



**AGILE SUPPLY CHAIN STRATEGIES AS DETERMINANTS OF  
LOGISTICS PERFORMANCE OF BGI ETHIOPIA**

**By**

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**(GSR/2570/14)**

**A THEIS SUBMITTED TO ADDIS ABABA UNIVERSITY, SCHOOL OF  
COMMERCE, IN PARTIAL FULFILMENT FOR THE DEGREE OF  
MASTERS OF ARTS IN LOGISTICS AND SUPPLY CHAIN PROGRAM**

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**June 2023**

**Addis Ababa, Ethiopia**

## **DECLARATION**

I, Bemnet Hailu, hereby declare that this thesis titled “Agile supply chain strategies as determinants of logistics performance at BGI Ethiopia” represents a thesis submitted by myself as a partial fulfillment of Master of Arts in Logistics and Supply Chain Management, to Addis Ababa University School of Commerce, is my own original work and has not been presented to either Addis Ababa University or to any other university. No chapter of this thesis has been in completely or partially has been copied and incorporated in this report from earlier work done by other researchers and all resources used in this research are properly acknowledged.

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This is to certify that this research study carried out by Bemnet Hailu on the topic entitled: “*Agile supply chain strategies as determinants of logistics performance at BGI Ethiopia*” is his Original Work and suitable for submission for the Award of Master of Arts degree in Logistics and Supply chain Management from Addis Ababa University.

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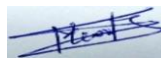
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## **ACKNOWLEDGEMENTS**

First and for most, I would like to thank God for giving me the strength and will to withstand the challenges and obstacles I faced to complete this study. Next, I would like to express my gratitude for my advisor Dr. Shiferaw Mitiku for his great advice, prompt responses and for directing and helping me finalize this thesis. I would also like to thank Mr. Mesfin and Mrs. Winta of BGI Ethiopia for facilitating the data collection process. I would also like to thank all the respondents of the study for taking time out of their day and filling out the questionnaires. Finally my acknowledgement and gratitude extends to my family who supported me and encouraged me to embark on this journey.

The researcher

(Bemnet Hailu)

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## **LIST OF ABBREVIATIONS**

ASC- Agile Supply Chain

BGI- Brasseries et Glaciers Internationals

SCOR- Supply Chain operations Reference

LSC- Lean Supply chain

HSC- Hybrid Supply chain

SCM- Supply Chain Management

ASCM- Agile Supply Chain Management

CSCMP- Council of Supply Chain Professionals

LP- Logistics Performance

## **ABSTRACT**

*The goal of this study was to evaluate how agile supply chain methods affected BGI Ethiopia's logistics performance. There is still a research void in this sector, despite that several studies are being undertaken in the field of supply chain agility. A supply chain's operational capability to quickly identify and respond to changes within and outside the organization, either beforehand or subsequently, using intra- and inter-organizational talents in an approach that guarantees profitability is known as supply chain agility. In order to explore and provide answers to the subject matter and goals, the study used the commonly utilized facets of supply chain agility: Alertness, Accessibility, Decisiveness, Swiftness, and Flexibility as a dependent variable and Technology Utilization, Resource Management, Supplier Relationship, Environmental Pressure, and Delivery Speed as an independent variable. The research also explored the Logistics performance of the organization. The research was based on 125 questionnaires distributed to BGI Ethiopia in which 119 responses were collected which resulted in 92.5% response rate. The research shows that BGI has a high overall adoption of the agile supply chain dimensions i.e., Flexibility, Alertness, and Accessibility had high ranking means and the rest with moderate ranking means. The organization also has a high overall logistics performance. Efficiency and Differentiation had high ranking means while Effectiveness gained a moderate ranking mean. Regression analysis indicated that Technology Utilization, Resource management and Delivery speed are significant determinants or enablers that affect Supply Chain Management and, Alertness, Decisiveness, and Flexibility significantly and favorably affect Logistics performance. It was suggested to strengthen its overall agility, emphasizing decisiveness and swiftness improvement is crucial; also, remaining under budget to boost efficiency will favorably affect logistics performance. Mainly focusing on Technology Utilization, Resource management and Delivery speed and bettering this enablers will positively affect the agile supply chain management and finally, giving a greater emphasis on Alertness, Decisiveness and Flexibility will positively affect the Logistics Performance.*

**Key words:** *Supply chain agility, Determinants of Agile supply chain, Logistics Performance*

# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND OF THE STUDY

Today's business environment is dynamic, and companies usually recognize that in order to compete in the global market and networked economy of today, they must rely on effective supply chains. Organizations in the modern world have developed a business plan that has allowed them to be more competitive against their commercial rivals. According to (Lambert and Schwieterman, 2012), the goal of a company's competitive strategy is to draw more customers to its products. The supply chain division of a corporation frequently works to maintain the company's competitiveness in the market. Supply chain management and competitive advantage in the market go hand in hand.

According to (Lu, 2011), a supply chain is a collection of interrelated, collaborating businesses that adds meaning to a channel of changed resources from their point of origination to the final goods or services that the targeted end customers are looking for. According to (Van der Vorst, 2004), supply chain management as the integrated planning, organizing, and controlling of all business processes and operations related to the supply chain with the aim of increasing customer satisfaction at a lower cost to the supply chain as a whole.

According to (Christopher and Towill, 2002) there are three kinds of Supply chain strategies as different products require different strategies. Among these strategies, Agile Supply Chain strategies (ASC) is one of them. Agility is defined as the ability of a supply chain as a whole and its members to swiftly adjust to the system and its activities to the changing and rapidly changing demands of customers. The major focus is on operating companies in network infrastructures with adequate agility to adapt to changes while also proactively anticipating changes and looking for new emergent opportunities. According to (Sharma et al, 2017) Supply chain agility (SCA) refers to a supply chain's tactical capability to recognize and respond to internal and external shifts quickly, either in advance or in response, by leveraging intra- and inter-organizational talents in a

profitable manner. According to (Gligor, 2015) Supply Chain Agility has five dimensions, which are Alertness which is about organizations ability to predict market shifts, Accessibility which is organizations ability to quick availability of accurate business information, Decisiveness which is organizations ability to quickly change existing operations, Swiftness which is Organizations ability to carry out action plans promptly and finally, Flexibility which is organizations ability to change ongoing processes when new possibilities arise without disrupting the entire business.

Logistics is defined as the act of planning, executing, and managing the procedures required for the timely conveyance of products, services, and other pertinent data from their point of inception to their endpoint in order to meet client needs. (CSCMP, 2018) Logistics performance is a way of understanding and measuring how the logistics function of an organization is operating and performing. According to (Fugate, *et al.*, 2010), Logistics Performance has three components. These components are Efficiency, which is ability of logistics component to manage assets wisely, Effectiveness which is the level that the logistics process objective is satisfied and Differentiation which is the contrasting the outputs of logistics operations to that of rivals.

It is well known that disruptions and unforeseen problems impact organizational performance and having a set of plans is very important to remain competitive and hold a tight grasp on market share. These disruptions impact organizations in numerous ways and organizations design strategies to remain competitive under these circumstances and also potentially capitalize on opportunities as well. To see the extent to which how much organizations are agile and what enables their agility is important. Although Logistics performance is done on most of these manufacturing businesses, it is never really shown together with agility and to further understand these dimensions and how one affects the other, this study was conducted.

Ethiopia's alcohol industry is seeing a significant increase in foreign investment as international groups are becoming more interested in the sector and leading foreign beverage companies are expanding their presence in the country's rapidly expanding economy (Ethiopian Food, Beverage and Pharmaceuticals Industry Development Institute, 2016). With newcomers entering the market and collaborating with domestic producers to create better products, the beer business, in

particular, has seen various changes in the previous ten years. BGI Ethiopia, Heineken, Habesha, Anbesa, Komari beverages are some of the manufacturers who are currently operating within Ethiopia.

## **1.2 BACKGROUND OF THE COMPANY**

Everything began 99 years ago. The St. George Brewery was founded in 1922 by Mussie Hal, a German citizen with Ethiopian ancestry. Near the current Mexico Square in Addis Ababa, he acquired 20,000 square meters plot of land. Soon after the facility began manufacturing, St. George Beer using outdated equipment, 137 workers, and, foreign imported raw ingredients. During that time the daily output did not surpass 200 to 300 bottles.

After occupying Addis Ababa in 1936, the Italians gained control of St. George Brewery. The brewery was able to expand its activities and satisfy the rising demand for "modern" beer after installing new equipment, expanding the production facilities, and, hiring more staff. The manufacturing of beer increased to between 3000 and 4000 thousand bottles per day under Italian management. The first draft beer which was sold in wooden casks was also created by the Italians.

After the Italian occupying forces were driven out in 1941, the St. George Brewery was given over to Emperor Haile Selassie I and an additional four people as their private property. Beer gained popularity among the populace in the 1940s and 1950s and St George Beer emerged as Ethiopia's unquestioned champion. To accommodate the escalating demand the brewery underwent a significant renovation and expansion. With the addition of new drinks like St George Stout Beer which is the first stout made in Ethiopia and Pilsner Beer, the brewery's product selection and St George Beer's admiration and acceptance both gradually increased throughout the 1960s and 1970s.

When the military junta known as "Dergue" came to power in 1974, St. George Brewery was nationalized and given to the Ministry of Finance. To process locally obtained malt the historic malt house at St. George Brewery was resurrected in 1975. Its modernization and expansion were finished in 1977 allowing it to fulfill its own malt requirements and supply extra to different

breweries. The brewery kept developing and modernizing its brewing processes such as by enhancing the flavor of St George beer by introducing fresh yeast which transformed the brand. The iconic and recognizable brand name St. George Beer and the St. George insignia logo were changed with "Addis Beer" in the late 1970s and weren't brought back until BGI Ethiopia assumed control in the late 1990s.

After The Dergue Regime was overthrown in 1991, St. George Brewery continued business as usual with only a few management shuffles and changes. In order to enable private investments in the brewery sector, BGI (the brewery and beverage manufacturing arm of Castel Group) created BGI Ethiopia P.L.C. in 1997, making it the first company of its kind in Ethiopia. BGI Ethiopia built the first privately owned brewery in the town of Kombolcha (Wollo) by acquiring 47 Hectares of land. Bati Beer, a popular local brand, and Castel Beer were the first two brands made at the Kombolcha brewery (an internationally renowned premium brand). BGI Ethiopia acquired the storied and renowned St. George Brewery and brand in December 1998, in addition to running its own brewery and creating its own beer brands. After the St. George Brewery was privatized, BGI Ethiopia extensively engaged in a number of rehabilitation, modernization, and expansion projects to bring the historic brewery back to life, raise the caliber of its output, and raise the skill level of its personnel to an international standard. Additionally, BGI Ethiopia made significant investments in pioneering innovative marketing strategies and CSR initiatives that were unheard of in the sector at the time. Additionally, several new products were released, including the first pasteurized draft beer.

The two breweries (Addis and Kombolcha) continued to expand and modernize during the 2000s, bringing their combined production capacity from 500,000 Hectolitres to 1,400,000 Hectolitres. BGI Ethiopia opened its third and largest brewery, a cutting-edge facility in the town of Hawassa, in June 2011. In 2012, BGI Ethiopia launched the first beer brand of its sort in the nation, Amber, as part of its ongoing effort to diversify its product line. By the middle of 2012, BGI Ethiopia had also entered the wine industry, having invested an initial 22 million USD in the construction and management of Zeway town's first privately owned winery and vineyard. By the middle of 2022, BGI Ethiopia had obtained TCCPA's approval to finalize the purchase of the Meta Abo Brewery.

This purchase of Meta Breweries will increase BGI's existing output from 5,200 000 HL to 6,400 000 HL, increasing economic activity in and around Sebeta Town while preserving jobs. BGI hasn't stood by while the global COVID-19 pandemic has been going on. The organization have vowed to work tirelessly for Ethiopia and Ethiopians, serving as a beacon of hope. The organization keep broadening its product offerings in order to bring Ethiopia up to the international standard of having a wide variety of beverages in order to realize that ambition. They have also launched the distinctive and well-known Doppel Beer as a new brand for its nation. Additionally, the organization entered the malt beverage market with its first-ever non-alcoholic beverage, SEN'Q.

The phrase "agile supply chain" (ASC) refers to the ability to preserve flexibility, reactivity, and an agile personality while recognizing short-term, transient changes that take place in the market during the supply chain process. The ability of a company and the people who are a part of its supply chain to quickly and effectively respond to cyclical shifts in the market and the environment in which the supply chain operates is known as supply chain agility. To do this, they must change their resource allocation plans and business practices while still operating within the existing supply chain framework (Tracey, Ruamsook and Smith, 2021). (Swafford, Ghosh and Murthy, 2006) said that flexibilities in the supply chain process give rise to agility, a skill that is externally focused. Because our world is a dynamic environment supply chain disruptions might occur and problems might arise for organizations including alcoholic beverage manufacturers. These organizations must have a strategy for such unforeseen occurrences.

### 1.3 PROBLEM STATEMENT

Manufacturing organizations are consistently faced with disruptions and find themselves struggling to maneuver to find a footing during these occurrences. To combat interruptions and waste, the manufacturing industry must employ a variety of supply chain solutions, including lean, agile, and a combination of the two. Agility is defined as the capability to take necessary actions against unforeseen and unpredicted problems and threats that were yet to be encountered and to assess the problem as an opportunity. According to (Dubey, *et al.* 2018), an agile supply chain ASC can identify temporary, transient shifts in the market while conducting supply chain operations. Although there aren't many studies that are done with respect to Supply chain Agility and beverage manufacturing firms, (Govender *et al.*, 2014) did a research on South African dietary supplement manufacturer and explored agile supply chain methods and supply chain resiliency. The researcher observed that organizations are more focused on risks and resilience compared to agility. A few studies were made to see and understand what enables Supply Chain Agility. According to (Ghatari *et al.*, 2013), ten factors were analyzed and delivery speed, planning and reorder segmentation, trust development, material quality adjustment and cost reduction were respectively put in order of priority. Although Agility is explored often, there exists a knowledge gap on what actually enables Agility in the first place.

In the context of the supply chain, logistics refers to the organization and transportation of raw materials such as personnel, goods, inventories, and machinery between certain locations to storage at the location of choice. Different criteria can be used to define logistics performance (Fugate *et al.*, 2010), who described how to measure logistics performance, this technique for measuring the logistic work's resources has as its main goals the monitoring and management of the logistical operations. (Berhane, 2020), conducted a study on the relationship between logistics performance and organizational performance of chosen Ethiopian brewers and used logistics performance measurement criteria like effectiveness, efficiency, and differentiation and observed that there is a positive relationship between Logistics performance and Organizational performance.

The lack of literature regarding agile supply chains and logistics performance particularly in Ethiopia is noticeable. As important as supply chain agility is there is an absence of studies made in accordance with the five supply chain agility dimensions, which dimensions are determinants of logistics performance in this study focuses on. The study also tried to see which enablers affect Agile supply chain management Alcohol manufacturers like the target company of this study face supply chain disruptions as the world is an ever changing and dynamic place and they need to prepare and face this disruption head-on. The thesis attempts to determine the factors of Agile supply chain practices in the supply chain and also determine which dimension affects logistics performance.

#### **1.4 RESEARCH QUESTIONS**

- What is the level of agile supply chain strategies adoption at BGI Ethiopia in terms of alertness, Accessibility, decisiveness, flexibility, and swiftness?
- What is the logistics performance of BGI Ethiopia in terms of efficiency, effectiveness, and differentiation?
- What are the determinants of agile supply chain management with respect to BGI Ethiopia?
- What is the role of agile supply chain management on logistics performance of BGI Ethiopia?

