THE EFFECT OF VERTICAL INTEGRATION PRACTICES ON THE COFFEE SUPPLY CHAIN PERFORMANCE: THE CASE OF ETHIO-GABANA TRADING PLC, ADDIS ABABA, ETHIOPIA

BY

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis by the title of "effect of Vertical integration practices on coffee supply chain performance" is my own original work and that I have not previously in its entirety or in part submitted at any university for a degree.

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This is to Certify that the thesis prepared by Amare Seifu, entitled: "**Effect of vertical integration practices on coffee supply chain performance**" submitted in partial fulfillment of the requirements for the Degree of Master of Arts in logistics and supply chain management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

This study delves in to investigating the practice and effect of vertical integration on the coffee supply chain performance focusing on the case of Ethio-Gabana Trading plc. Drawing up on extensive theoretical literatures, the study conceptualized three VI dimensions: internal, supplier, and customer integration which serves as predictor variables, while supply chain performance was taken as an outcome variable and measured in terms of flexibility, responsiveness, quality, cost, and asset utilization capabilities. To reveal the causal-effect relationship between vertical integration and SCP, descriptive and explanatory research design with quantitative research approach were employed. And primary data was collected through the utilization of survey method and analyzed using both descriptive statistics (mean and standard deviation) and inferential statistics (Pearson correlation and multiple regression) via SPSS. The descriptive statistics result unveiled a strong practice of VI at all dimensions: internal, supplier and customer level at the company. Similarly, the analysis result of the company's current supply chain performance revealed keen company capability in terms of flexibility, responsiveness, and asset management. However, the major challenges lie under cost and quality management capabilities which require immediate measures. Moreover, the Pearson correlation analysis demonstrates a moderate positive correlation between internal, supplier and customer integration with SCP. In addition, the regression analysis conformed the significant positive effect of internal integration, supplier integration and customer integration on SCP. Based on these findings, the company is better to take quality and cost optimization measure inline to upgrading the level of integration across all levels of the supply chain for driving improved SCP.

Keywords: *Vertical Integration, Customer Integration, Internal integration, Supplier Integration, Supply chain performance*

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LIST OF ABBREVIATIONS AND ACRONYMS

AA: -Addis Ababa

CSCMP: - Council of Supply Chain Management Professionals

ECX: - Ethiopian Commodity Exchange

ERP: - Enterprise resource planning

G: - Gelan

IT: - Information technology

ICT: - Information communication technology

ISM: - Institute for supply management

NBE: - National Bank of Ethiopia

SCI: - Supply chain Integration

SCIS: - Supply chain integration strategy

SCP: - Supply chain Performance

SCM: - Supply chain Management

SPSS: - Statistical Package for social science

VIF: - Variance Inflation Factor

VI: - Vertical Integration

CHAPTER ONE

INTRODUCTION

This section of delves into the basics of the study through providing a concise overview on the background, problem statement, research questions, study objectives, scope, momentum, and organization of the study. And the section concludes with an implication of key terms.

1.1 Background of the study

The essence of a supply chain lies in the intricate network built between individuals and companies connected with a common goal of creating and delivering valuable product or service to consumers (Hayes, 2021). This captivating concept has been studied in the past literatures for unraveling the interplay between these interconnected entities with the managing aspects in their collective endeavor of satisfying customer demands. The management interplay network takes us to the concept of supply chain management (SCM). The Institute for Supply Management (ISM) describes SCM as "the configuration and management of coherent, value-adding processes within and beyond the firm boundary with a laser aim of meeting customer requirements (as cited by Khan and Wisner, 2019).

Nowadays, a business environment frequently subjected to anticipated and unanticipated changes (Munir *et al.* 2020). And integration across the SC was pointed as a major determinant strategy of achieving economic, social, and environmental performance (Donkor, Papadopoulos, and Spiegler, 2022). The Council of Supply Chain Management Professionals (CSCMP) views "Supply chain integration (SCI)"as strategic activity connecting critical internal business functions and processes both within and across firms. SCI was implied as a major enabler of green SCM which can leads to better economic, environmental, and operational performance (Kaliani *et al.,* 2018). Similarly, Danese and Romano,

(2011) depicted that, integration at both upper and downstream level can lead to better SCP. SCI takes numerous strategies depending on the industry, market, and nature of the product or service to be provided. And all strategies have a common goal of maximizing total SC surplus (Chopra and Meindl, 2016). Vertical integration (VI) was pointed as a form of SCI made with suppliers, customers, and internal departments (Barratt, 2004).

