score related to advanced information technology utilization in supply chain management is considered low level with of course significant difference between the two case companies as indicated in the hypothesis testing result and the remaining 12.5% of the mean performance score is considered high level. Comparatively, Brewery Company A is in a better position than Brewery Company B in ITC utilization. 80% of the mean reliability performance score is considered high level and the remaining 20% of the mean performance score is considered low level for both the case companies. 80% of the mean responsiveness performance score is considered high level and the remaining 20% of the mean respmsiveness performance was considered low. 80% of the mean inventory management performance score was considered low level and the remaining 20% of the mean inventory management performance was considered high. 67 % of the mean supply chain agility performance score considered high level and the remaining 33% of the mean supply chain agility performance score was considered low level for both the case companies. 86% of the mean supply chain cost performance score considered low level and the remaining 14% of the mean supply chain cost performance was considered high.

## 5.2 CONCLUSION

- ✓ The integration and collaboration of the case brewery companies with strategic suppliers was generally considered good with limitations in terms of local supplier's capacity development, joint planning and forecasting as well as sharing of long terms demands due to less trust for fear of their competitors.
- ✓ The integration and collaboration of the brewery companies with strategic customers was generally considered good with limitation in terms of jointly forecasting of demands, jointly planning of inventories and lack of visible supply chain inventory status along the downstream supply chain network.
- ✓ The downstream supply chain was more reliable in terms of accuracy in quantity, place and time of delivery than the upstream supply chain. Suppliers are less reliable due to production capacity limitation (local) and long distance and involvement of several stake holders (Customs Authority, Banks, Transport Companies).
- ✓ The brewery companies were flexible to manage unplanned demand fluctuations to certain extent. However, their local suppliers were less flexible to handle unplanned changes of demand due to capacity limitation. The distributors were also less flexible to handle small orders at any time of request.
- ✓ Supply chain operation costs related to transportation, production, inventory carrying and sourcing are considered high.
- ✓ Inventory management performance was considered low due to lack of automated inventory management practice (BGI Ethiopia), collaborative forecasting and planning of inventory with supply chain partners, vender managed inventory system. As a result, there was less visible supply chain inventory along the chain due to lack of supply chain integration.

## 5.3 RECOMMENDATIONS

The researcher recommend the case brewery companies to jointly/collaboratively plan and forecast inventories with key strategic suppliers. As the sole and strategic local suppliers (E.g. AMF, AABGF) have capacity limitations to satisfy the local demand. So, it is recommended to arrange partnership agreement to finance for the development of their production capacity. It was also recommended to establish more trust with strategic suppliers (local and foreign) to share long term production plan and the derived material requirement plans to avoid carrying inventory up to 6 months and associated

costs by implementing VMI system and automatic replenishment. The existing integration and collaboration between the breweries and their distributors were considered good as they at least share inventory status on daily basis. The researcher recommended the breweries to share their annual sales / demand plan with distributors and to involve them in demand/sales forecasting. Therefore, the researcher recommended that there should be collaborative and joint planning and forecasting of demands and inventories with distribution agents and retail outlets with improved trust among the distribution channel partners. There should also be automated warehouse system and VMI system for automatic replenishment of finished products to the distributors' warehouse and visible inventory status along the distribution channel members. Regarding advanced information technology utilization, the researcher recommended BGI Ethiopia to have automated inventory/warehouse management system, ERP/SAP or equivalent as well as EDI to support the integration with different functions and efficient exchange of documents. The researcher recommended both breweries to have transport management system (TMS) for all the distribution channel members in order to ensure efficient and effective distribution management and customer order fulfilment.

Currently, sourcing of inputs, packaging materials and spare parts etc. has long cycle time as procurement was from foreign suppliers and production capacity limitation of the local suppliers. With the same reason suppliers often fail to meet delivery schedule.

The best solution recommended for was to either capacitate the local suppliers or establish sister companies (backward integration) to supply the inputs and the packaging bottles for brewery companies to be more responsive, reliable and cost effective. As managing inventory in the supply chain was very important, the researcher recommended the brewery companies to set enforceable but flexible standard inventory replenishment reorder level as well as Min/Max inventory level to avoid understocking and overstocking. The brewery companies should work closely with logistics companies to invest on public warehouses to ensure flexibility and cost reduction related to holding costs in private warehouses. There should also be collaborative planning, forecasting and replenishment (CPFR) of inventories with upstream and downstream supply chain partners. Vendor Managed Inventory (VMI) system and automated warehouse management system was also recommended to be in place.