#### **1.5 OBJECTIVE OF THE STUDY**

##### **1.5.1 General objectives**

The main purpose of this research is to analyze the influence of agile supply chain strategies as the determinants of the logistics performance of BGI Ethiopia.

##### **1.5.2 Specific Objectives**

- To examine the agile supply chain strategies of BGI Ethiopia in terms of alertness, accessibility, decisiveness, flexibility, and swiftness.

- To measure the logistics performance of BGI Ethiopia in terms of efficiency, effectiveness, and differentiation.
- To detect the determinants of agile supply chain management with respect to BGI Ethiopia.
- To identify the role of agile supply chain management on logistics performance of BGI Ethiopia

## **1.6 SIGNIFICANCE OF THE STUDY**

The study will contribute to the body of knowledge on supply-chain approaches, especially agile supply chains, and it will provide new insight into the relationship between agile supply chains and logistics performance in the liquor production industry. The study will help the target company, BGI Ethiopia in how agile its supply chain is. Not so long ago, supply chain disorders occurred particularly because of the Covid-19 pandemic. Lots of manufacturing firms seized operations because of low demand for their products. When such unforeseen disruptions occur, it becomes difficult to maintain operational activities. Companies should always prepare for the worst so they don't lose their market share.

By focusing on five dimensions of supply chain agility, the study will try to see how agile the supply chain of BGI Ethiopia is. This will contribute in the literature gap with respect to alcoholic beverage manufacturers. It will also contribute in recommending ways on making the supply chain agile and coming up with improvements for the company's supply chain.

## **1.7 SCOPE OF THE STUDY**

The study's scope is going to be restricted to the case organization, BGI Ethiopia, headquartered in Addis Ababa, Ethiopia. Despite BGI Ethiopia maintaining multiple facilities in Ethiopia, this research will concentrate on the main factory, which is located near Mexico Square in Addis Ababa. The research will concentrate on supply chain agility and its five aspects, which are alertness, accessibility, decisiveness, swiftness, and flexibility. It won't contain performance measures like as Reliability, Responsiveness, Agility, Cost, and Asset Management Efficiency,

which are included in the SCOR model alongside Supply chain agility. The efficiency, efficacy, and distinction of logistics will be measured.

## **1.8 LIMITATION OF THE STUDY**

The research only assess the agility of BGI Ethiopia which makes it impossible to come to a general conclusion about supply chain agility and the brewery industry. Although the researcher believes that the variables selected are sufficient for this particular study, considering other variables could help show the link between Agile supply chain management and its determinants or facilitators.

## **1.9 ORGANIZATION OF THE STUDY**

The first chapter will cover the study's history, problem statement, objective, research questions, significance, scope, constraints, and lastly the study's organization. The second chapter will concentrate on the theoretical literature review, empirical literature review, identified literature gap, and study conceptual framework. The methods will be discussed in Chapter three. This part will go over the research topic, study design, research methods, data collection instrument, sampling techniques, data analysis method, and ethical considerations. The results, discussion, and interpretation of the findings are presented in chapter four, and the summary, conclusions, and suggestions, as well as references, are presented in chapter five.

## **CHAPTER TWO**

### **RELATED LITERATURE REVIEW**

#### **2.1 THEORETICAL LITERATURE REVIEW**

##### **2.1.1 AGILE SUPPLY CHAIN STRATEGIES**

According to (Qi, Boyer, and Zhao, 2009), supply chain strategy includes the procurement of basic supplies, transit of those goods from the supplier to the company, manufacturing the goods or activity to offer the service, and the delivery of the product to customers. It also defines if subsequent services are going to be supplied in-house or by third-party vendors. Retailers' supply chain strategy relates to their supplier chain's strategic aims and objectives.

Narasimhan, Kim and Tan, (2008) in today's highly competitive global business environment, an organization's ongoing competitive performance is dependent on developing a robust supply chain strategy. A company's supply chain strategy, which is closely linked to its operations plan, includes decisions on sourcing, value partitioning, regulating the movement of goods, conversion, delivery, management of relation to suppliers, and logistics.

The supply chain strategy is a sequence of decisions made in respect to product procurement, capacity planning, resource transformation, demand oversight, interaction throughout the supply chain, and the supply of goods and services. It is critical to link supply chain strategy to overall company strategy since these decisions have an impact on critical business processes involved in the creation and distribution of an organization's goods and service.

According to (Christopher and Towill, 2002) there are three kinds of supply chain strategies. These strategies are Lean supply chain strategy (LSC), Agile supply chain strategy (ASC), and finally the mixture of the two or commonly known as Hybrid supply chain (HSC) that impact overall chain performance. By integrating the lean and agile supply chain strategies they used the term “Leagile” for the commonly known hybrid strategy.

Different products warrant a different supply chain strategy, some supply chains can become efficient when they use the Lean strategy and others responsive when they use the agile supply chain strategy.

According to (Ferreira *et al.* 2017) Lean thinking is a business concept that aims to reduce costs by optimizing the manufacturing procedure and guaranteeing that consumers get precisely what they require, when they're looking for it, and in the amount that they define. It is generally recommended to evaluate the concepts and beliefs of the lean mindset before selecting management tools as they influence how the methodology will perform. Intellectual comprehension is necessary for selecting the appropriate instruments and arriving at conclusions. Functioning with fewer supplies, greater flexibility, and better service to customers all at the same time necessitates a highly obvious reasoning that is often incredible in its simplicity. Compared to traditional SCM, which allows various inefficiencies and has large inventory, lean culture tries to improve stream value while reducing inefficiency and loss. (Guimares & Rodriguez, 2018).

This strategy seeks to obtain the most effective means of product manufacturing and delivery by minimizing waste during the value creation process. However, the method is susceptible to building up large export stockpiles of finished goods. The goals of a lean approach are to carry out every activity with the fewest resources possible, comprising personnel, area, stock, machinery, time, and any additional aspects that are most appropriate throughout the supply chain. Firms can improve the efficiency and effectiveness of their supply chains by cutting out non-value-added operations, simplifying processes, lowering redundant stock, using superior technology, looking for economies of scale, identifying stores close to consumers, and eliminating pointless supply chain links (Perry, 1996).

Common waste includes the manufacturing of items that are yet to be instructed, awaiting, maintaining inaccuracies exorbitant treatment, a great deal of motion, excessive transport, and maintaining a large quantity of inventory. According to (Ohno, 1988). The seven wastes are

**Overproduction** is the production of more than is required. Regardless of whether the products are eventually sold, overproduction incurs additional storage costs as well as the possibility of pricing or demand changes.

**Inventory** that includes waste related with storage, money wasted on untouched items, waste associated with transferring the inventory, waste related with the containers used to store the inventory, waste involved with illuminating the storage area, and so on. Furthermore, excess inventory can obscure the initial losses connected with its production.

**Unnecessary Motion**- Processes that include superfluous motion, including a person moving parts individually at a given time.

**Defects or Errors** - When an item becomes defective or alternatively faulty within the production process. It will either have to be discarded or additional work and time will be required to repair it.

**Inappropriate Processing** - Using equipment or procedures that are more sophisticated or expensive than is strictly necessary to do the task efficiently.

**Waiting** - When a product must sit and wait for the next stage in the manufacturing process to be completed. This can occur if there is a delay in the manufacturing process.

**Transport** - Products should be moved as little as feasible. Eliminating any unnecessary movement of items within the facility and elsewhere is a key step toward waste reduction.

There are various ways to express agility. First, agility is founded on certain, but not all, lean thinking methodologies, and it has its roots in time-bound competitiveness (Stalk and Hout, 1990) and fast-cycle creation (Womack *et al.* 1990). Agility refers to the adaptability of the previously mentioned business components working toward a common goal (Christopher & Towill, 2000)

Agility, as defined by the European Agile Forum (2000), is a company's capacity to adjust and restructure its internal and external components, such as its approaches, structure of operation,

innovations, individuals, shareholders and vendors, distributors, as well as consumers, in response to unforeseeable occurrences or shifts in the world of business.

Agility refers to the ability of the supply chain as a whole and its members to swiftly adjust the system and its activities to the changing and rapidly changing demands of customers. The major focus is on operating companies in network infrastructures with adequate agility to adapt to changes while also proactively anticipating changes and looking for new emergent opportunities. (Ismail and Sharifi, 2005)

Agility is the ability to take the necessary measures against previously unknown challenges and perils, and to regard these conditions as opportunities. Furthermore, it is the company's ability to use its resources quickly and adaptably in order to foresee and respond to opportunities and difficulties that develop in the business's internal and external contexts (Li et al., 2008).

According to (Sharma et al, 2017) Supply chain agility (SCA) refers to a supply chain's tactical capability to recognize and respond to internal and external shifts quickly, either in advance or in response, by leveraging intra- and inter-organizational talents in a profitable manner.

### **2.1.2 DIMENSIONS OF SUPPLY CHAIN AGILITY**

According to (Christopher, 2000), Market sensitivity, virtuality, process incorporation, and networking are key components of ASCM techniques. Accordingly, ASCM techniques focus on organizational frameworks and procedures that promote responsiveness, adaptability, and resilience (Azevedo, *et al.* 2012).

**Customer Sensitivity-** To be customer-sensitive, businesses must read and respond to their consumers' genuine wants. It encourages firms to be demand-driven rather than forecast-driven, which means they would rely on direct market feed-forward in the form of information on actual consumer requirements rather than projecting inventories based on historical sales (Christopher, 2000). Customer sensitivity is an ASCM strategy that assists firms in recognizing and swiftly serving customers while also increasing market growth.

**Supply chain virtualization-** Virtuality has been utilized in a wide range of contexts, each with its own connotation and purpose. Virtuality is a term used in supply chain management to indicate the manner in which the tangible and informational aspects of supply chain operations are managed separately, so that resource ownership and supervision are accomplished via internet/intranet programs instead of actual physical interactions (Yusuf *et al.*, 2004)

**Supply chain process integration-** Supply chain process integration comprises connecting different supply chain nodes in order to increase the movement of raw materials in the supply chain and guarantee smooth and effective operation. Although different supply chain integration business models exist, (Yusuf et al, 2004) found several prevalent practices as brief temporary partnerships, senior junior long-term linkages with vendors and consumers, and internet-based collaboration. The primary difference between traditional relationships and supply chain process integration resides in "the simplicity of creation and breakdown, the relative prominence and dedication of members, the level of integration of information by means of the internet, and objectives, which may vary from manufacturing knowledge advancement, outsourcing, or marketing."(Yusuf *et al.* 2004).

**Supply chain Networking-** Building working partnerships that incorporate the expertise and abilities of every organization in order to boost competitiveness is one strategic option accessible for firms to solve the issues of the business landscape (Baker, Faircloth, and Simental, 2005). For supply chain network integration, a shared identity is required, which can consist of a dedication to agile methodologies, structural harmony, data structure, and tradeable skills (Yusuf *et al.* 2004). It has become fashionable to network both within and between firms in order to capitalize on ephemeral business opportunities and assist companies in enduring the volatility of the business environment while pursuing predetermined goals (Ateke and Kalu, 2016).

According to (Gligor, 2015), in today's manufacturing contexts, there are five fundamental frameworks for limiting doubt and managing a competitive supply chain. These are Alertness, Accessibility, Decisiveness, Swiftness, and Flexibility and Adaptability.

**Alertness-** Organizations that remain alert are in the best position to predict market shifts, business opportunities, impending disruptions, and competition threats. The more alert and conscious companies are to these facts, the quicker a business may respond to changes in customer demand, material sourcing, supplier trends, supplier feedback, market price, and other considerations.

**Accessibility-** Organizations are unable to change in the shadows. As a result, alert organizations must have quick availability of accurate business information and relevant past records that all decision-makers can quickly examine, discuss, and dissect after detecting a forming pattern or trend.

**Decisiveness-** Fast-acting organizations do so by creating a strategic objective in response to observable market developments and accompanying information. In other words, it is the organization where executives possess the means and ability to quickly change an operation and then explain the reason and how the alteration was made to others. Highly decisive firms typically have streamlined or unified chains of command, minimizing the total amount of interactions required to reach a quick decision.

**Swiftness-** Swift producers carry out their plans of action promptly. When bringing a process modification to pertinent value chain operations, there are few to no barriers, communication barriers, or organizational technologies that need to be reconfigured. The more quickly adjustments are implemented, the more economical the whole supply chain is, and the more successful your company will be. Since all of the efforts up to this point are already data-driven and preliminary, this element also demonstrates the reality of the agility loop.

**Flexibility and Adaptability-** Finally, and most importantly, flexible companies have the authority and support to change ongoing processes when new possibilities arise without disrupting the entire business. Those that are adept in this aspect understand that business plans will unavoidably shift, even if they began in a seamless, information-backed sequence that matched the present state of chain demand. To summarize, businesses are not rigid and approach everyday activities with the retrospective-cost fallacy that has previously proven profitable.

Organizations occasionally employ a hybrid strategy that combines the usage of lean and agile supply chains (Christopher and Towill, 2002). As a result, hybrid supply chains integrate lean and agile approaches as a component of a supply chain strategy to reap the benefits of the two lean and agile supply networks. This hybrid approach is used by supply chains to keep strategic inventory at the decoupling point in a generic or incomplete form, with fast configuration occurring once the real need is recognized (Mason-Jones, Naylor, and Towil, 2000)

Hybrid strategy tries to adhere to lean concepts until the point of decoupling and then use agile methods to construct an agile response on a lean platform. Firms that wish to improve performance through economical methods ought to work in an economical region and develop lean supply chain strategies (Dubey *et al.* 2004). Conversely, companies that want to be innovative and competitive should use more flexible supply chain tactics.

### **2.1.3 LOGISTICS PERFORMANCE**

Logistics has been defined in many ways by various scholars. Among the various definitions available, the most widely used and well-known comes from the Council of Supply Chain Management Professionals. Logistics is defined as the act of planning, executing, and managing the procedures required for the timely conveyance of products, services, and other pertinent data from their point of inception to their endpoint in order to meet client needs. (CSCMP, 2018).

The European Logistics Association defines logistics as "the organization, planning, control, and execution of the movement of items from the point of manufacture (purchase), through all facets of manufacturing and delivery to the final consumer, in order to meet market demands with a minimal amount of commitment and investment." The supervision of all operations that permit mobility and the coordination of supply and demand in establishing time and place utility is referred to as logistics. (Riopel, Langevin, and Campbell, 2005), Logistics is the placement of resources at the proper time, the correct location, appropriate expenses, and of adequate. According to the Council of Logistics Management (2018), Logistics is primarily concerned with organizing, carrying out, and overseeing the effective and efficient transport and retention of products from

their point of origin to the point of use in order to affirm what the client desires. According to (Fynes, Burca, and Mangan, 2008), Logistics is defined as providing service in the correct location, at the appropriate cost, and with the correct quality. According to (Lambert, Stock, and Elram, 1998), the idea of logistics has changed over time in reaction to things like modifications to the commercial surroundings. In every firm maintaining the firm's customer service objectives effectively and efficiently is the major objective of logistics. Therefore before developing a logistics strategy a company should decide which performance levels are most important. This choice will take into account elements of the company's overall competitive strategy like the positioning of their products in terms of price or quality.