However, the scope and application of SCISs may vary across countries, since depending on their development plan, economic system, and the contribution of industry sector to their economy, countries may limit the scope and application of SCISs. In Ethiopia, owing to the concession of agricultural sector to the whole economy, the sector had been subjected to successive reforms. From the agricultural sub sectors, crop production covers 65.1 % (National Bank of Ethiopia, 2021). And from crop production, coffee takes the led by generating 30–45% of foreign currency inflow through export (Gizaw, Abafita, and Merra, 2022). For boosting the economic contribution of this sector, the government had made various policy reforms on the marketing, production, and on the interaction of supply chain actors. However, the practice and effect that the reforms brought on the coffee supply chain performance wasn't well addressed and documented whether in the exporter, customer, or supplier level.

1.2 Background of the company

Ethio-Gabana Trading is one of the privately owned limited company that emerged in 2019 as part of Horra corporate group on the mission of exporting commercial and specialty coffee sourced from finest coffee growing regions in Ethiopia. As per the company directory implication, the company has around 472 employees from which 212 are fulltime and 260 as a contract. Since its establishment, the firm has been boldly engaging on the export of both commercial and specialty coffee through sourcing from Ethiopia commodity exchange (ECX).

1.3 Statement of the problem

In the current business environment where competition between firms gets intense and intense, firms always seek ways of creating a win-win scenario that can maximize the entire supply chain performance. In such case supply chain integration (SCI) was implied as a determinant factor for firms to achieve superior competitive performance (Getasew, 2017).

Supply chain requires integration at internal, customer and supplier level to cope-up with the business dynamics and allow efficient production and delivery of valued product or service to customer. Vertical integration is one form of SCI which requires integration at both internal and external level. At internal level, integration is made between departments while externally integration is made at upstream and downstream level of the SC specifically with customers and supplier respectively (Liu and Lee, 2018). The performance effect of SCI has been a major concern in the past decades and researchers like Getasew, (2017); Nguyen, Phan, and Matsui, (2021) revealed that, integration with customer, supplier and among internal departments significant exert an add-on effect on the SCP of firms. Additionally, the internal integration effect assessment study conducted by Zewdu, (2020) on Ethiopian pharmaceutical supply chain agency (EPSCA) also revealed the exertion of enormous significant positive effect on the company SCP. Furthermore, Andreou, Louca, and Panayides, (2015), also implied that, VI can revamp firms' capabilities in terms of efficiency, responsiveness, quality, and innovativeness. In relation, Kaiser and Obermaier, (2020) also found out the positive effect of VI on the firms' financial performance.

The application of forms of integration can differ from country to country depending on their economic system, development plan, and the contribution of the industry sector to their economy. In Ethiopia, the coffee sector has been a driving force behind the country's economy. The sector has been a major source of foreign currency accounting approximately 30% to 45% (Gizaw, Abafita, and Merra, 2022)

Recognizing its immense value, the sector has undergone a series of transformative reforms on the aim of bolstering its economic impact and overall contribution. Notably, the 2017 reform would be memorable, which introduced the groundbreaking system of "vertical integration" to the coffee supply chain (Federal Democratic Republic of Ethiopia, 2017). However, its practice and effect on the coffee supply chain performance remains unexplored at national level, whether at the exporters, customers, suppliers, or farmers level. Besides, there is also a dearth of studies examining the effect of vertical integration at international level.

On this ground, for addressing this literature gap and in consideration to budget and time constraints, this study aimed to analyze the practice and effect of VI on the coffee SCP in the case of Ethio-Gabana Trading plc. Additionally, the study was believed to provide valuable insights for the management of the company, policymakers, as well as for researchers through forwarding implications on the extent of effect the system brought on the coffee SC. Additionally, the generalizability of the study could be used as an input for the policy reforms made in the future to further improve the entire coffee SCP of the country. The study findings can also serve as a valuable empirical reference for future research conducted on similar or related subjects in the field of area.