The researcher recommended joint planning of raw materials, packaging materials, parts and finished product inventories with suppliers and customers (B2B) to ensure visible end-to-end inventory management. The brewery companies should work with distribution agents to be more flexible and adaptable to quickly respond to small volume demands of customers at any time by arranging small capacity transportation means instead of ignoring for economic reasons. Supply chain operation of the case brewery companies is very costly. The searcher recommended that the brewery companies should work on import substitution to alleviate sourcing related costs and reduce inventory carrying cost by implementing collaborative planning, forecasting and replenishment with the supply chain partners.

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## APPENDICES

### Appendix A: Survey Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

POST GRADUATE STUDIES IN LOGISTICS & SCM

SUPPLY CHAIN PERFORMANCE ASSESSMENT QUESTIONNAIRE

Dear Sir/Madam,

I am undertaking my master's thesis on the title "Assessing the perceived performance of supply chain management in the beer manufacturing companies in Addis Ababa" as a partial fulfilment requirement for M.A degree in Logistics & Supply Chain Management.

Considering that your response and participation is essential to contribute to the body of knowledge in the areas of supply chain management and to the success of this study, I kindly request you to participate in this data collection process. All responses will be kept confidential and will not be traceable to individual respondents.

You will be asked questions concerning the company's current supply chain management. If you are unable to complete the questionnaire yourself, please entrust the task to another who is knowledgeable about supply chain management, supply chain integration and supply chain performance. There are no right or wrong answers to the following questions. We are only interested in your assessment of your organisation's supply chain management practices.

Completing the questionnaire will take about 20 minutes. Kindly spare a few minutes from your valuable time and busy schedule to complete the questionnaire as your participation is valuable and indispensable for the success of this study.

Please put the check mark (✓) in the box of your choice and your attempt to answer all the questions is highly appreciated. I confirm that the entire data collection and analysis

will be held confidential and ethical. Please be aware that it is not necessary to mention your name and that of your company.

Once you have completed the questionnaire, I am willing to physically collect or you mail it directly to me using my e-mail address indicated below. Thank you in advance for your cooperation and in case of enquiry, please do not hesitate to contact me at my address below.

Finally, I thank you for your concern and patience while responding to the questionnaire.

Sintayehu Asmamaw

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### SECTION-1: COMPANY PROFILE

The following questions are about demographic profile of your organisation. Kindly indicate the appropriate characteristics of your organisation using (✓).

1.1 The numbers of employees:

- Less than 50
- 50 - 100
- 100 - 250
- 250 - 500
- More than 500

1.2 Operating experience of this company in Ethiopia :

- Less than 1 year
- 1 – 5 years
- 5 – 10 years
- 10 – 15 years
- 15 – 20 years
- More than 20 years

### SECTION-2 RESPONDENT'S PROFILE

The following questions are about the respondents profile in the organisation. Kindly indicate the appropriate characteristics of the respondent's profile using (✓).

2.1 Respondent's current position in the company

- Commercial Manager
- Supply Chain Manager
- Sales & Marketing Manager
- Deputy Marketing Manager
- Production Manager
- Deputy Production Manager
- Distribution Manager
- Transport Manager
- Warehouse & Inventory Manager
- Warehouse & Inventory Officers
- Sourcing Manager
- Procurement Manager
- Category Manager
- Import Manager
- Deputy Production Manager

2.2 Respondent's qualification level:

- College diploma
- B.A/B.Sc.
- MA/MBA/MSc & Above

2.3 Respondent's work experience

- Below 2 years,
- 2-5 years ,
- 5-10 years ,
- Above 10 years

- Operations Production Manager
  - Officers
  - Inventory Controller
  - Any other, please write here
- 

**SECTION 3: PERFORMANCE OF SUPPLY CHAIN MANAGEMENT PRACTICES**

The following questions are about how your organisation has been implementing supply chain management practices. Please indicate the level of your agreement or disagreement using (✓) on the following statements based on your experience in your company on the following supply chain management practices. The rating is from 1= Strongly Disagree to 5=Strongly Agree as shown below.