Logistics performance is defined as the effectiveness and efficiency with which logistical activities are completed. Given that consumer value from logistics operations is frequently used as an indicator of logistics performance. This notion was further developed by researchers, by including logistical differentiation as an essential element of logistics performance. Logistics, according to the study, can give value through efficiency, effectiveness, and distinction. Customer service elements such as accessibility of goods, timely and dependable delivery, and ease of purchase, for example, can bring value. A company may be able to differentiate itself from competitors if logistics can create value through the distinctiveness of its logistics operations. Superiority in comparison to the competition is required for effectiveness in logistics performance (i.e., differentiation). Subsequently, the concept of logistics performance by (Langley and Holcomb, 1992) was expanded to encompass logistical efficiency, effectiveness, and distinctiveness as an additional notion. This was then built on by (Bobbitt, 2004), who enhanced a number of the measures. In short, the dimensions of effectiveness, efficiency, and distinctiveness can be utilized to categorize practically all of the numerous Logistics criteria outlined in previous work. As a result, the weight of prior research refers to the multifaceted character of logistics performance, which can be described as the level of effectiveness, distinctiveness, and efficiency with which logistics operations are done (Bobbitt 2004).

Other academics describe LP as a measure being used to evaluate the effectiveness and efficiency of a course of action (Neely, 2005). The degree of efficiency, effectiveness, and distinction

associated with operational performance has been designated as LP, which is a multifaceted term (Fugate, *et al.*, 2010) Because organizations usually have several, competing aims, researchers have traditionally had a tough time defining LP. Efficiency is an indicator of how productively the firm's resources are used in the setting of this research.

**Logistics Efficiency-** According to (Fugate, *et al* 2010), is defined as the ability of the logistics process to manage assets wisely, and it is often best demonstrated by a certain proportion of the average level of intakes to the actual level of outcomes.

**Logistics Effectiveness-** According to (Fugate, *et al.* 2010) research, logistics effectiveness is the level that the logistics process' objectives are satisfied. Variations in logistics performance are assumed to be caused by changes in the underlying logistical effectiveness

**Logistics Differentiation-** To be successful in the rapidly evolving marketplace, logistics activities must also provide the best contrasting net value to customers, in addition to efficiency and effectiveness. This feature of contrasting the outputs of logistics operations with that of rivals is recognized in the logistics field as "Logistics Differentiation," Furthermore, logistics is thought to be an equipment that can assist an organization stand out from the competitors. (Bobbitt 2004). Understanding logistics operations in comparison to competitors is critical, given to the significantly higher route weights of logistics differentiation on logistics performance than the remaining two logistics performance elements (Fugate 2010).

## **2.2 EMPIRICAL LITERATURE REVIEW**

### **2.2.1 AGILE SUPPLY CHAIN STRATEGIES**

The study discovered that the agile supply chain strategy has a substantial impact on supply chain performance because the agile approach always strives to maximize customer satisfaction by providing timely responses at reasonable pricing. To remain responsive to customer needs, businesses must integrate an agile approach into their supply chain. It was determined that the lean strategy had an effect on the supply chain's effectiveness. It was shown to be a critical factor that

can increase supply chain responsiveness. Considering the lean supply chain approach focuses primarily on waste reduction, it may be difficult for organizations to boost responsiveness using this technique. There was also a slight association between Hybrid strategy and supply chain responsiveness (Sohel et al., 2015.)

According to (Purnomo, 2009) When researching the agile supply chain and its effects for green logistics, researchers discovered that while postponement increases agility throughout the supply chain, it may additionally have an effect on the efficiency of green logistics and transportation. These possible effects of postponement and other supply chain approaches may be mitigated by coordinating both downward and upward flows of goods and information among the carriers, supply chain enterprises, and suppliers.

The hallmark of progressive business praxis has been organizational adaptation in response to the demands of the corporate environment and satisfying shifting consumer expectations. As a result, ASCM has appeared as a crucial prerequisite for long-term competitiveness. Because ASCM methods let businesses adapt quickly to changes in client demand without sacrificing quality. Additionally, it enables the business to swiftly react to moves made by rivals. Therefore, it is a crucial skill for businesses that are looking to the future, and it needs to become ingrained in their corporate culture. Businesses must continue to be adaptable and flexible in light of the constantly shifting business environment. Therefore, in order for a company to be strong and resilient in the business environment, it is essential that it adopt the concepts and practices that support supply chain agility. Practices in ASCM help organizations be responsive. Therefore, ASCM techniques are essential skills for businesses that want to succeed in the current business environment (Walter and Michael, 2017)

According to (Govender *et. al*, 2014) South African dietary supplement manufacturer's explored agile methods and supply chain resiliency. By performing qualitative research and gathering the relevant data, the researchers set out to investigate the risks and agile techniques used to create durability in supply chains. Organizations are more concerned with supply chain risk, whereas demand and operational threats are less so. They also observed that operational risks are

concerning as well. As resilient attributes, the study highlighted agility, preemptive reactions, and responsive actions after disruptions.

(Marcus, 2017) on agile supply chain, strategy for competitive advantage discussed lean management is a prerequisite for Agile supply chain. In challenging industrial environments, agility is regarded as essential to company success because it enables competitors to effectively respond to time-to-market challenges. When the concepts of lean and agile supply chain are combined, it is conceivable to conclude that an agile supply chain is essential for market success and that lean is required to develop agility. To accomplish the ultimate objective of improved performance, and hence competitive advantage, an organization's agile supply chain strategy must be coordinated with its differentiation strategy. As a result, agile supply chain is a method for acquiring a competitive edge. Because consumer expectations are never static, you will fail if you are not nimble.

(Zelege, 2021) investigated the impact of agility on operational performance in the Ethiopian Airlines maintenance, repair, and overhaul unit and concluded that the unit, to varying degrees, adopts all five aspects of supply chain agility and that supply chain agility techniques have a significant impact on the case company's overall performance in operations.

### **2.2.2 LOGISTICS PERFORMANCE**

According to (Fugate et al. 2010)'s examination of the relationship among logistics performance and firm performance, logistics performance is complex and is dependent on the resources used in logistics, in compliance with stated goals, and results compared to competitors. Under this context, the researchers suggested that the examination of the logistic function's performance must be centered on the evaluation of several characteristics, notably efficiency, effectiveness, and differentiation. According to these researchers, differentiation is fully understood when the potential value which could be created by the climate of client service in comparison, effectiveness is characterized as the extent to which goals are achieved, and efficiency could refer to an element linked to the use of logistical resources. According to the researchers, the greater the principle of

combined workforce logistics, preparing, and implementation of solutions to customer requests, the lower the degree of seventeen duplicates, disputes, and grievances from clients, which increases efficiency levels because of responsiveness (less time), permits lesser wastage and return on funds, and thus improves logistics efficiency and the possibility of completing assignments. On this matter, the researchers established the following conceptual model after concluding their investigation into the interactions between the major determinants of logistic performance and organizational dimension.

(Varma and Shah, 2021) in a study, they conducted research on the relationship between logistics performance and human development and concluded that there is a connection between the human development index and the logistics performance index and that a nation's level of development and logistics cost are related to one another. The ability to reduce logistics costs for any nation, wealthy or developing, can lower the overall end cost and make it more affordable for consumers. Developing countries incur higher logistics costs than industrialized countries. The logistics performance index, by making prices competitive can make the standard of living much better.

According to (Bakar et al., 2014) in a study made on logistics performance and measurements, logistics performance dimensions used were efficiency which is interpreted by cost, and speed and effectiveness which is represented by quality, flexibility, dependability, and communication. They came to the conclusion that global supply chains can provide several insights that affect overall logistics performance. Logistics performance in Malaysia is discussed and acknowledged that there is a poor awareness regarding logistics performance, particularly regarding logistics performance indexes. Focus on infrastructure and development of border management is believed to increase the overall logistics performance as well.

(Berhane, 2020) investigated the relationship among logistics performance and organizational performance of Ethiopian breweries and discovered that the companies' logistics performance was good in terms of effectiveness and differentiation, but ineffective in terms of Transportation Cost and logistics cost overall. The researcher also observed that there was a small but positive correlation between logistics effectiveness and logistics efficiency. There was a strong positive

relationship between logistics effectiveness and logistics differentiation. And finally, a small positive correlation between logistics efficiency and logistics differentiation. In the end, the author found that there exists a link between dependent and independent variable.

### **2.2.3 DETERMINANT OF AGILE SUPPLY CHAIN STRATEGIES**

Although there aren't many studies made on Determinants of agile supply chain, particularly in manufacturing organizations, there are studies made that explain the different factors that affect agile supply chain in different industries. The studies discuss different factors with some commonality between some of the factors. By a study conducted by (Sayuti, 2011) titled Critical determinants of agile supply chain in buyer and supplier relationship: A Literature review and future direction, three determinants were discussed. These determinants are Partners characteristic capability, Alliance management capability and process capability. The researcher came to the deduction that the incorporation of these capabilities is important as they significantly influence supply chain agility. The study also came to a conclusion that each firm must focus on the area where they are especially competitive. As a result, depending on their core competencies, each partner should analyze the manner in which values are developed, as well as what they may contribute.

According to study done by (Ghatari et al., 2013) titled, Developing a model for Agile Supply: an empirical study from Iranian pharmaceutical supply chain, identified ten factors. The ten factors are analyzed and the researcher arranged each factor according to their importance and priority. The ten factors are Planning and reorder segmentation, assessment and prioritizing of suppliers and purchasing, Utilizing of IT tools, Suppliers empowerment, Material quantity adjustment (for different orders) Process integration and performance management, cost reduction, Delivery speed, Trust development, and Environmental pressure. Using TOPSIS (Technique for ordering preference by similarity to ideal solution), the elements were ranked in order of priority, with delivery speed being the highest priority, the ability of products to be delivered more quickly than rivals is referred to as speed of delivery. According to (Sharifi and Zhang, 1999), this indicator will immediately boost the speed of the supply chain combined with sub indications. Planning and

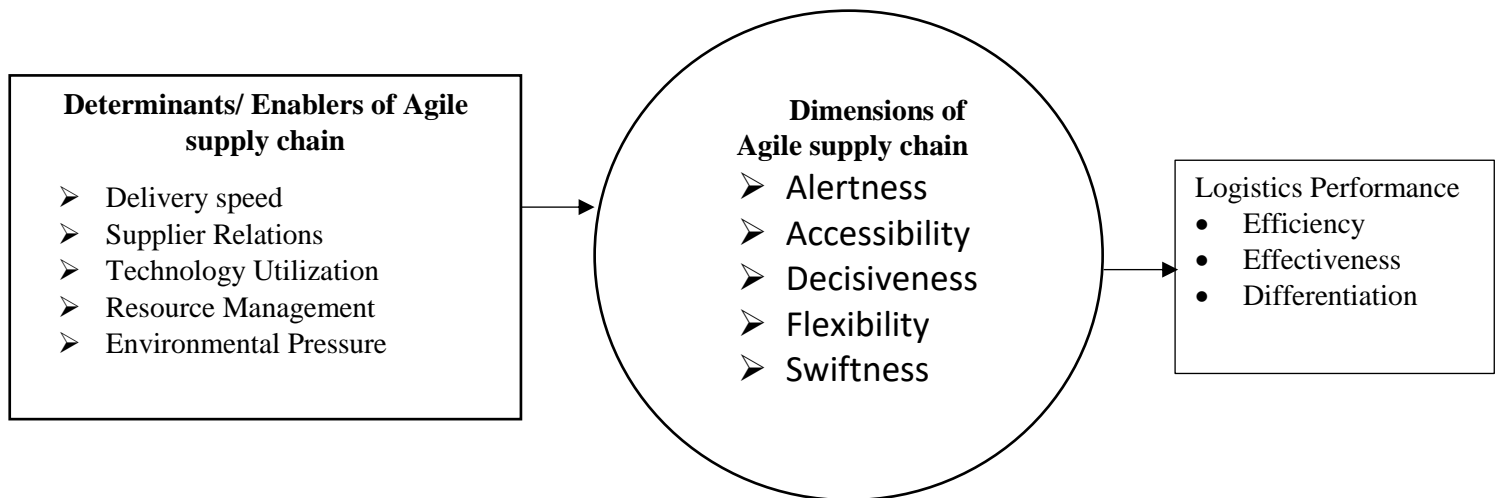
reorder segmentation is the second indicator, which entails coordinated and group activities from collaborators to accomplish identical goals. Trust development is the third significant and significant factor that influences the agility of the supply. This indicator, together with its corresponding sub indicators, can have an immediate impact on the competence and responsibility of the supply chain. According to (Sharifi and Zhang, 1999), the fourth indicator is material quantity adjustment, which will improve chain supply credibility and adaptability by alerting providers of the specific amount of need and range of materials. The fifth indicator is cost reduction. Every company wants to cut costs since it has so many advantages. There is a desire to decrease costs both within and without the organization, which affects the price of the final goods in the agile supply chain either directly or indirectly. The sixth factor is the evaluation and prioritization of suppliers for procurement. According to (Sharifi and Zhang, 1999) the seventh factor is the change in customer needs, which is the most significant environmental pressure. The eighth component is supplier empowerment, which has three sub-indicators: conveying ideas regarding the characteristics of the product, taking benefits of flexible agreements with regard to product qualities, and collaborative connections. The combination of processes and oversight of performance are the ninth and final factors to consider. The tenth and final indicated important factor is the use of IT tools.

According to research conducted by (Power, Sohal and Rahman, 2001) they identified factors that affect supply chain. These are the Participative management style along with particular approaches to HR management that have been identified as significant to firms striving for agility. Computer based technologies, According to (Bovet and Martha 2000), using information technologies to link clients, suppliers, and value-adding activities was a key sign of supply chain management best practices. Resource management, for an aspiring "agile" organization, inventory control and production planning are crucial. Remaining flexible and responsive to shifting market demands requires flexibility in both process and product. MRP, ERP, OPT, JIT, and other approaches have all been utilized by organizations to maximize the utilization of their resources. Continuous improvement enablers, given the linkage being handled and the relationships that are supported, supply chain performance will be quite dynamic. Supplier relations. In the quest for an agile supply

chain, the value of close supplier relations has gotten a lot of support in the literature. According to (Christopher and Towill, 2000), networks connected by confederations of partners are a key component of agility. Collaboration is another important difference for businesses using best practices in supply chain management, according to (Bovet and Martha 2000). Just-in-time methodology, although not as important this dimension was used to see if the organizations were more agile or less agile. And Finally Technology Utilization. The deployment of cutting-edge technologies as a way to offer an "agile" capability is a major theme in the literature. For some businesses, the appropriate application and usage of existing technologies could be a superior option. There isn't much empirical research on the potential significance of effective usage in a supply chain context, even though this topic is frequently implied in the literature.

From the three studies discussed above, there are common factors that can be selected for this study. Not only that, but also the combination of different factors that are closely related and can be considered as one is another way of selection. From the factors, Technology Utilization, Computer based technologies and Utilizing of IT tools are close in definition and can be generalized as Technology Utilization. Trust development, Supplier empowerment and, process integration and performance management mainly focus on relationships with suppliers and aren't that far off of Supplier relations indicator of the second study. Delivery speed being an important priority for the second study discussed will be selected as in of itself. Resource management encompasses JIT but also has close relationships with indicators. Assessment and prioritizing of suppliers for purchasing and Material quantity adjustment. The last will be environmental pressure, meaning the five dimensions selected will be Technology utilization, Supplier relations, Resource management, Delivery speed and finally resource management.