1.3 Research Questions

- How vertical integration is being practiced at Ethio-Gabana?
- What is the effect of Internal, supplier and customer integration on the SCP of Ethio-Gabana?

1.4 Objectives of the study

1.4.1 General Objective of the study

- The study generally aims to examine the practice and effect of vertical integration on the coffee supply chain performance of Ethio-Gabana Trading plc.

1.4.2 Specific objectives of the study

- To apprise the practice of internal, supplier and customer integration at Ethio-Gabana.
- To measure the current supply chain performance of Ethio-Gabana.
- To analyze the effect of internal integration and SCP of Ethio-Gabana.
- To investigate the effect of supplier integration on SCP of Ethio-Gabana.
- To examine the effect of level of customer integration on the SCP of Ethio-Gabana,

1.5 Significance of the study

This study on the practice and effect of vertical integration on the SCP of Ethio-Gabana holds a great significant. Since, the effect of SCI on SCP had been extensively studied and well documented, there remains a lack of complete understanding regarding the practice and effect of VI specifically in the coffee sector. Additionally, it's difficult to find sufficient studies conducted at global level that apprise the issue specially in the coffee sector. Thus, this study aims to bridge this research gap and promised to provide valuable insight to various stakeholders by analyzing the extent of the company vertical integration at internal level between internal departments and at external level with suppliers and customers. And also, the respective effect of each of VI dimensions imposed on the overall coffee supply chain performance would be analyzed, in terms of cost, quality, flexibility, time (speed) and asset utilization. Additionally, the study results were anticipated to yield two significant benefits. Firstly, the findings will offer valuable implications for the subject company by uncovering the extent of effect of vertical integration imposed

on its coffee SCP. This could enable the company's management to gain a comprehensive understanding of the pros and cons associated with the system (policy). Secondly, the generalizability of the study findings could provide insights for policymakers on the collective effect brought by the system on the coffee exporter's performance. This information can serve as a valuable input for the policy reforms to be made in the future for boosting the overall coffee SCP of the country. Lastly since there is dearth of studies on the subject area, the study will be used as an empirical reference.

1.6 Scope of the study

This study aimed to examine the effect of VI on the coffee SCP, taking Ethio-Gabana Trading plc as a subject who is known by an exporter of coffee. The study was conducted on the company headquarter located at Addis Ababa city, and its production facility at Oromia special zone, Gelan city.

Additionally, the study had conceptualized three VI dimensions: Internal, Supplier and Customer integration and analyzed the respective effect of each level of integrations on the company SCP which measured in terms of flexibility, responsiveness, cost, quality, and asset utilization metrics. The study doesn't cover other factors such as environmental, economic, or social. And also, the finding of the study also cannot not be generalized to other companies or industries except coffee exporters.

The study has adopted both descriptive and explanatory research design with quantitative research approach to collect data using survey method and make analysis between three months (April to mid of June 2023). The input data required for successful completion of the study was collected directly from sample permanent employees of the company selected from various functional departments and location of the company.

1.7 Limitations of the study

The issue of non-cooperation by participants is the major concern through data collection. This issue mostly arose due to lack of assurance on the confidentiality of the information respondents provide which creates a sense of uncertainty in their mind that, the information would be fall under the wrong individuals or companies which latter be used against them or their company. To cope up with such issue, the purpose statement from the academic school was presented to assert the academic purpose of the study. Furthermore, the researcher had kept all the collected information confidential as well as ensured anonymity of respondents on data collection instruments.

Moreover, through the course of filling the questionnaires, few of respondents were confused because of language issue which created difficulty on comprehending the questionnaires easily. As a result, the researcher had resolved this issue through assisting respondents on the course of filling the questionnaire, and in some circumstances where it is necessary, translation to local languages were made.

On the other hand, despite, the researcher effort made to increase the number of subject companies in expectation to gain comprehensive understanding of the effect of VI, from the contacted four additional export companies, none of them were willing to participate in the study even if an academic school letter explaining the study's purpose were presented. Consequently, the researcher was compelled to proceed with a single company as a sole subject.

1.8 Definition of Terms

To enhance comprehension of the study, the subsequent terms were consistently employed throughout the study, accompanied by their implied operational definitions.

Vertical Integration (coordination): defined as a form of integration mechanism by which a company strategically establishes relationship internally between its departments and externally with its suppliers and customers in the supply chain (Barratt, 2004).