**3.1. INTEGRATION WITH SUPPLIERS (SSI)**

CODE	DESCRIPTION	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
SSI1	Have a long term framework agreement with key strategic suppliers					
SSI2	Encouraging and developing the capacity of local strategic suppliers					
SSI3	Sharing long term production and raw material requirement plans with our key strategic suppliers					
SSI4	Joint forecasting of demand and planning inventory with our key suppliers					
SSI5	Trust key suppliers to share supply chain information.					

**3.2. INTEGRATION WITH CUSTOMERS (SCI)**

CODE	DESCRIPTION	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
SCI1	Trusting key strategic customers (B2B) to share supply chain information.					
SCI2	Involving key customers (distributors) in demand forecasting process.					

SCI3	Involving key customers (retailers) in demand forecasting process.					
SCI4	Integrate with key customers (Retail outlets) in inventory carrying decision					
SCI5	Integrate with key customers(distributors) in inventory carrying decision					
SCI6	Sharing real time inventory information for automatic replenishment.					

### 3.3. INFORMATION TECHNOLOGY (ICT ) UTILIZATION IN SCM

CODE	DESCRIPTION	Strongly	Disagree	Disagree	Neutral	Agree	Strongly
		1	2	2	3	4	5
ICT1	Employ advanced planning and scheduling software						
ICT2	Employ Electronic Data Interchange (EDI) system						
ICT3	Use electronic mail system for data exchange						
ICT4	Employ Enterprise Recourse Planning System or equivalent						
ICT5	Employ forecast / demand management software						
ICT6	Employ transportation management software						
ICT7	Employ warehouse/inventory management software						
ICT8	Brewery companies exchange supply chain data with its distribution channel members using ICT infrastructure.						

### 3.4 SUPPLY CHAIN RELIABILITY (RL)

CODE	DESCRIPTION	Strongly	Disagree	Disagree	Neutral	Agree	Strongly
		1	2	2	3	4	5
RL1	The brewery company always meet delivery committed/promised date to customers (Distributors).						
RL2	The distributors always meet delivery committed/promised date to customers (retail outlet).						

RL3	Strategic suppliers meet delivery lead time /delivery schedule with the required standard.					
RL4	The brewery company always deliver customer orders at accurate locations.					
RL5	Customer orders are fulfilled accurately in terms of quantity and type of product.					

### 3.5 SUPPLY CHAIN RESPONSIVENESS (RS)

CODE	DESCRIPTION	Strongly	Disagree	Disagree	Neutral	Agree	Strongly
		1	2	2	3	4	5
RS1	The company has short raw material sourcing cycle time						
RS2	The company has short products deliveries cycle time						
RS3	The company has short production cycle time						
RS4	The company has short packaging and sorting cycle time						
RS5	The brewery company holds forecasted finished product inventory to quickly respond to demand fluctuation.						

### 3.6 SUPPLY CHAIN AGILITY (FLEXIBILITY & ADAPTEBILITY (AGL))

CODE	DESCRIPTION	Strongly	Disagre	Disagre	Neutral	Agree	Strongly
		1	2	2	3	4	5
AGL 1	Suppliers are flexible to accommodate a 25% increase /decrease in raw material demand change above the forecasted quantity.						
AGL 2	The brewery company is flexible in production facility to accommodate a 25% increase/decrease in demand of finished products from the forecasted quantity.						
AGL 3	The brewery company is flexible in delivery schedule to accommodate changes by 25% earlier/later than the delivery schedule.						
AGL 4	The brewery company's production is adaptable to meet extra demand of customers through overtime work or outsourcing, to produce more than the normal production and meet the unplanned need.						

AGL 5	The brewery company rapidly adjusts its production capacity to address demand changes					
AGL6	Distributors adjusts transportation capacity to respond to small volume demands of customers					

### 3.7 SUPPLY CHAIN MANAGEMENT COST(COS)

Please indicate the level of supply chain operation cost with the rating :  
1=Very High up to 5= Very Low

CODE	DESCRIPTION	Very High	High	Neutral	Low	Very Low
		1	2	3	4	5
COS1	Order fulfilment and management cost					
COS2	Inventory carrying cost					
COS3	Transportation and distribution cost					
COS4	Defects and returns management cost					
COS5	Sourcing cost					
COS6	Material landed cost					
COS7	Production (Labour , Machine) cost					

### 3.8 INVENTORY MANAGEMENT RACTICE PERFORMANCE (INV)

CODE	DESCRIPTION	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
INV1	The brewery company set Standard Inventory Replenishment, Reorder level as well as Min/Max Inventory Policy					
INV2	The brewery company implement Collaborative Planning, Forecasting and Replenishment (CPFR) approach with its partners					
INV3	The brewery company implement Vendor Managed Inventory (VMI) system.					
INV4	The brewery company coordinate and manage inventories with all the supply chain partners.					