## 2.3 CONCEPTUAL FRAMEWORK



*Figure 1 Conceptual framework of the study*

## 2.4 IDENTIFIED LITERATURE GAP

Many researchers studied about Agile Supply Chain and explained how important it is for organizations to be agile. Agility is the capacity of the supply chain in its entirety and of its participators to quickly modify the system and its activities to the fluctuating and quickly altering demands of the consumers. The key goal is to manage businesses in network infrastructures with enough agility to react to shifts, foresee changes proactively, and search for fresh possibilities that arise. (Ismail and Sharifi 2005). As a result, research in logistics has looked at how high-performance logistics practices and skills affect organizational performance. For instance, an earlier study (Lambert and Burduroglo 2000) and (Lynch, Keller, and Ozment 2000) has demonstrated a relationship between exceptional organizational performance and excellence in performing logistics operations and capabilities. Despite numerous studies being made in these two areas it remains there is a gap in the relationship between the two, how they affect one another,

and which dimensions determine which performance measure, particularly in the alcoholic beverage manufacturing industry.

## **2.5 HYPOTHESIS SUMMARY**

*H1<sub>a</sub>: Technology Utilization positively and significantly enables agile supply chain management.*

*H1<sub>b</sub>: Resource Management positively and significantly enables agile supply chain management.*

*H1<sub>c</sub>: Supplier Relations positively and significantly enables agile supply chain management.*

*H1<sub>d</sub>: Environmental Pressure positively and significantly enables agile supply chain management.*

*H1<sub>e</sub>: Delivery Speed positively and significantly enables agile supply chain management.*

*H2<sub>a</sub>: Alertness positively and significantly influences the Logistics Performance of BGI Ethiopia.*

*H2<sub>b</sub>: Accessibility positively and significantly influences the Logistics Performance of BGI Ethiopia.*

*H2<sub>c</sub>: Decisiveness positively and significantly influences the Logistics Performance of BGI Ethiopia.*

*H2<sub>d</sub>: Swiftness positively and significantly influences the Logistics Performance of BGI Ethiopia.*

*H2<sub>e</sub>: Flexibility positively and significantly influences the Logistics Performance of BGI Ethiopia.*

# CHAPTER THREE

## RESEARCH METHODOLOGY

### INTRODUCTION

*This chapter will go over the research technique that will be employed, as well as the type of research design that will be used, the demographic and sample design of the research, the gathering of data methods, and assessment and dissemination methodologies.*

### 3.1 DESCRIPTION OF THE STUDY AREA

When St George, the nation's first brewery, was built in 1922, Addis Ababa was just starting to witness the initial flashes of modernity. The brewery was established with rudimentary facilities in order to create the nation's first bottled beverage. BGI is a globally renowned brewing corporation with operations in numerous countries that purchased St. George Brewery in 1997. Due to its high demand, BGI Ethiopia has built and bought other breweries in Ethiopia in the last decade. BGI Ethiopia manages the following breweries: Addis Ababa St. George Brewery, Kombolcha Brewery, Hawassa Brewery, Zebidar Brewery, Raya Brewery, and Meta abo Brewery. In addition, the business manages and owns the Castel Winery and Vineyard in Batu Ethiopia.

For competitive advantage and higher market share, Companies employ different strategies. Among this strategies, Agile Supply Chain strategies are one of them. Because the world is an unpredictable and dynamic place, disruptions occur all the time in a competitive environment. Maneuvering through these difficulties and preparing for such unforeseen events is crucial. The study aims in capturing how agile the company is and which dimensions are determinants of logistics performance. A quantitative study will be conducted where primary data will be gathered in the form of questionnaires and different statistical methods will be utilized to analyze the acquired data in order to get a conclusion.

### **3.2 RESEARCH APPROACH**

A quantitative method was used for this study and was done on BGI Ethiopia, Addis Ababa plant. Structured questionnaires were utilized to gather the necessary information from the case company and the research was on the influence of agile supply chain strategies as determinants of the logistics performance of BGI Ethiopia.

### **3.3 RESEARCH DESIGN**

A research design is a strategy and set of processes for conducting a study that covers everything from broad hypotheses to specific techniques for gathering and analyzing data (Cresswell, 2003). A research design is an arrangement of parameters for data collecting and analysis that seeks to balance procedural economy with relevance to the study goal. It outlines the specific steps required to get the data required to formulate and/or address issues in marketing research. The study will employ a descriptive and explanatory research design. Descriptive research answers the what, where, when, and how questions, and it is utilized to determine traits, frequencies, and patterns, as well as to give a precise and reliable depiction of components and variables related to study topics. To examine the effects of independent variables on dependent variables, inferential statistics was utilized.

### **3.4 POPULATION AND SAMPLE DESIGN**

The entire group of units on which the study is focused is represented by the population or universe. As a result, depending on the objective of the research and scope, the population could involve individuals in the country, people in a particular region, or people belonging to a specific ethnic or socioeconomic group. BGI Ethiopia, Addis Ababa plant has 956 permanent Employees as well as 58 seasonal employees. There are different departments or functions that directly affect the supply chain function of organizations. Although the company employs over a thousand people those who are not relevant to the study will be neglected and those who have a direct effect on the supply chain will be considered.

Samples were collected from 125 respondents as 125 is in between a small and medium sample for a population of 956 and it qualifies the necessary number of respondents to come to an adequate generalization for the study.

Among the 956 employees only 385 employees are considered as the population because the rest do not have either the necessary education level or are part of an irrelevant department. The 125 employees for the sample are selected among these 385 employees.

<b>Population Size</b>	<b>Small</b>	<b>Medium</b>	<b>Large</b>
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3201-10,000	80	200	315
10,001-35,000	125	315	500
35,001-150,000	200	500	800

*Table 3. 1 Sample size determination (Carvalho, 1984)*

A sampling design involves choosing a subset of a population's components from which a researcher can extrapolate findings about the entire population. For this research, sampling approach is stratified sampling. A probability sampling method in which simple random subsamples are taken from various strata that have characteristics that are essentially equal in some aspects. This sampling technique will be used in which different relevant departments will be classified into stratum and then simple random sampling was utilized to identify the representative sample population from the stratum.

The studies sampling frame will be collected from the staff list which is found at the human resources of BGI Ethiopia as the sampling frame is where the target population sample size is selected from.

### **3.5 DATA SOURCE AND TYPE**

Questionnaires had been utilized as the primary source of data. (Malhotra and Birks, 2006) state that a researcher creates primary data for the specific function of addressing the topic in question. Primary data for this study was gathered through the use of questionnaires.

### **3.6 DATA COLLECTION PROCEDURE**

During the Data collection stage, the questionnaires will be distributed to the company to collect the primary data. After explaining the purpose of the research, ample respondents will get the questionnaires. The confidentiality of the respondents will be kept. The questionnaires will be collected at a later date so that respondents will have enough time to answer the questions.

### **3.7 RELIABILITY AND VALIDITY TESTS**

#### **3.7.1 RELIABILITY**

The degree to which an indicator or collection of variables is consistent with what it is supposed to assess is referred to as dependability. The homogeneity of questionnaire components is measured using reliability analysis. There are several ways for measuring dependability; Cronbach's alpha was thought to be appropriate for this investigation. Cronbach's alpha is the most commonly used dependability metric.

Cronbach's Alpha	No. of items
0.931	49

*Table 3. 2 Summary of Cronbach's Alpha Coefficient Result*

### **3.7.2 VALIDITY**

The most important criterion is validity, which indicates how well the instrument measures what it is supposed to measure. Validity is concerned with two major issues: if the instruments used for assessment are correct and whether they accurately capture what they are intended for. The content validity of the questions was evaluated by the research advisor, who examined the questions to determine their relevance.

### **3.8 ETHICAL CONSIDERATION**

The principle of informed consent, according to (Bryman and Bell, 2007), stipulates that participants in the study cannot be coerced into taking part. Any research project carries with it an ethical obligation to conduct the work honestly and morally (Adams *et al.* 2014). In consideration of the viewpoint, the researcher will inform all participants and the research's primary stakeholders and treat all information from any individual discreetly without revealing the respondents identify. The researcher stated that all sources, including literature and other studies, are cited and mentioned appropriately so as to avoid the danger of plagiarism.

### **3.9 DATA ANALYSIS**

To analyze the collected data through questionnaires, appropriate statistical tools like SPSS (Statistical package for social sciences) will be used. The data will be properly arranged, scrutinized, and analyzed after sample respondents answer the necessary questions provided in the questionnaire. The summary of the statistics will be presented in tabular form or if necessary, in graphical forms as well.

### **3.10 DATA PRESENTATION**

The data is presented using statistical tools such as tables, percentages, frequency, and mean as major tools of data presentation and analysis.

## **CHAPTER FOUR**

### **RESULTS, INTERPRETATION, AND DISCUSSION**

#### **INTRODUCTION**

This section focuses on conveying and analyzing the study to assist the researcher or user of the study in better understanding the various findings related to the research topic, The Influence of Agile Supply Chain Strategies as Determinants of Logistics Performance of BGI Ethiopia.

This chapter will begin by presenting the demographic data of the respondents and will then proceed to present the results of the specific objectives of this study. The collected data was analyzed using descriptive statistics (tables, frequencies, mean, and standard deviation) and inferential statistics (linear regression analysis) to determine the influence of independent variables on dependent variables.

The research objectives established at chapter one and which are to be met in this chapter include:

- To examine the agile supply chain strategies of BGI Ethiopia in terms of alertness, accessibility, decisiveness, flexibility, and swiftness.
- To measure the logistics performance of BGI Ethiopia in terms of efficiency, effectiveness, and differentiation.
- To detect the determinants of agile supply chain management with respect to BGI Ethiopia.
- To identify the role of agile supply chain management on logistics performance of BGI Ethiopia

#### **4.1 THE RESPONSE OF THE STUDY**

A group of 125 respondents were the focus for this study, representing various departments such as Supply Chain, Logistics and Transport, Sales and Marketing, Production, Inventory and Warehouse, and Finance, and a total of 119 respondents returned their questionnaire, which was

thought to be sufficient to carry out the study's analysis. The resulting response rate of 95.2% was deemed enough for drawing conclusions about the research.

**Table 4. 1 Response Rate of Respondents**

<b>Rating</b>	<b>Frequency</b>	<b>Valid Percent</b>
Respondent	119	92.5
Non-Respondent	6	7.5
<b>Total</b>	<b>125</b>	<b>100</b>

Source: own SPSS survey result (2023)

## **4.2 DEMOGRAPHIC INFORMATION**

The demographic information is used to determine if the offered sample of respondents in the specific study appropriately reflects the population being studied. The demographic information also helps the researcher decide if the respondents are qualified to answer the research questions, allowing the study's findings to be generalized. The research's demographic data includes Gender, Educational Background, Department, Time in Organization, and Time in Position.

Respondents were prompted to declare their gender in the questionnaire. Table 4.2 demonstrates that male respondents outnumbered female respondents in the poll, with 63% being male and 37% being female. The study has also shown that there are more male respondents in all the departments than female respondent. It's possible, nonetheless, that the research study's findings were not biased by gender given that participants of both sexes were participating. According to the study, most of the respondents were 18-30 years old which is around 58.8%, 41-50, around 26.9% and aged 41-50, around 11.8%. This indicates majority of the respondents working in the organization are aged 18-30 which is consistent with the organization's aim of utilizing youth talents. This is beneficial because young and energetic people are key to company's growth and have an updated knowledge with respect to their fields, compared to the rather older employees or respondents. Although there are quite a lot of respondents from this age group it does not mean the information gathered from the other respondents is irrelevant as the other respondents have good educational backgrounds

and adequate experience to depict the bigger picture of the study which makes their responses significant.

For the purpose of the study, only those with a formal education were considered and it was observed that 83.2% of the respondents had a Bachelor degree while the 16.8% have a Master degree. These figures indicate that those surveyed are well educated and are capable of answering the questions without difficulty.

From the table above it can be observed that most of those surveyed are working in the production department as it is the main department which constitutes 52.9% of the respondents. It is followed by sales and marketing which constitutes 21% of the respondents closely followed by Logistics and Transport at 14.3%.

Also from the table it can be observed that 28.6% of the respondents spent 3 to 5 years in the organization, 27.7% spent below 2 years in the organization, 23.5% spent over 10 years in the organization and 20.2% spent 6 to 10 years in the organization. It can also be seen that 27.7% of the respondents spent 3 to 5 years in their position, 26.9% spent over ten years in their position, 26.1% spent 6 to 10 years in their position and finally, 19.3% spent below two years in their respective positions. This shows that the surveyed participants have varying level of experiences and different amount of times spent in the organization which brings different perspectives to the way the respond to the questionnaire.

**Table 4. 2 Summary of Demography of Respondents**

<i>Category</i>	<i>Item No.</i>	<i>Cluster</i>	<i>Frequency</i>	<i>Percent</i>
<b>Gender</b>	1	Male	75	63
	2	Female	44	37
	<b>Total</b>		<b>119</b>	<b>100</b>
<b>Age</b>	1	18-30	70	58.8
	2	31-40	32	26.9
	3	41-50	14	11.8

	4	51-65	3	2.5
		<b>Total</b>	<b>119</b>	<b>100</b>
<b>Educational Background</b>	1	PhD	0	0
	2	Masters	20	16.8
	3	Bachelors	99	83.2
	4	Diploma	0	0
	5	Certificate	0	0
			<b>Total</b>	<b>119</b>
<b>Department</b>	1	Supply chain	9	7.6
	2	Logistics	17	14.3
	3	Production	63	52.9
	4	Sales and Marketing	25	21.0
	5	Finance	5	4.2
			<b>Total</b>	<b>119</b>
<b>Time in Organization</b>	1	Below 2 years	33	27.7
	2	3 to 5 years	34	28.6
	3	6 to 10 years	24	20.2
	4	Above 10 years	28	23.5
			<b>Total</b>	<b>119</b>
<b>Time in Position</b>	1	Below 2 years	23	19.3
	2	3 to 5 years	33	27.7
	3	6 to 10 years	31	26.1
	4	Above 10 years	32	26.9
			<b>Total</b>	<b>119</b>

Source: own SPSS survey result (2023)

### 4.3 DESCRIPTIVE STATISTICS

Data collection, summarization, and simplification are all topics covered by descriptive statistics. It aims to accomplish this in a way that makes it simple to derive important inferences from the data. Descriptive statistics were utilized in this research to assess the level of the dependent variable, logistics performance, and the independent variables, which are aspects of an agile supply chain. The implementation of agile supply chain techniques was measured using descriptive statistics in terms of Alertness, Accessibility, Decisiveness, Swiftness, and Flexibility, as well as the performance of logistics in terms of Efficiency, Effectiveness, and Differentiation. A 5-point Likert scale was employed to collect data from respondents, with 5 highly agreeing, 4 agreeing, 3 neutral, 2 disagreeing, and 1 strongly disagreeing. One open-ended question was found adequate for gathering information not captured by the questionnaire. Because of the nature of the study and the dimensions involved, a total of 49 questions were in the questionnaire. Items and responses were computed accordingly using Statistical Package SPSS version 25. In general, the study used descriptive statistics and multiple regression to answer the questions presented in the specific objectives.

The following assumptions are used to display the means statistical values of the variables according to the 5-point Likert scale (Salingay & Tan 2018): If the mean (M) score is less than 3, the respondents are presumed to disagree with the statement, neutral if the mean (M) score is equal to 3, and agree with the statement if the mean (M) score is greater than 3.

For a 5 point Likert scale the interval is 0.8 which means the intervals to analyze the means found from the Likert scales will be shown in the table below.

Likert scale	Scale	Interpretation
Strongly disagree	1.00 - 1.80	Very Low
Disagree	1.81 - 2.60	Low
Neutral	2.61 - 3.40	Average/ moderate
Agree	3.41 - 4.20	High

Strongly agree	4.21 - 5.00	Very high
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*Table 4. 3 Likert Scale Points*

#### 4.3.1 PRACTICES OF SUPPLY CHAIN AGILITY IN BGI ETHIOPIA

The first goal of the research is to examine the agile supply chain strategies of BGI Ethiopia in terms of alertness, accessibility, decisiveness, flexibility and, swiftness. Respondents were asked to show their level of agreement using a 5- point Likert scale in which 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.