Internal integration: is the extent to which a firm structure its own strategies, functions, and processes into a coordinated and synchronized way, to fulfill its customers demand efficiently through creating keen integration between internal departments, suppliers, and customers (Flynn, Huo, and Zhao, 2010)

Supplier Integration is form of collaboration made between the firm and its suppliers through interconnecting their process for facilitating efficient flow of information, materials, money, knowledge, and experiences (Stank, Keller, and Closs, 2001b).

Customer Integration is a coordination process that the company made with its customers for cognizing and fulfilling the specific customer requirements (Kumar *et al.,* 2017). And this requires frequent communication of information, regarding contract terms, quality preference, inventory availability, production schedules, delivery time, and purchasing ability.

Supply chain Performance (SCP) is a holistic measure of a key elements or cornerstone which determines the firm competitiveness through aggregating various metrics that can lead to higher customer intimacy and firm supply chain performance (Estampe *et al.,* 2013). By the implication of various literatures, the study had measured the firm SCP through the following five metrics: Flexibility, Responsiveness, Quality, Cost, and Asset Management.

Flexibility: implies the ability to which the firm can respond to changes in business environment and sudden customer request well as the firm capability of providing diverse product range to customer (Aramyan *et al.,* 2007).

Responsiveness: is about the firm capability of delivering the product quickly or on pre-stated agreed time interval (Gimenez, Van, and Pieter, 2012).

Quality: the extent to which the product is free from defects and meets customer specification and thereby drive customer satisfaction" (Juran *et al.,* 1999)

Cost: is the sum of total costs of material, production, distribution, and all costs associated with managing and storing raw materials, work in process, finished, byproduct inventories (Ramaa, Rangaswamy, and Subramanya, 2009)

Asset management: is the capability of the firm to utilize its resources (assets) and it is measured in terms of capacity utilization of the firm in effectively managing its assets to fulfil its customer order (Supply Chain Council, 2010)

1.9 Organization of the study

The content of the study was organized into five chapters. The first Chapter begin with introducing the subject shading lights on the background of the study, problem statement, research questions, objective, significance, scope, and limitation of the study and concluded with implying definition of terms. The second chapter chews over relevant theoretical and empirical literatures related to the subject under investigation. And the third chapter describes the methodologies followed for successful completion of the study while the fourth chapter presents findings with proper discussion. The last chapter compiles major findings, provide conclusion, and finally ended with forwarding recommendations and future research implications with the respective disclosure of major limitations of the study.

CHAPTER TWO

RELATED LITERATURE REVIEW

2.1 Introduction

Successful supply chain necessitates collaborative efforts among supply chain players for maximizing the total supply chain surplus while parallelly enhancing the performance of individual supply chain actors. The process of establishing coordination among supply chain partners is called supply chain integration (SCI). In this regard, different scholars had tried to imply some of the strategies used to bring integration in supply chain. Vertical integration was implied as one form of SCI strategy which aims to bring integration at both internal and external level for delivering product or service to that can drive maximum satisfaction level to the ultimate customer while simultaneously leads to maximum SC surplus. Based on those highlighted subject, this section tries to explore the concepts related to supply chain, supply chain integration, vertical integration, and supply chain performance. And, in inference to empirical literatures implications, the causal relationships between VI dimensions and SCP would be explored, hypotheses formulated, and research gaps also be identified. Finally, based on those literature implications, the conceptual model would be formulated.

2.2 Theoretical review

2.2.1 Supply chain

The term supply chain and its management aspect were originally introduced in the early 1980s (Mangan and Lalwani, 2016c). As per Houlihan, (1985), "supply chain" is viewed as "a process of establishing keen relationship with upstream and downstream business linkages (partners) on the aim of creating value for the ultimate customer. In relation, through extending this definition, Christopher, (2011) described "supply chain" as a network of independent firms in the upstream (suppliers beginning of the

supply chain) and downstream (customer end of the supply chain) connect their processes and activities to produce and deliver value in the form of products or services for the ultimate customer. This network has the goal of maximizing and sharing the overall value generated by the supply chain to each SC actors which requires alignment of each SC actors' goal and objectives with the overall supply chain goal. In this manner, the timing and accuracy of information plays a significant role in preventing disturbances come up with lack of building effective and efficient communication channel along the SC. This requires all members to exert maximum emphasis on improving the extent, timing, and accuracy of information to be shared across the SC through adopting ways of streamlining processes and operation that can drive maximum efficiency level on the overall SCP while parallelly boost the individual performance of each member (Chopra and Meindl, 2016).