INV5	The brewery company implemented automated warehouse and inventory management system that facilitate coordination regional warehouses					
INV6	The brewery company implements Just-in-time (JIT) delivery arrangements.					
INV 7	The brewery company jointly manage raw material inventory with strategic suppliers.					
INV8	The brewery company jointly manage inventory with customers (distributors).					
INV9	The brewery company jointly manage inventory with customers (retail outlets )					
INV10	The brewery company has centrally coordinated regional distribution centers for product distribution					

THIS IS THE END.

THANK YOU FOR YOUR VALUABLE INPUT AND KIND COOPERATION.

YOUR KIND PARTICIPATION IS MUCH APPRECIATED.

THANK YOU AGAIN.

*As a token of my appreciation for your kind assistance, I would like to send you a copy of the findings of this study OR to invite you to attend the thesis defence programme.*

*Could you please provide me with your contact address or e-mail*

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## **Appendix B:** Interview Questions to Brewery Company Managers

1. Please explain the following complementary semi structured questions. Please tell me about your company and what do you supply to the case brewery companies?
2. How do you evaluate the level of your relationship, collaboration and integration with your suppliers, local and foreign?
3. Please explain the areas of collaboration with your distributors and retailers as a supply chain member?
4. How do you explain the supply chain management in terms of reliability, responsiveness, flexibility, operational cost?
5. What is the level of ICT utilization in the supply chain and communication with your partners?
6. How do you evaluate the cost of supply chain operation?
7. Please tell me about the inventory warehouse management process?
8. What is the level of involvement of your customers and suppliers in joint planning, forecasting and sharing supply chain information?
9. Tell me about the ICT that use use in your SCM?

## **Appendix C:** Interview Questions to Suppliers

1. Does your company jointly forecast plan future demands of the case brewery companies? Please explain briefly
2. Do the case brewery companies share their long term needs to manage inventory jointly you as a supplier? Please explain briefly
3. How do evaluate the collaboration and integration effort of the case brewery companies in terms of capacity development, involvement in research activities, quality control, etc? Please explain briefly
4. What is the level of ICT utilization in the supply chain operation and communication with your customer? How do you communicate, by e-mail telephone or any other?
5. Do you satisfy the demands of the case brewery companies in terms of quality and quantity? Please explain briefly
6. Do you have the capacity to accommodate unplanned demand changes? How, please explain?
7. Does your company deliver orders on time with the right quantity and quality?

8. If you have anything to add please?

**Appendix D:** Interview Questions to Distribution agent

Please answer the following complementary questions. Thank you for participation.

1. Please tell me about the level of collaboration and partnership with the brewery companies and the retailers
2. Are you involved in the market research activities with the brewery company?
3. Are you involved in joint forecasting and planning of demands with the brewery company?
4. What is the level of flexibility of the brewery company in case of demand fluctuation or unplanned change of demand?
5. Does the brewery company hold inventory to quickly respond to demand fluctuation?
6. Does your company hold inventory based on standard Mim /Max and ROL?
7. Does the brewery company deliver products to your warehouse on time?
8. Does your company deliver products to your retail outlets on time and with adequate flexibility?
9. Do you receive order from different customers prior to shipment?
10. Does the brewery company automatically replenish your stock or is it based on your order?
11. Do you share inventory status among the brewery company, the retailers and your company?
12. Do you have anything to add?

**Appendix E:** Interview Questions to Retail Outlets

Thank you for your collaboration to participate in this interview. Kindly answer the following question based on the case brewery companies I mentioned to you.

1. How frequently do the market promoters or MR visit you?
2. What do they do when they come?
3. Do you report your inventory status? If Yes, to whom?
4. Do you do demand forecast and inventory planning? If yes, do you share it? To whom?
5. What do you do with the distributors and the brewery companies jointly?