*Table 4. 4 Agile Supply chain management dimensions summary*

No.	SUPPLY CHAIN AGILITY <sup>1</sup>		
	<b>ALERTNESS</b>	<b>Mean</b>	<b>Std. Dev</b>
1	BGI Ethiopia is quick to notice changes in the company's working environment	3.13	0.929
2	BGI Ethiopia is quick to discover new business possibilities	3.79	0.938
3	BGI Ethiopia is rapid detection of dangers in its business environment	4.14	0.751
	<i>Grand mean</i>	<b>3.69</b>	
	<b>ACCESSIBILITY</b>		
4	BGI Ethiopia Suppliers are ready to provide pertinent information to the organization.	3.34	1.020
5	BGI Ethiopia Customers are fast to provide pertinent information to the organization.	3.31	0.998
6	BGI employees, usually quickly access data needed to make decisions	4.00	0.759
	<i>Grand mean</i>	<b>3.55</b>	

<b>DECISIVENESS</b>			
7	BGI Ethiopia has procedures in place to allow for swift decisions	3.03	0.961
8	BGI Ethiopia is quick to make choices about supply chain operations	3.73	0.945
9	BGI Ethiopia is quick to make choices about supply chain methods	3.45	1.110
	<i>Grand mean</i>	<b>3.40</b>	
<b>SWIFTNESS</b>			
10	BGI Ethiopia promptly implements the decision to change the supply chain operations.	2.86	0.941
11	BGI Ethiopia can quickly adopt a change in its supply chain techniques.	3.48	1.056
12	BGI Ethiopia is quick to make adjustments to its supply chain	3.22	1.250
	<i>Grand mean</i>	<b>3.19</b>	
<b>FLEXIBILITY</b>			
13	BGI Ethiopia's Suppliers can respond rapidly to an increase in order size.	3.97	0.843
14	BGI Ethiopia's Suppliers can swiftly modify order specifications.	3.40	1.068
15	BGI Ethiopia's Suppliers can readily modify or accelerate their delivery lead time.	3.73	0.997
	<i>Grand mean</i>	<b>3.70</b>	

Source: own SPSS survey result (2023)

Alertness was measured using three sub-variables indicated in the table above. As indicated from Table 4.4, a mean of 3.13 lies in the moderate interval when it comes to quickness to detect changes in its business environment. Responses were pretty much even, even though, over 50% of the respondents agreed with this statement. It is also shown that the organization is BGI Ethiopia is quick to discover new business possibilities with a High mean of 3.79 which is indicated by 77.3% of the respondents agree or strongly agree with the statement and Finally, Over 92.4% of the respondents agreed or strongly agreed with the third statement, that describes the organizations quickness to detect threats in its business environment which is shown by a very high mean of

4.14. Alertness had a high grand mean of 3.69 shows that most of the respondents believe that BGI Ethiopia is Alert to different situations and opportunities arising in its business environment.

Like Alertness, accessibility was also measured using three sub-variables which can be observed below. As shown from Table 4.4, with a Moderate mean of 3.34 when it comes to suppliers quickly sharing important information with the company. The same goes for the second sub-variable which is indicated by a moderate mean of 3.31 that Customers are fast to provide pertinent information to the organization. On the other hand however, with a High mean of 4.00, most of the respondents agreed that they believe employees of the organization can usually and promptly access data needed to make decisions with over 60% of the respondents agreeing with this statement. Accessibility has a grand mean of 3.55 which shows a high ranking to having access to different industry data and historical records to make good decisions.

Just like Accessibility and Alertness, Decisiveness also have three sub-variables. The first statement states that the organization has processes has procedures in place to allow for swift decisions in which the majority of the respondents, 58% of whom, did not agree with. This is also shown with a moderate mean of 3.03. From the second statement it can be observed that the organization is quick to make choices about supply chain operations with over 70% of the respondents agreeing with the statement. This can also be seen with a High mean of 3.73. Same goes for the third statement with a mean of 3.45 and 55% of the respondents agreeing with this statement. A moderate grand mean of 3.40. From the responses, we can see that although there isn't a process put in place that allow quick decisions, it doesn't mean that quick decisions aren't made.

Just like the other variables, Swiftiness also has three sub-variables. The first statement has a mean of 2.86 which is low and discusses the prompt implementation of decisions to change the supply chain operations in which 58% disagreed with. The second statement discusses change in tactics quickly implemented which has a mean of 3.48 and 53% agreeing with the statement. And the final statement states that the organization quickly implement changes in its supply chain and it has a mean of 3.22 which is relatively moderate although over 50% agreed with the statement. A

grand mean of 3.19 is moderate and shows Swiftness meaning that respondents are divided as to whether the organization carry out their plan of action promptly.

Just like the other four dimensions, Flexibility also has three sub-variables. The first statement discuss the ability of the organization’s suppliers to quickly meet an increase in order in which 86% in total agreed with. This can also be shown with a High mean of 3.97. The second statement discusses suppliers possessing the ability to quickly adjust the specification of orders which has a relatively moderate mean of 3.40 with 58% of the respondents agreeing with the statement. And finally the third statement discusses whether the Suppliers can readily modify or accelerate their delivery lead time and the majority of the respondents agreed with the statement, 73% to be exact which is shown with a High mean of 3.73. A High grand mean of 3.70 shows that the respondents believed that the organization is flexible and believed that the organization has the capability to change ongoing processes when new possibilities arise without compromising or causing a disruption to the entire business.

#### 4.3.1.1 SUMMARY OF ADOPTION OF SUPPLY CHAIN AGILITY

The table below summarizes the analysis of supply chain agility practices of BGI Ethiopia

*Table 4. 5 Summary of Mean scores of Dimensions of Agility*

<b>Supply chain Agility Dimensions</b>	<b>Mean Value</b>	<b>Rank</b>
Alertness	3.69	2 <sup>nd</sup>
Accessibility	3.55	3 <sup>rd</sup>
Decisiveness	3.40	4 <sup>th</sup>
Swiftness	3.19	5 <sup>th</sup>
Flexibility	3.70	1 <sup>st</sup>
<b>Overall Mean</b>	<b>3.51</b>	

Source: own SPSS survey result (2023)

From the table above, it can be observed that the overall mean value of the five dimensions of supply chain agility is 3.51 and indicates that there adoption of the five dimensions is high. The table also indicates that the adoption of Alertness, Accessibility and flexibility was high but swiftness and decisiveness were average. The rank column shows that, Flexibility, Alertness, Accessibility, Decisiveness and Swiftness took first, second, third, fourth and fifth places respectively.

#### 4.3.2 LOGISTICS PERFORMANCE OF BGI ETHIOPIA

The second objective is the assessment of logistics performance of BGI Ethiopia in terms of Efficiency, effectiveness and differentiation. As with the first goal, a 5-point Likert scale was employed to show the respondents' degree of agreement or disagreement with the Sub- factors.

*Table 4. 6 Logistics performance Summary*

No.	LOGISTICS PERFORMANCE	Mean	Std. Dev
	<b>Efficiency</b> (Performance in logistic activities)		
1	BGI Ethiopia's large proportion of orders are dispatched to consumers from the primary location assigned to serve those customers	3.71	1.092
2	BGI Ethiopia's <b>Line-Item Fill Rate</b> (Percentage of order items the picking operation actually found) Is efficient	3.77	0.969
3	BGI Ethiopia deliver orders promptly ( <b>Percent of Orders Shipped on Time</b> )	3.71	0.975
4	BGI Ethiopia's <b>Percent of Shipments</b> Requiring Expediting is adequate	3.65	1.054
5	BGI Ethiopia has a high number of <b>Inventory Turns per Year</b>	3.83	0.827
6	BGI Ethiopia's <b>Average Order Cycle Time</b> (Time in days between order receipt and Order Delivery) is low	4.10	0.616
	<b>Grand Mean</b>	<b>3.80</b>	
	<b>Effectiveness</b> (Actual logistics performance compared to planned performance)		

7	BGI Ethiopia's <b>Transportation cost</b> is much better for actual performance than budgeted performance	2.58	0.897
8	BGI Ethiopia's <b>Warehousing cost</b> is much better for actual performance than budgeted performance	3.70	0.953
9	BGI Ethiopia's <b>Inventory cost</b> is much better for actual performance than budgeted performance	3.25	0.985
10	BGI Ethiopia's <b>Total logistics cost</b> is much better for actual performance than budgeted performance	2.66	0.925
11	BGI Ethiopia's <b>Documentation cost</b> is much better for actual performance than budgeted performance	4.05	0.484
<b>Grand Mean</b>		<b>3.25</b>	
<b>Differentiation</b>			
12	BGI Ethiopia provide <b>Damage Free Deliveries</b> when compared to competitors	3.86	0.886
13	BGI Ethiopia holds a high number of <b>Finished Goods Inventory</b>	3.84	0.833
14	Demand is <b>accurately forecasted</b> at BGI	3.86	0.857
15	At BGI the <b>Time between Order Receipt and Delivery</b> is low	4.19	0.572
16	BGI's <b>Time on Backorder</b> is lower than competitors	4.17	0.493
17	BGI's <b>Total Inventory turns</b> is higher than competitors	3.96	0.896
18	BGI makes <b>On-Time Delivery</b> to items ordered	4.14	0.509
<b>Grand Mean</b>		<b>4.00</b>	

Source: own SPSS survey result (2023)

Logistics efficiency has six sub-variables. The first statement discusses the percentage large proportion of orders are dispatched to consumers from the primary location assigned to serve those customers and most of the responded with agree to the statement. The statement has High mean of 3.71 and 80.7% of the respondents agreed with the statement. The second statement discuss the efficiency of Line-item fill rate of the organization. The results showed a High mean of 3.77 in which 82.4% agreed with the statement. The third item discuss the organization being capable of

delivering orders on time in which 79% agreed with the statement and has a High mean of 3.71. The fourth statement discuss the percent of orders requiring expediting is adequate which has a High mean of 3.65 and a high agreement rate of 73.9%. The fifth statement discuss the organization having a high number of inventory turns per year in which a mean of 3.83 was observed and 81.5% of those polled agreed with the assertion. The sixth statement discussed the organizations average order cycle time being low in which in which a combined 93.2% of the respondents either agreed or strongly agreed with. And it has a High mean of 4.10. The overall mean of the Logistics efficiency is 3.80 which is high and which means the respondents believe that BGI Ethiopia handle resources intelligently.

Unlike Logistics efficiency, Logistics effectiveness has one less sub-variable with a total of five. The first statement states that the transportation cost of the organization being much better for the actual than the budgeted one and has a mean score of 2.58 which is Moderate and 63% of the respondents disagreed with the statement. The second statement discusses the warehousing cost being better for the actual than the budgeted performance which has a mean of 3.70 which is high and 78.2% of the respondents either agreed or strongly agreed with the statement. The third statement discusses the inventory cost being better for the actual performance compared to the budgeted performance and as it can be seen from the table, with a mean of 3.25 and 62.2% of the respondents disagreeing with the statement, it can be observed that the response was Moderate. When we see total Logistics cost, we can observe a Low mean of 2.66. In the last statement of this variable, Documentation cost is discussed for being better for the actual performance instead of budgeted performance. And an overwhelming majority of respondents, 92.4% to be exact either agreed or strongly agreed to this statement. A mean of 4.05 is also observed. The overall mean of logistics effectiveness is 3.25 which results in an average or moderate ranking although some of the sub-variables scored higher.

Just like the other Logistics Performance variables, Logistics differentiation has seven sub-variables. The first statement discusses the organization being capable of providing damage free deliveries in which a mean of 3.86, which is high was observed. 82.4% of the respondents either agreed or strongly agreed with the statement showing that more people believed that the

organization mostly provide damage free deliveries. The second statement discusses BGI Ethiopia holding a high number of finished goods inventory which resulted in a mean of 3.84 which is high. 85.7% of the respondents either agree or strongly agree with the statement. The third statement discusses the organization accurately forecasting demand which resulted in a mean of 3.86 which is actually high. And 84.9% of the respondents responded with agree and strongly agree. The fourth statement discusses the time between order receipt and delivery being low where a mean of 4.19 which has a high ranking, is observed and 93.3% answered with either agree or strongly agree. The fifth sentence discusses the time on backorder of BGI being lower which has a mean of 4.17 which is ranked as high and 95.8 percent of the respondents answered with either agree or strongly agree. The sixth sentence discusses total inventory turns of the organization being high which has a high ranking mean score of 3.96 and an huge majority of respondents, 86.6% of whom, answered with either agree or strongly agree. The last statement discusses the on-time delivery of items ordered. As it can be seen from the table, it can be observed that a mean of 4.14 which is high is indicate with the vast majority of the respondents, 93.3% of whom agreed and strongly agreed with the statement. The overall mean of the variable is 4.00 which garners a high ranking and indicates the respondents believe their organization is better at the items mentioned above when compared to rivals and competitors.

#### 4.3.2.1 SUMMARY OF LOGISTICS PERFORMANCE

The table below shows that the summary of logistics performance of BGI Ethiopia.

*Table 4. 7 Summary of Means of Logistics Performance*

<b>Logistics performance</b>	<b>Mean Value</b>
Logistics Efficiency	3.80
Logistics Effectiveness	3.25
Logistics Differentiation	4.00
<b>Overall mean</b>	3.68

Source: own SPSS survey result (2023)

As indicated in the table above, the mean values of 3.80 and 4.00 of logistics efficiency and differentiation respectively are high compared to a mean of 3.25 for logistics effectiveness which is low. A grand mean of 3.68 is also high which shows that the Logistics performance of the organization is very good.

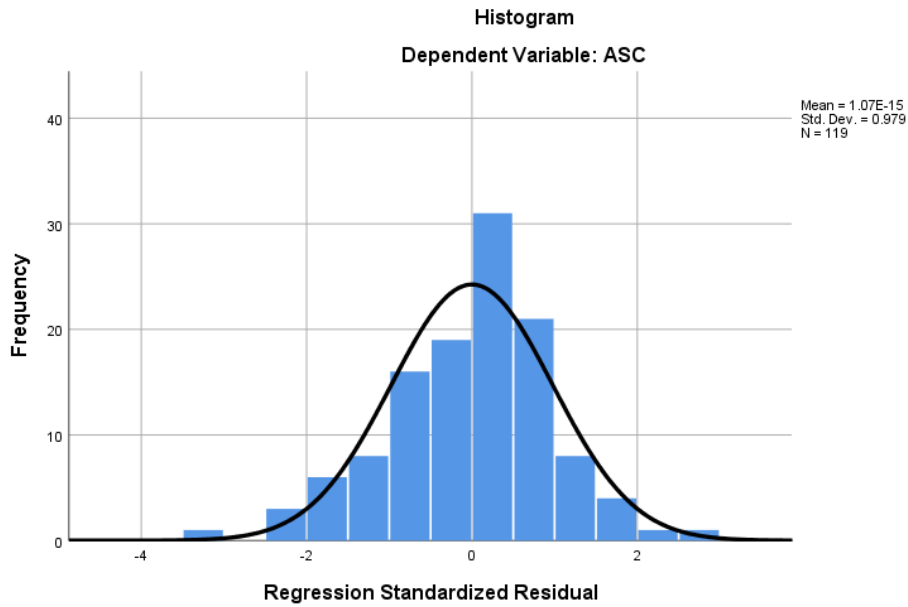
#### **4.4 REGRESSION ANALYSIS**

Multiple linear regression analysis was used to determine how well the explanatory variables indicated the variation in the explanatory variable. Using the statistical method known as multiple regression analysis, one can investigate the relationship between a dependent or criteria variable and a group of independent or prediction variable(s). Regression's main goal, in contrast to correlation, is prediction (Marczyk, 2017).