Based on this view, deep scrutinization of the above concepts provides the extensive nature of the SC, encompassing a wide range of operations and activities. These operations starts from the upstream level through acquiring raw materials undergo transformation processes at internal level, and ends with the delivery of the product or service to the ultimate customers at the downstream level of the SC. These activities are commonly categorized as sourcing (procurement), operations, logistics, distribution, and customer service functions. And the effective management of these activities and processes encapsulated within the concept of "supply chain management."

2.2.2 Supply chain management

The Association for Operations Management (APICS) defines SCM as the design, planning, implementation, and controlling of supply chain activities. Its aim includes creating net value, developing capabilities, utilizing worldwide logistics, achieving sustainable supply and demand equilibrium point, and measuring performance (Blackstone and APICS, 2010). On the other hand, Sadler, (2007) views

SCM simply as "a planning and management of flow of materials and products between network members on the intent of delivering goods and services to the ultimate consumers. In extending the Sadler's view Bozarth and Handfield, (2013) implied that, SC encompasses the management flows of information, and finance in addition to the flow of material. And this requires the integration between member of supply chain to work together collaboratively with shared information and joint planning for creating and delivering valued products and services that can drive maximum intimacy level for the ultimate customers. And this view of SCM leads us to the concept of supply chain integration (SCI).

2.2.3 Supply chain integration

As implied in the previous section, for surviving in the competitive business environment where rivalry among firms intensified without geographical limit and added up to the evolving nature of customer demand, rendering products or services that can drive high consumer satisfaction level is the only way of winning for survival. To do so, having all the resource and capability on custody is pivotal, unfortunately, since firms cannot have all the resources, they require for producing and delivering the intended product or service to the customer, they seek to establish mutual beneficial relationship with other firms who have what they needed most. In this process the concept of supply chain integration could sit in the table. There have been a lot of debate regarding the theoretical ground of SCI, but majority of scholars inferred the Porter's value chain model as a host for the development of this concept (Vickery *et al.,* 2003).

Porter in his value chain model advocate that, focusing only on internal activities and process cannot lead to competitive advantage rather firm had to focus on the holistic view what he calls the "value chain system" which includes the upstream and downstream chains. The upstream value emphasizes suppliers which provides inputs to the firm and believed to have an impact on the firm performance. On the other hand, downstream value chain includes the product delivery actors and customers. And these channels

perform their own delivery activities which can affect the customer satisfaction level as well as the firm performance since needs always comes from customers. For this reason, Porter suggested that the better way of linking the firm value chain system (internal) with upstream and downstream is through "vertical linkage". And he believed that this system of linkage can lead firms to sustainable competitive advantage in addition to improving their internal performance (Porter, 1985). And this model was taken as source of evolvement for the concept of supply chain integration and vertical integration.

Based on this implication, several scholars had tried to define supply chain integration. In this case, Zhao *et al.*, (2007) defines it as "the degree in which a firm strategically establish relationship with its supply chain partners and manage intra and inter-organization processes to achieve effective and efficient flows of products, services, information, and finance, for creating and delivering maximum value to the ultimate customers". On the other hand, Lee and Whang, (2001) views it as an internal aspect of the firm. And defines it as "the quality of state of collaboration made between departments to fulfill the demands of the environment". While this definition refers to integration as an internal aspect of a firm, our emphasis here goes beyond the firm and encompasses external integration with suppliers and customers along the supply chain network.

2.2.4 Supply chain integration forms

Past literatures implication asserts, the existence of diverse view among scholars on the forms of SCI. And still consensus hadn't been reached among scholars to pursue a single and universally accepted forms of SCI. In an endeavor made to shed light on this matter, past literature implications were diligently examined regarding its form. Thus, according to Barratt, (2004) SCI is classified in to two distinctive forms named "vertical integration and horizontal integration". And defines vertical integration (VI) as "a form of integration made with suppliers, customers, and between internal departments while

horizontal integration (HI) was viewed as another form of integration made with competitors, internally and with non-competitors in the form of merger or acquisition.