Multiple regression is a statistical tool which is often utilized to determine the best predictive relationship for a particular collection of both dependent and independent variables. Its goal is to assess the influence of a specific variable or collection of variables, find structural connections, and provide an explanation for multiple relationships (Robert, 2017). As a result, the multiple linear regression method was used in this investigation to ascertain the distinct contributions made by every distinct independent variable factor to the dependent variable.

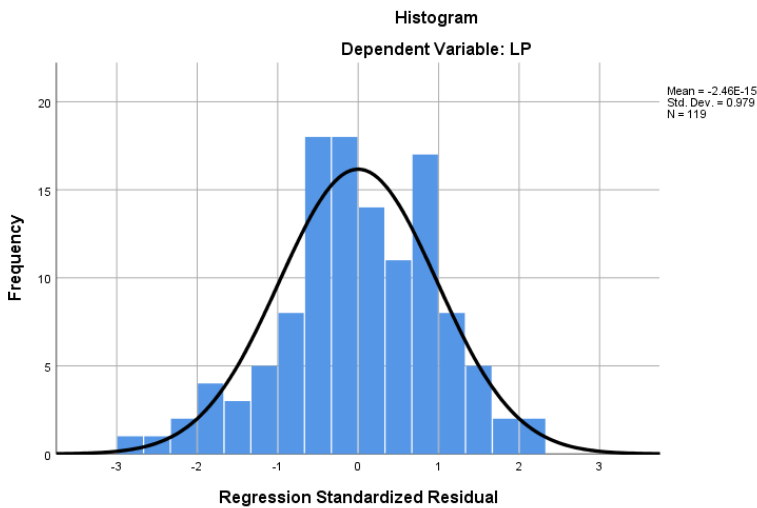
#### 4.4.1 ASSUMPTION TESTS

Three assumption tests were conducted before the regression analysis and the results are listed



below.

*Figure 2 Histogram for objective 3*

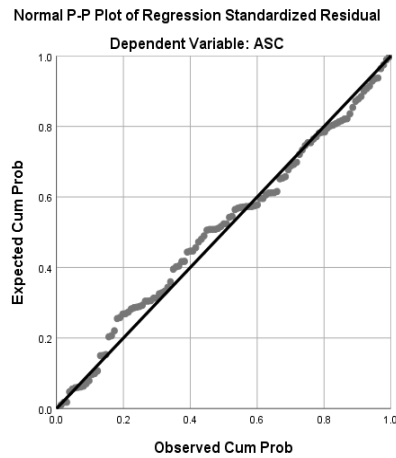


*Figure 3 Histogram for objective 4*

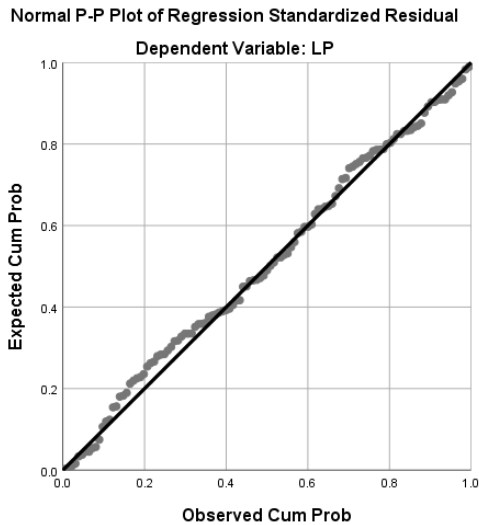
**Normaly Dstributed Test:** The residuals are taken to be random variables with a normal distribution. This demonstrates that there are very few situations when there are significant

deviations greater than zero and that the variations between the model and the real data typically are zero or very near to zero (Creswell, 2018). Examine the histogram and the normal probability plot to see whether the residuals are normally distributed.

For both regressions, based on the histogram in Figure 2 and Figure 3, the distribution pattern generally appears to be normal.



*Figure 4 P-P Plots for objective 3*

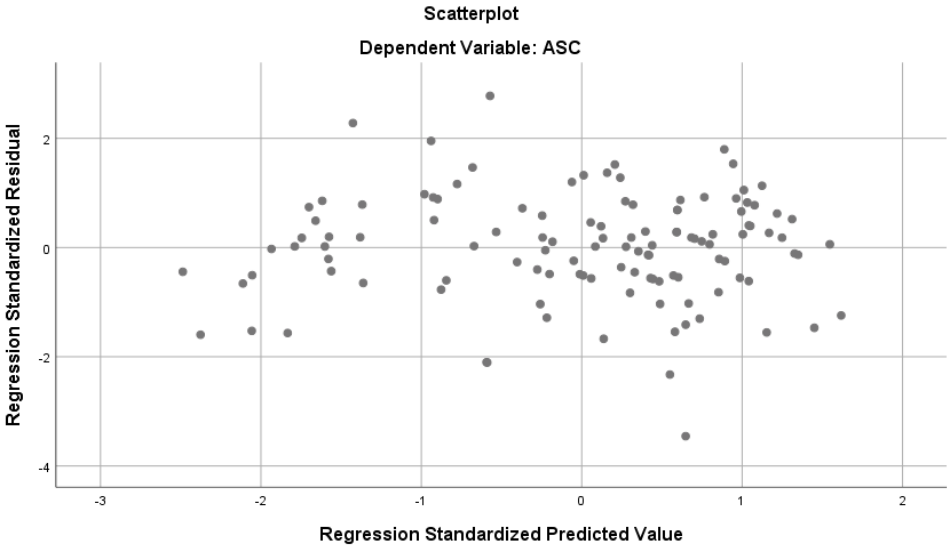


*Figure 5 P-P Plots for objective 4*

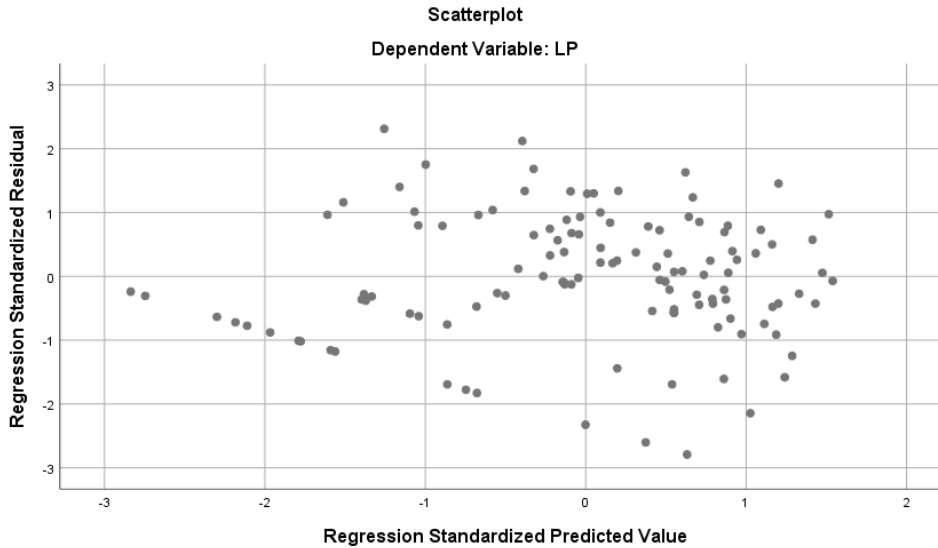
The divergence from normalcy is shown in the normal probability plot in Figure 3 and Figure 4 above. The residuals have a more uniform distribution the closer the dots are to the diagonal line.

The P-P plots demonstrate that the points are nearly on the diagonal line or the slope of the line, demonstrating the normality of the distribution.

Homoscedasticity is the presumption that the variance in residuals (or the degree of errors in the model) is identical at each point across the model; in other words, the distribution of residuals should be largely consistent across all points where the linear model predicts a given set of variables. We must look at the resulting finale graph, which is displayed below, to verify this assertion. This graph compares the standardized residuals obtained with the standardized values predicted by our model. As the anticipated values increased (along the x-axis), the variation in the residuals should follow a similar pattern. This should appear to be a random array of dots if everything is in working order. This assumption has most definitely been falsified if the graph looks like a funnel. Our plot of standardized residuals vs standardized predicted values in Figure 4 does not clearly display any signs of funneling, demonstrating that the homoscedasticity criterion has been satisfied.



*Figure 4 Scatter Plot for objective 3*



**Figure 7 Scatter Plot for objective 4**

The third objective of the study was to detect the determinants of agile supply chain management with respect to BGI Ethiopia. To see which determinants of agile supply chain are enablers of Agile supply chain management, regression analysis was used.

The table below shows the model summary and it indicates how much the variance in Agile Supply Chain Management (Alertness, Accessibility, Decisiveness, Swiftiness and Flexibility) is explained by explanatory variables (Technology Utilization, Resource Management, Supplier relation, Environmental pressure and Delivery speed) in the model.

**Table 4. 8 Model Summary for Agile supply chain management dimensions and Determinants of agile supply chain**

Model	R	R square	Adjusted R square	Std. Error of the Estimate	Durbin- Watson
1	0.744 <sup>a</sup>	0.554	0.534	0.32638	2.218

a. Predictors: (Constant), DS, RM, SR, TU, EP

Source: own SPSS survey result (2023)

The Adjusted R Square value in the model summary table illustrates the relationship among the measured values of the dependent variable, indicating that the adjusted R square value derived indicates that the combined variance in the parameters of the independent variable, determinants of agile supply chain, can explain 53.4% of the variation in Agile Supply chain management.

**Table 4. 9 Anova for Agile supply chain management dimensions and Determinants of agile supply chain**

Model		Sum of squares	df	Mean square	F	sig
1	Regression	14.951	5	2.990	28.072	0.000 <sup>b</sup>
	Residual	12.037	113	.107		
	Total	26.989	118			

- a. Dependent Variable: ASC
- b. Predictors: (Constant), DS, RM, SR, TU, EP

Source: own SPSS survey result (2023)

The statistical acceptability of the model is verified by the ANOVA test. In contrast to the regression row, which displays the level of variation described by the model, the residual row, or variation on the dependent variable derived from components not included in the model, gives information about the variation that is not provided for by the model.

According to the table above, the computed F statistic is 28.072 with a noticeable significance level of 0.000, indicating the statistical fitness of the regression model.

The regression model has a substantial impact on agile supply chain management because the Significance value is 0.000, which is smaller than 0.005. The regression model is statistically significant as a result of this. That is, since the regression analysis explains the influence of Agile Supply Chain Determinants.

**Table 4. 10 Coefficients for Agile supply chain management dimensions and Determinants of agile supply chain**

Model		Unstandardized Coefficients		Standardized Coefficients	t	sig
		B	Std. Error	Beta		
1	(Constant)	1.356	0.192		7.054	0.000
	TU	0.201	0.053	0.325	3.837	0.000
	RM	0.197	0.058	0.283	3.377	0.001
	SR	0.059	0.050	0.91	1.182	0.240
	EP	- 0.010	0.046	-0.017	-0.216	0.829
	DS	0.180	0.052	0.260	3.447	0.001

a. Dependent Variable: ASC

Source: own SPSS survey result (2023)

The unstandardized beta value displays the number of standard deviations that will vary with every prediction change of one standard deviation. Because the units of standard deviation are closely analogous, they offer a clearer understanding of the significance of a predictor variable in the model. The dependent variable can be predicted more accurately when an independent variable's large beta coefficient value is present. The unstandardized beta value for Technology Utilization, Resource Management, Supplier Relations, Environmental Pressure and Delivery speed are 0.201, 0.197, 0.059, - 0.010 and, 0.180 respectively.

Finally, the model will be,

$$Y = 1.356 + 0.325X_1 + 0.283X_2 + 0.260X_3 + e$$

Where X1 is Technology utilization

X2 is Resource management

X3 is Delivery Speed

From the coefficients table, it can also observe the significance level of the independent variables, Technology Utilization, Resource Management, supplier relations, Environmental Pressure and, Delivery Speed. Among these variables, with P-value less than 0.05 are Technology utilization, Resource management and, Delivery speed are the ones that are significant.

#### 4.4.1 HYPOTHESIS (1) TESTING

*Table 4. 11 Hypothesis (1) Summary*

	<b>Hypothesis</b>	<b>P- Value</b>	<b>Remark</b>
H1 <sub>a</sub>	Technology Utilization positively and significantly enables agile supply chain management.	0.000	H1 <sub>a</sub> = Accepted
H1 <sub>b</sub>	Resource Management positively and significantly enables agile supply chain management.	0.001	H1 <sub>b</sub> = Accepted
H1 <sub>c</sub>	Supplier Relations positively and significantly enables agile supply chain management.	0.240	H1 <sub>c</sub> = Rejected
H1 <sub>d</sub>	Environmental Pressure positively and significantly enables agile supply chain management.	0.829	H1 <sub>d</sub> = Rejected
H1 <sub>e</sub>	Delivery Speed positively and significantly enables agile supply chain management	0.001	H1 <sub>e</sub> = Accepted

Source: own SPSS survey result (2023)

The fourth and last objective of the study is to identify the role of agile supply chain management on logistics performance of BGI Ethiopia. Regression analysis was used to identify which dimensions affect Logistics performance.

The table below shows the model summary and it indicates how much the variance in Logistics \performance (Efficiency, effectiveness and differentiation) is explained by explanatory variables (Alertness, accessibility, decisiveness, swiftness and flexibility) in the model.

**Table 4. 12 Model Summary for Agile supply chain management dimensions and Logistics performance**

Model	R	R square	Adjusted R square	Std. Error of the Estimate	Durbin- Watson
1	0.601 <sup>a</sup>	0.361	0.333	0.44233	1.867

a. Dependent Variable: LP

b. Predictors: (Constant), FL, AC, DE, SW, AL

Source: own SPSS survey result (2023)

The Adjusted R Square value in the model summary table illustrates the relationship among the measured values of the dependent variable, indicating that the adjusted R square value derived indicates that the combined variance in the parameters of the independent variable, agile supply chain dimensions, can explain 33.3% of the variation in Logistics performance.

**Table 4. 13 ANOVA for Agile supply chain management dimensions and Logistics Performance**

Model		Sum of squares	df	Mean square	F	sig
1	Regression	12.493	5	2.499	12.771	0.000 <sup>b</sup>
	Residual	22.109	113	0.196		
	Total	34.602	118			

a. Dependent Variable: LP

b. Predictors: (Constant), FL, AC, DE, SW, AL

Source: own SPSS survey result (2023)

The statistical acceptability of the model is verified by the ANOVA test. In contrast to the regression row, which displays the level of variation described by the model, the residual row, or variation on the dependent variable derived from components not included in the model, gives information about the variation that is not provided for by the model.

According to the table above, the computed F statistic is 12.771 with a noticeable significance level of 0.000, indicating the statistical fitness of the regression model.

The regression model has a substantial impact on agile supply chain management because the Significance value is 0.000, which is smaller than 0.005. The regression model is statistically significant as a result of this. That is, since the regression analysis explains the influence of Agile Supply Chain Dimensions.

**Table 4. 14 Coefficients for Agile supply chain management and Logistics Performance**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	sig
		B	Std. Error			
1	(Constant)	1.435	0.315		4.552	0.000
	AL	0.177	0.069	0.245	2.556	0.012
	AC	0.042	0.057	0.057	0.734	0.464
	DE	0.182	0.063	0.270	2.911	0.004
	SW	- 0.001	0.049	-0.002	-0.024	0.981
	FL	0.226	0.054	0.340	4.174	0.000

a. Dependent Variable: LP

Source: own SPSS survey result (2023)

The unstandardized beta value displays the number of standard deviations that will vary with every prediction change of one standard deviation. Because the units of standard deviation are directly comparable, they provide a clearer understanding of the significance of a predictor variable in the model. The dependent variable can be predicted more accurately when an independent variable's large beta coefficient value is present. The unstandardized beta value for Alertness, accessibility, decisiveness, swiftness and flexibility are 0.177, 0.042, 0.182, -0.001, 0.226 respectively.

Finally, the model will be,

$$Y = 1.435 + 0.245X_1 + 0.270X_2 + 0.340X_3 + e$$

Where X1 is Alertness

X2 is Decisiveness

X3 is Flexibility

From the coefficients table, it can also observe the significance level of the independent variables, Technology Utilization, Resource Management, supplier relations, Environmental Pressure and, Delivery Speed. Among these variables, with P-value less than 0.05 are Technology utilization, Resource management and, Delivery speed are the ones that are significant.

#### 4.4.2 HYPOTHESIS (2) TESTING

*Table 4. 15 Hypothesis (2) Summary*

	<b>Hypothesis</b>	<b>P- Value</b>	<b>Remark</b>
H2 <sub>a</sub>	Alertness positively and significantly influences the Logistics Performance of BGI Ethiopia.	0.012	H2 <sub>a</sub> = Accepted
H2 <sub>b</sub>	Accessibility positively and significantly influences the Logistics Performance of BGI Ethiopia.	0.464	H2 <sub>b</sub> = Rejected

H2 <sub>c</sub>	Decisiveness positively and significantly influences the Logistics Performance of BGI Ethiopia.	0.04	H2 <sub>c</sub> = Accepted
H2 <sub>d</sub>	Swiftness positively and significantly influences the Logistics Performance of BGI Ethiopia.	0.981	H2 <sub>d</sub> = Rejected
H2 <sub>e</sub>	Flexibility positively and significantly influences the Logistics Performance of BGI Ethiopia.	0.000	H2 <sub>e</sub> = Accepted

Source: own SPSS survey result (2023)

**4.4 DISCUSSION**

**PRACTICE OF AGILE SUPPLY CHAIN IN BGI ETHIOPIA**

The first objective of the study was to examine the agile supply chain strategies of BGI Ethiopia in terms of the five agile supply chain dimensions which are Alertness, Accessibility, Decisiveness, Swiftness and Flexibility. The study revealed that the organization. Alertness had a high grand mean of 3.69 shows that larger portion of the respondents believe that BGI Ethiopia is Alert to different situations and opportunities arising in its business environment. Although their responses on the first statement were rather neutral, the respondents agreed with the other two statements. For the second dimension, Accessibility, with a mean of 3.55 which shows a high ranking to having access to different industry data and historical records to make good decisions. The third dimension was Decisiveness. This dimension has a grand mean of 3.40 which is lies in the average or moderate ranking. This shows that the respondents were rather divided when answering the questions. Swiftness is the fourth dimension and it had a grand mean of 3.19 which is average and a more neutral response was observed. The respondents were divided when it comes to the organization carrying out its plan of action promptly. And finally, the last dimension is flexibility. This dimension had a high mean score of 3.70 in which all the statements also had high

mean scores. This shows that the organization is capable of changing ongoing processes when new possibilities arise without causing disruption to the entire business process.

When comparing the means of the five dimensions, it was observed that Flexibility took the first rank, Alertness took the second rank, Accessibility took the third rank, Decisiveness took the fourth rank and finally Swiftnes took the fifth and last rank. Although there is a gap when it comes to the dimensions of Agility proposed by (Gligor, 2015) it was observed that the organization has an overall good adoption of Supply chain agility.

### **LOGISTICS PERFORMANCE OF BGI ETHIOPIA**

The second goal of the study was to measure the logistics performance of the organization in terms of Logistics efficiency, Logistics effectiveness and Logistics differentiation. The first variable was logistics efficiency and it had a grand mean of 3.80 when interpreted is high. All the statements used to assess the variable had mean scores that lie in the high intervals. This shows that the organization handles resources intelligently. The second dimension is Logistics effectiveness and it had a grand mean score of 3.25 which is average. Statements about transport cost and total logistics cost had a mean value that lies in the low interval while the others lie in the high interval. The final variable is logistics differentiation and it had a high mean score of 4.00. All the statement pertaining to Logistics differentiation had means that lie in the high interval. This shows the organization is better at the items mentioned above when computed against rivals and competitors. A Grand mean of 3.68 shows that BGI Ethiopia has a high Logistics Performance. Although there are some improvements when it comes to logistics performance of the organization, the results support findings from previous studies made by (Berhane, 2020), on the logistics performance of alcoholic manufacturers in Ethiopia.

### **REGRESSION ANALYSIS**

The third finding was related to the third objective which is the identification of the determinant agile supply chain strategy for the Agile Supply Chain management of BGI Ethiopia. To select

which variable has a significant effect on the Agile Supply Chain management, Regression analysis was used.

The R value of the model was 0.744, the R square value was 0.554, and the Adjusted R square value was 0.534. The corrected R square value obtained suggests that the combined variance in dimensions of the independent variable, determinants of agile supply chain, can explain 53.4% of the variation in Agile Supply Chain management. The calculated adjusted R square value demonstrates the link between the observed dependent variable values in the model summary table.

The calculated F statistic, which shows the statistical fitness of the regression model, is 28.072 with an observed significance level of 0.000.

Since the Significance value is 0.000, which is less than 0.005, it can also be seen that the regression model significantly affects Agile Supply Chain management. This demonstrates the statistical significance of the regression model. That is to say, the regression analysis reveals how the Determinants of Agile Supply chain affect each other.

The significance level of the independent variables, Technology Utilization, Resource Management, Supplier Relationships, Environmental Pressure, and Delivery Speed, may also be seen from the coefficients table. The ones that are significant among these variables with a P-value under 0.05 are delivery speed, resource management, and technology utilization. From prior studies done by (Ghatari *et al.*, 2013), it was observed that priority should be given to Delivery speed is a dimension that needs to be prioritized. Studies made by (Power, Sohal and Rahman, 2001) indicate that Technology Utilization and Resource Management are important indicators of agility as well. There was no significant effect shown on the dependent variables from Supplier relations and environmental pressure although these factors are important ones. This could be attributed to the size of the sample or random variation within the data.

The fourth finding was concerned with the fourth objective which is concerned with the role agile supply chain management plays on Logistics performance. Just like the third objective, regression analysis was used to identify which has a significant effect on the dependent variable.

The Adjusted R Square value in the model summary table illustrates the relationship between the observed values of the dependent variable, indicating that 33.3% of the variation in Logistics Performance can be explained by the combined variance in dimensions of the independent variable, agile supply chain management dimensions.

From the table above, it can be observed that the computed F statistic is 12.771 with an observed significance level of 0.000, which indicates the statistical fitness of the regression model.

Since the Significance value is 0.000, which is less than 0.005, it can also be seen that the regression model significantly affects Agile Supply Chain management. This demonstrates the statistical significance of the regression model. That is to say, the regression analysis reveals how the agile supply chain management dimensions affect Logistics performance.

The significance level of the independent variables, Alertness, Accessibility, Decisiveness, Swiftness and Flexibility may also be seen from the coefficients table. The ones that are significant among these variables with a P-value under 0.05 are Alertness, Decisiveness and Flexibility. Although there is a gap when it comes to agile supply chain and logistics performance, other studies were made on the effect of the dimensions on organizational performance. Other studies were also done on the relationship between organizational performance and logistics performance which overall supports the final finding. Statistical significance wasn't observed when it comes to Swiftness and accessibility but this could be attributed to either random variation or small sample size.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

This section highlights the research's key data findings, makes conclusions from those findings, and gives recommendations to ensure the improvement of agility within the organization. The chapter is organized as follows: Summary, Conclusion, recommendations, and proposals for future research.

#### **5.1 SUMMARY**

The primary goal of this research was to investigate the impact of agile supply chain techniques as predictors of BGI Ethiopia's logistics performance. And the subsequent summary is based on the study's findings. Agility was defined as the ability to take the necessary measures against previously unknown challenges and perils, and to regard these conditions as opportunities.

In this study, different variables were utilized to investigate different areas. Agile supply chain management was measured using five dimensions of supply chain agility which are Alertness, Accessibility, Decisiveness, Swiftiness and Flexibility. Enablers of Agility were Technology Utilization, Resource Management, Supplier Relations, Environmental Pressure and Delivery Speed were used and finally, to measure logistics performance, Logistics Efficiency, Logistics Effectiveness and Logistics Differentiation were utilized

The research strategy and methodology used in the study were appropriate. Then an instrument for research was developed. Before distributing the research instrument to the employees of BGI Ethiopia in various departments, the constructs were pre-tested to make sure they were internally consistent.

The study showed that Agile Supply Chain strategy as determinant of Logistics performance of BGI Ethiopia. In accordance to the findings of the study, from the analyzed data in the descriptive analysis and regression analysis there is a significant interaction among the three variables, Determinants of agile supply chain, Agile Supply chain management dimensions and Logistics

performance. It was observed that the organization has an overall good adoption of Supply chain agility. Flexibility, Alertness and Accessibility had high ranking means and Decisiveness and Swiftness had moderate ranking means.

The overall Logistics performance of the organization is high which was shown by a high grand mean. Logistics efficiency and Logistics Differentiation had high ranking means and Logistics Effectiveness had an average ranking mean. Although there are some improvements when it comes to logistics performance of the organization, the results support findings from previous studies on the logistics performance of alcoholic manufacturers in Ethiopia.

The first regression analysis showed that Technology utilization, Delivery speed and resource management with p value less than 0.05, have a positive and significant effect on Agile supply chain management. There was no significant effect shown on the dependent variables from Supplier relations and environmental pressure although these factors are important ones. This could be attributed to the size of the sample or random variation within the data.

The second regression analysis shows that Alertness, Decisiveness and Flexibility with p value less than 0.05 significantly and positively affect logistics performance of the organization. Although there is a gap when it comes to agile supply chain and logistics performance, other studies were made on the effect of the dimensions on organizational performance. Other studies were also done on the relationship between organizational performance and logistics performance which overall supports the final finding. Statistical significance wasn't observed when it comes to Swiftness and accessibility but this could be attributed to either random variation or small sample size.

## **5.2 CONCLUSION**

The findings of this study indicated that the adoption of dimensions of supply chain agility practices was high. It was observed that BGI Ethiopia, although in some areas lack the necessary understanding of some of the variables, overall the adoption of the dimensions was good. Among

the five dimensions, Flexibility Alertness, Accessibility, Decisiveness and Swiftness ranked one through five respectively. Their rank was determined by introducing intervals and comparing their mean scores.

It was also observed that the Logistics performance of the organization was high with an overall mean that lies in the high interval. Although the mean of the Logistics effectiveness of the organization was average, the mean of the logistics efficiency and the Logistics differentiation of the organization scored high.

In the first regression analysis, it was observed that Technology Utilization, Resource management and Delivery speed had greater significance compared to Supplier relations and Environmental factors. An R score of 0.744, R square value of 0.554 and an Adjusted R square value of 0.534 were observed which shows the statistical fit of the Model.

In the second regression analysis, it was observed that Alertness, Decisiveness and Flexibility had greater significance compared to Accessibility and Swiftness. An R score of 0.601, R square value of 0.361 and an Adjusted R square value of 0.333 were observed which shows the statistical fit of the Model.

### **5.3 RECOMMENDATION**

Based on the findings of the study, the following are the researcher's recommendations that BGI Ethiopia should focus on to maximize their market share and improve their operation. Although the company scored high on most of the measurement criteria, there are some areas of improvement that needs to be implemented to make the overall performance of the organization better.

- BGI Ethiopia has a good performance when it comes to Dimensions of supply chain agility but they can do better. By improving metrics on all dimensions especially, in accessibility and swiftness they can increase their overall performance. The Supply chain department should focus on these dimensions so that they increase their overall Agility.

- BGI Ethiopia has a very good Logistics performance, particularly when it comes to Logistics efficiency and Logistics Differentiation. But the company's logistics effectiveness is average. To increase the overall Logistics the supply chain team and logistics team must work together. To increase the logistics effectiveness the company should focus on staying under the budget, so they perform better.
- As seen from the first regression, Technology Utilization, Resource Management and Delivery speed significantly and positively affect agile supply chain strategies or dimensions. Management should focus on these variables to improve the dependent variable, agile supply chain dimensions.
- As seen from the second regression, Alertness, Decisiveness and Flexibility positively and significantly affects Logistics performance. Supply chain and logistics department should focus on the three significant enablers to increase the overall performance.

#### **5.4 SUGGESTIONS FOR FUTURE RESEARCH.**

The research concentrated on supply chain agility dimensions, factors of agile supply chain performance, and logistics performance. It analyzed the level of adoption of supply chain agility and logistics performance, as well as the impact of agile supply chain determinants on logistics performance. For future research, the researcher recommends employing various indicators for both logistics performance and determinants of agile supply chain, as well as exploring the possibilities that emerge and developing a model that depicts a holistic perspective of a firm.

## REFERENCE

- Adams, John & Khan, Hafiz & Raeside, Robert. (2014). *Research Methods for Graduate Business and Social Science Students*. 10.4135/9788132108498.
- Ateke, B. W., & Kalu, S. E. (2016). *Collaborative marketing and business wellness of Global System of Mobile-communication (GSM) service providers in Nigeria* International Journal of Marketing and Communication Studies, 1(1), 14-26.
- Azevedo, S. G, Govindan, K., Carvalho, H., & Cruz-Machado, V. (2012). *An integrated model to assess the leanness and agility of the automotive industry*. Resource Conservation and Recycling, doi: 10.1016/j.resconrec.2011.12.013.
- Bakar, A., Azlan, M., Suzana, H., Azlan Abu Bakar, M., Suzana Jaafar, H., Faisol, N. and Muhammad, A., (2014). *Logistics Performance Measurements-Issues and Reviews*. Munich Personal RePEc Archive
- Baker, S. M., Faircloth, J. B., & Simental, V. (2005). *Perceptions of University-Corporate partnership influences on a brand*. Journal of Marketing Theory and Practice, 13(2), 32-46
- Berhane, D (2020), *Assessing the Relation Between Logistics Performance and Organizational Performance*, Addis Ababa University Library research catalog
- Bobbitt, L. Michelle (2004), *An Examination of the Logistics Leverage Process: Implications for Marketing Strategy and Competitive Advantage*, Unpublished Ph.D. Dissertation, The University of Tennessee.
- Bovet, D. and Martha, J. (2000) From Supply Chain to Value Net. Journal of Business Strategy
- Bryman, A. and Bell, E. (2007). *Business research methods*. Oxford University Press, USA.
- Carvalho J., (1984). *Archival application of mathematical sampling techniques*, Records management quarterly, 18(63).