Moreover, the quest for consensus continues urging scholars to unravel the ever-evolving nature of SCI and its profound implications for modern supply chain management. On this ground, through considering the managerial levels that integration to be applied in, Mozafari and Tafazzoli, (2012) classified it as "Forward integration and backward integration". Forward integration involves the "coordination and integration of the forward physical flow of materials, information and money between suppliers, manufacturers, and customers" while backward integration involves "the backward coordination of information technologies and flow of information or data from customers to suppliers". This classification focuses mainly on the direction and management of flows in SC.

Further, Lambert and Cooper, (2000) also categorizes SCI as upstream and downstream integration. And views downstream integration as a coordination mechanism a firm made with customer to allow the efficient forward flow of information, product, and money. On the other hand, upstream integration was viewed as coordination made with first tier supplier to allow efficient forward flow of materials, information, and money. Economists also refer upstream and downstream integration as backward and forward integration (Harrigan, 1986). This paper pursued the classification made by Barratt and focus on only "vertical" integration".

2.2.5 Vertical integration

Vertical integration has been one of the major concerns in the past literatures which have been implied as one form of SCI strategies. Scholars have been viewing vertical integration differently in consideration to various business and industry factors.

According to, Barratt, (2004) vertical integration (VI) is defined as a form of integration made between internal departments within the firm as well as with external partners (suppliers and customers). Additionally, Mpoyi, (2003) views it as the extent to which a firm exercises control over the processes and functions involved in the flow and conversion process of materials to products as well as the respective distribution mechanisms. Similarly, Marion, (1976) also defined it as a process by which the various functions of vertically value adding system of the firm connect with supply chain partners to produce product and deliver to the ultimate customer.

Vertical integration can also be viewed as the overall process of the different firms' functions connects and managed through single company (Majumdar and Ramaswamy, 1994). For the purpose of this paper, it is conceptualized as the extent to which a company strategically makes collaboration internally between its departments and externally with suppliers and customers.

Vertical integration plays an important role in the selection of the supply network partners to involve in SCM process. Vertically integrated firm's natural inclination is to optimize the performance of the combined system rather than individual parts (Thomas, Hayes, and Wheelwright, 1985). This doesn't mean that firms need to ignore their internal operations and only focus on improving the entire SCP rather, they must find best methods that can parallelly boost their individual as well as the entire SCP. Therefore, SC partners needs to align their individual goal and objectives with the entire SC goal.

Regarding the pivotality of VI, Howells and Wood, (1993) on their book implied two major deliverability for firms. First, it provides control benefits by ensuring continuous supply of materials and information that impose direct positive influence on SCP in terms of quality, delivery, and cost. Secondly, it also provides economic benefits through sharing of costs. The coordination made can also leads to sharing of knowledge and expertise that can improve the overall aspects of the firm's operation performance.

Further, Porter, (1998) on his book "Competitive Strategy" suggested that vertical integration is a strategic method of creating competitive advantage for firms in an imperfect market. Additionally, he stated that, the strategic purpose of VI is to utilize different forms of economies namely: economies of combined operation, economies of internal control and co-ordination, economies of information, economies of avoiding market risks, and economies of stable relationship.

2.2.6 Vertical integration approaches

Integration in SC have been viewed and measured in various dimensions in past literatures. The major approaches to SCI and VI were elaborated as follows.

- **Internal-External vs Contingency approach**

The **Internal-External approach** to SCI argues that integration needs to be made at both internal and external level to deliver valued product/service to the customer (Pagell, 2004). Internal integration refers to the extent to which a firm structures its own strategies, practices, activities, and processes into collaborative, synchronized processes, for fulfilling its customers' requirements and efficiently interacts with its suppliers (Kahn and Mentzer, 1996). On the other hand, external integration encompasses customer and supplier integration which indicates the extent to which a firm interact or link with its external partners (customers and suppliers) through structuring inter-organizational strategies, practices, and processes into collaborative, synchronized processes (Stank, Keller, and Closs, 2001b).