- Christopher, M., (2000). *The Agile Supply Chain : Competing in Volatile Markets*. Industrial Marketing Management,
- Christopher M & Towill D. (2000) *Supply chain migration from lean and functional to agile and customized*. *Supply Chain Management: An International Journal* 5(4): 206–213.
- Christopher, M. and Towill, D.R. (2002), *Developing Market Specific Supply Chain Strategies*, *International Journal of Logistics Management*, 13:1, pp. 1-14.
- Council of Logistics Management, promotional material, and website at [www.clm.org](http://www.clm.org)
- Creswell, W. (2003). *Research Design: Quantitative, qualitative and mixed methods approach*. (2nded.). Thousand Oaks, CA: Sage
- CSCMP, (2018). Concils of Supply Chain Management Professionals. Available at: <http://www.clm1.org> [Accessed 27 January 2018]
- David M. Gligor, (2015), *The five dimensions of supply chain agility*.
- Ferreira, P. O., Francescki, A. S. N., Melo, D. M., Silva, J. R., & Reichert, L. R. (2017). *Lean Thinking as support to integration of Service areas*. *Journal of Lean Systems*, 2(4): 2-12.
- Fugate, Brian S., John T. Mentzer, & Stank T. P. (2010). *Logistics Performance: Efficiency, Effectiveness, and Differentiation*: *Journal of Business Logistics* 31(1) 43-62
- Fynes B., Burca d. S. & Mangan, J. (2008), *The effect of Relationship Characteristics on relationship quality and performance*. *International Journal of Production Economic*
- Ghatari, A. R., Mchralian, G. Zarenezhad Forouzabdch and Rasekh, H. R. (2013) *Developing a model for agile supply: an impirical study from Iranian Pharmaceutical supply chain*. *Iranian Journal of Pharmaceutical research*.
- Govender T., Niemann W., Meyer A. & Kotze T., (2014), *Agile Practices and Supply Chain Resilience: A Study of Food and Beverage Manufacturers in South Africa*.

- Guimarães, M. C., & Rodriguez, C. M. T. (2018). *Lean assembly supply strategies and results in logistics and manufacturing*. Journal of Lean Systems, 3(4): 15-37.
- Ismail HS & Sharifi H. (2005) *Supply Chain Design for supply Chain: A balanced approach to building agile supply chain*. In: Andersin HE, Niemi R & Hirvonen V (eds) Proceedings of the International Conference on Agility – ICAM 2005, Helsinki, Finland, July 2005, Helsinki University of Technology,
- Lambert, D.M. and Schwieterman, M.A. (2012), *Supplier relationship management as a macro business process*, Supply Chain Management, Vol. 17 No. 3, pp. 337-352.
- Langley, C.J., Holcomb, M.C., (1992) *Creating logistics customer value*. Journal of Business Logistics 13 (2), 1-27.
- Li, Xun, Chen Chung, Thomas J. Goldsby, and Clyde W. Holsapple. (2008). *A Unified Model of Supply Chain Agility: The Work-Design Perspective*. The International Journal of Logistics Management 19 (3): 408-435. doi:10.1108/09574090810919224.
- Likert, R. (1932). *A technique for the measurement of attitudes*. Archives of Psychology, 22 140, 55.
- Lu, D. D., (2011) *Fundamentals of supply chain management*. S.l.: Ventus publishing Aps.
- Malhotra, N.K. and Birks, D. (2006) *Marketing Research: An Applied Approach*. 3rd Edition, Prentice Hall, Upper Saddle River.
- Marcus, I. (2010), *Agile supply chain: Strategy for Competitive Advantage*, Journal of Global strategic management
- Marczyk, G. D. D. & F. D. (. E. o. R. D. a. M. N. Y. N. J. W. & S. I., (2017). *Essentials of Research Design and Methodology*. Open journal of modern linguistics, 7(No.2,).

- Mason-Jones, R., Naylor, B. and Towill, D. R. (2000) *Lean, agile or leagile? Matching your supply chain to the marketplace*. International Journal of Production Research, 38(17): 4061-70.
- Narasimhan, R., Kim, S.W. and Tan, K.C., (2008). *An empirical investigation of supply chain strategy typologies and relationships to performance*. International Journal of Production Research, 46(18), pp.5231–5259. <https://doi.org/10.1080/00207540600847137>.
- Naylor, B. J., Naim, M. M. and Berry, D. (1999). *Leagility: Integrating the lean & agile manufacturing paradigms in the total supply chain*. International Journal of Production Economics, 62 (1-2), pp.107-118.
- Ohno, T. (1988) *Toyota Production System: Beyond Large Scale Production*. Productivity Press, New York.
- Perry, M. (1996), Talk at the Marketing Council, London. Pereira-Moliner, J., Claver-Cortés, E., Molina-Azorín, J. F., and Tarí, J. J. (2012). *Quality management, environmental management and firm performance: direct and mediating effects in the hotel industry*. Journal of Cleaner Production, 37, 82-92.
- Power, D.J., Sohal, A.S. and Rahman, S. (2001), "Critical success factors in agile supply chain management - An empirical study", International Journal of Physical Distribution & Logistics Management, Vol. 31 No. 4, pp. 247-265. <https://doi.org/10.1108/09600030110394923>
- Purnomo, A., (2009) *Agile Supply Chain and its Implications on Green Logistics Performance. On Green Technology and Engineering*.
- Qi, Y., Boyer, K.K. and Zhao, X. (2009), *Supply chain strategy, product characteristics, and performance impact: evidence from Chinese manufacturers*, Decision Sciences, Vol. 40, No. 4, pp. 667- 695

- Riopel D., A. Langevin, J.F. Campbell, (2005), *The network of logistics decisions*, chapter published in: A. Langevin, D. Riopel (Eds.), *Logistics Systems: Definition and Optimization*, Springer, New York,
- Robert, (2017). *Regression and Prediction. In: Practical Statistics for Data Scientists*. s.l.:O'Reilly Media, Inc..
- Sayuti,, M. N. (2011), *Critical determinants of agile supply chain in buyer and supplier relationship: A Literature Review and future direction*, *International Journal of Business and Management*
- Sharifi, H. and Zhang, Z., (1999). *A Methodology for Achieving Agility in Manufacturing Organizations: An Introduction*. *International Journal of Production Economics*, pp.7–22.
- Sharma, N., Sahay, B. S., Shankar, R., & Sarma, P. R. S. (2017). *Supply chain agility: review, classification and synthesis*. *International Journal of Logistics Research and Applications*, 20(6), 532 559.
- Sohel, R.S.M., Osman, A., Kol, L., bin Bahari, A. and Solaiman, M., (2015). *Determinants of Supply Chain Performance: A Strategic Point of View*. Available at: <<https://www.researchgate.net/publication/282605394>>.
- Stalk G. Jr, Hout T.M. (1990). *Competing Against Time: How Time-Based Competition Is Reshaping Global Markets*, The Free Press, New York.
- Swafford, P.M., Ghosh, S. and Murthy, N., (2006). *The antecedents of supply chain agility of a firm: Scale development and model testing*. *Journal of Operations Management*, 24(2), pp.170–188. <https://doi.org/10.1016/J.JOM.2005.05.002>.
- Tracey, S., Ruamsook, K. and Smith, G., (2021). Contributing authors. *The Spectrum of Supply Chain Agility*.

- Van der Vorst, J. and van der Vorst, J.G.A.J., (2004). *Supply Chain Management: theory and practices Robust food/ supply supply chains View project Reverse Supply Chain Redesign for Household Plastic Waste View project Supply Chain Management: theory and practices.*
- Varma, S. and Shah, B., (2021). *A Study of the Relationship between Logistics Performance and Human Development.*
- Walter, B. and Michael, N., (2017). *Agile Supply Chain Management Practices and Competitiveness of SMEs: A Conceptualization.* International Journal of Social Sciences and Management Research, Available at: <[www.iiardpub.org](http://www.iiardpub.org)>.
- Womack, J., Jones, D., & Roos, D. (1990). *The machine that changed the world.* New York: Rawson Associates.
- Womack, J. P., & Jones, D. T. (2003). *Lean thinking: banish waste and create wealth in your corporation.* New York: Free Press.
- Yusuf, Y.Y., Gunasekaran, A., Adeleye, E.O., & Sivayoganathan, K. (2004). *Agile supply chain capabilities: Determinants of competitive objectives.* European Journal of Operational Research, 159, 379-392.
- Zelege, B., (2021). *The effect of supply chain agility on operational performance: the case of ethiopian airlines maintenance, repair and overhaul unit (et-mro).*

## **APPENDIX A:**

### **INTRODUCTION LETTER**

Dear Respondent

My name is Bemnet Hailu and I am currently pursuing my Master of Arts in Logistics and Supply Chain Management at Addis Ababa University, School of Commerce. I am working on my research titled “The influence of Agile Supply Chain strategies as Determinants of Logistics Performance of BGI Ethiopia.” As a requirement in partial fulfillment for the degree of Master of Arts in Logistics and Supply Chain program. This questionnaire is prepared only for academic purposes and because you have the necessary knowledge and expertise in the area of study. The study follows confidentiality and your answers to the following questions will only be used for this research only. I kindly ask you to take a few minutes out of your time and fill the questionnaire on current situations.

Thank you for participating.

Sincerely, Bemnet Hailu

Researcher

Email- [bemnet.hailu@gmail.com](mailto:bemnet.hailu@gmail.com)

Telephone: +251921407635



- 3 = Neutral
- 4 = Agree
- 5 = Strongly agree

<b>SUPPLY CHAIN AGILITY<sup>2</sup></b>	<b>SCALE</b>				
<b>ALERTNESS</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
BGI Ethiopia is quick to notice changes in the company's working environment					
BGI Ethiopia is quick to discover new business possibilities					
BGI Ethiopia is rapid detection of dangers in its business environment					
<b>ACCESSIBILITY</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
BGI Ethiopia Suppliers are ready to provide pertinent information to the organization.					
BGI Ethiopia Customers are fast to provide pertinent information to the organization.					
BGI employees, usually quickly access data needed to make decisions					
<b>DECISIVENESS</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
BGI Ethiopia has procedures in place to allow for swift decisions					
BGI Ethiopia is quick to make choices about supply chain operations					
BGI Ethiopia is quick to make choices about supply chain tactics					
<b>SWIFTNESS</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
BGI Ethiopia promptly implements the decision to change the supply chain operations.					
BGI Ethiopia can quickly adopt a change in its supply chain techniques.					
BGI Ethiopia is quick to make adjustments to its supply chain					
<b>FLEXIBILITY</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

BGI Ethiopia's Suppliers can respond rapidly to an increase in order size.					
BGI Ethiopia's Suppliers can swiftly modify order specifications.					
BGI Ethiopia's Suppliers can readily modify or accelerate their delivery lead time.					

**Source: Gligor (2015)**

**Objective 2:** The following questions are interceded to identify the determinants of agile supply chain strategy for the logistics performance of BGI Ethiopia.

S.No	Determinants of agile supply chain strategy for the logistics performance	SCALE				
		1	2	3	4	5
<b>1</b>	<b>A: Technology Utilization</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.1	Adoption of Computerized technologies in the extent of contribution to competitive position helps BGI Ethiopia improve its agile supply chain strategy					
1.2	The use of Local area network helps to effectively communicate with suppliers hence, improved its agile supply chain strategy					
1.3	Adoption of core manufacturing technology allows BGI Ethiopia to be competitive in the marketplace, hence, improved its agile supply chain strategy					
<b>2</b>	<b>B: Resource Management</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
2.1	BGI Ethiopia has an advantage in the area of material management and warehousing which helped to improve its agile supply chain strategy					
2.2	BGI Ethiopia has an advantage in the area of production planning and control					
2.3	BGI Ethiopia has a variety of competitive suppliers to choose from, this helped to improve its agile supply chain strategy					

2.4	BGI Ethiopia's Order consolidation is satisfactory, helped to improve its agile supply chain strategy					
<b>3</b>	<b>C: Supplier relations</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
3.1	BGI Ethiopia works closely with suppliers during product development to improve its agile supply chain strategy					
3.2	BGI Ethiopia works closely with its suppliers to improve each other's processes, helped to improve its agile supply chain strategy					
3.3	BGI Ethiopia's suppliers have an effective system for measuring the quality of the materials they send this helped them to improve its agile supply chain strategy					
<b>4</b>	<b>D: Environmental pressure</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
4.1	Environmental pressure (such change in customer demand ) positively affects the Agile supply chain capacity of BGI Ethiopia					
4.2	Economic factors improved the Agile supply chain capacity of BGI Ethiopia					
4.3	Social factors improved tthe Agile supply chain capacity of BGI Ethiopia					
<b>5</b>	<b>E: Delivery Speed</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
5.1	BGI Ethiopia's Responsiveness rate helps to improve its agile supply chain strategy through high delivery reliability					
5.2	At BGI Ethiopia there is a trust based relations with suppliers when receiving deliveries					
5.3	BGI Ethiopia receives the correct ordered items from its suppliers.					

Source: Ghatari *et al.* 2013

**Objective 3: The following questions aim to assess the Logistics Performance of BGI Ethiopia.**

S.no	LOGISTICS PERFORMANCE	SCALE
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<b>6</b>	<b>Efficiency</b> (Performance in logistic activities)	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
6.1	BGI Ethiopia's large proportion of orders are dispatched to consumers from the primary location assigned to serve those customers					
6.2	BGI Ethiopia's <b>Line-Item Fill Rate</b> (Percentage of order items the picking operation actually found) Is efficient					
6.3	BGI Ethiopia deliver orders promptly ( <b>Percent of Orders Shipped on Time</b> )					
6.4	BGI Ethiopia's <b>Percent of Shipments</b> Requiring Expediting is adequate					
6.5	BGI Ethiopia has a high number of <b>Inventory Turns per Year</b>					
6.6	BGI Ethiopia's <b>Average Order Cycle Time</b> (Time in days between order receipt and Order Delivery) is low					
<b>7</b>	<b>Effectiveness</b> (Actual logistics performance compared to planned performance)	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
7.1	BGI Ethiopia's <b>Transportation cost</b> is much better for actual performance than budgeted performance					
7.2	BGI Ethiopia's <b>Warehousing cost</b> is much better for actual performance than budgeted performance					
7.3	BGI Ethiopia's <b>Inventory cost</b> is much better for actual performance than budgeted performance					
7.4	BGI Ethiopia's <b>Total logistics cost</b> is much better for actual performance than budgeted performance					
7.5	BGI Ethiopia's <b>Documentation cost</b> is much better for actual performance than budgeted performance					
<b>8</b>	<b>Differentiation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
8.1	BGI Ethiopia provide <b>Damage Free Deliveries</b> when compared to competitors					
8.2	BGI Ethiopia holds a high number of <b>Finished Goods Inventory</b>					

8.3	Demand is <b>accurately forecasted</b> at BGI					
8.4	At BGI the <b>Time between Order Receipt and Delivery</b> is low					
8.5	BGI's <b>Time on Backorder</b> is lower than competitors					
8.6	BGI's <b>Total Inventory turns</b> is higher than competitors					
8.7	BGI makes <b>On-Time Delivery</b> to items ordered					

Source: Bobbit (2004)

## APPENDIX B

### Reliability Tables

#### Alertness

##### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

##### Reliability Statistics

Cronbach's	
Alpha	N of Items
.798	3

#### Decisiveness

##### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

##### Reliability Statistics

Cronbach's	
Alpha	N of Items
.715	3

#### Accessibility

##### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

##### Reliability Statistics

Cronbach's	
Alpha	N of Items
.717	3

#### Swiftess

##### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

##### Reliability Statistics

Cronbach's	
Alpha	N of Items
.809	3

## Flexibility

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.785	3

## Resource Management

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.710	4

## Technology Utilization

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.732	3

## Supplier Relations

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.733	3

## Environmental pressure

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.787	3

## Logistics Efficiency

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.930	6

## Delivery speed

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.728	3

## Logistics Effectiveness

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.830	5

## Logistics Differentiation

### Case Processing Summary

		N	%
Cases	Valid	119	100.0
	Excluded <sup>a</sup>	0	.0
	Total	119	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's	
Alpha	N of Items
.846	7