The internal and external approach is widely accepted approach by various researchers. For instance, researchers like Stevens, (1989); Flynn, Huo, and Zhao, (2010); Giménez and Ventura, (2002) emphasized that, high performing SC encompasses integration between internal departments and externally with suppliers and customers. This is on the notion that, internal integration enables process integration among departments while external integration allows efficient forward and backward flow of

information, materials, and finance from customers and suppliers respectively. Based on this view, this approach emphasizes, integration at both levels as an important approach that can lead to higher SCP through allowing SC members to act in a concerted way and respond to customer demands.

On the other hand, the **Contingency approach** to VI by Lawrence and Lorsch, (1968) argues that there is no one best form of integration approach to SC. And stressed that, the selection and application of form of integration is determined by the environment in which a firm operates. And based on the change in environment, firms should shape their structures and processes to achieve improved SCP. In other word, according to this approach, the selection and extent of integration depends on the dynamics made at business environment. And this approach views customers and suppliers as the important part of a firm's environment. In support of this notion, Cannon and William (1999) implied that, firms do not always desire to form close ties with suppliers. Thus, depending on the environment various types and degrees of inter-organizational relationships (Integrations) can be developed or made.

Further, Lawrence and Lorsch, (1968) also pointed that, the extent of the firm performance depends on the extent to which the strategy that it seeks to pursue is aligned with its design and process. This alignment between strategy and performance in the strategic management literature is described as ''strategic fit'' (Milgrom and Roberts, 1995). In the same stance, when this applied to SCI context, structural contingency theory suggests that the individual dimensions of SCI (internal-external) should be applied depending on the fit with the demand of environment to achieve best SCP.

Based on this view, in the modern business environment which characterized by intense competition across the globe, firms require strategic collaboration to acquire resource and competency for ensuring their going concern by delivering valued product or service to their customers.

In doing so, since everything starts from the firm, the operations, process and activities of the departments within the firm needs be collaborated first before pursuing external integration (Basnet, 2013; Stevens, 1989). And depending on the current business environment, firms may take strategic measures regarding whether or not to form integration with external parties in consideration to their strengths, weakness and the opportunities and threats available in the business environment. However, depending on their economic system, industry, and product type countries can limit or restrict the choice and application of SCI forms.

Taking this notion to our problem, in consideration to the economic significance of coffee for the Ethiopian economy, the government had imposed keen restrictions on the form of integration to be made across the coffee SC. In doing so, the government had made policy reforms which allowed integration to be vertically made across the SC. For this reason, firms aren't allowed to choose or change their integration strategy based on dynamics in the current business environment. And this aspect would go against the contingency theory which advocates the application of specific SCI form based on business dynamics. Additionally, since internal integration is always mandatory for firms, its extent cannot be strengthened or weakened depending on the changes in the market. On this ground, rather than contingency, the internal-external approach was found to align with the nature of this study problem.

2.2.7 Vertical integration dimensions

As we have seen above SC requires integration at both internal and external level. Even if the internal-external integration perspective was taken as a key element for SCI, the level of application still differs since firms has given much emphasis on customer and supplier integration than internal integration which was pointed as the forerunner step for SCI. On this ground, as vertical integration was implied as one form of SCI, it also follows the internal external approach.

Various literatures, strongly advocate that, the internal-external perspective is the ultimate dimensions for wielding the advantages of VI. In these notions, Flynn, Huo, and Zhao, (2010) views internal integration as a process of recognizing and ensuring the integrity of the internal department's process and functions, while external integration was taken as a process of establishing interactive mutually beneficial link with customers and suppliers for the ultimate purpose of creating and delivering value to customer to drive maximum SC surplus. And in SC, integration was implied to first begin internally since firm's first needs to develop the capability of linking and managing their internal process and functions in a way that all departments work collaboratively. After concluding these assignments, firms can move to the next step of synchronizing their internal process and functions with their suppliers and customers for allowing effective and efficient forward and backward flow of information, material, money, and knowledge for creating and delivering value for the ultimate customers. This maximizes the total SCP and grants each supply chain actors to achieve their individual objectives simultaneously. Thus, firms would ensure their going concern beside developing keen competitive capabilities over their rivals (Getasew, 2017).

Information technology (IT) has been implied as a major enabler of integration in SC. It aids firms to integrate their internal functions with external SC partners using information communication technology (ICT) products. And also, it was implied as a pivotal add-on factor for firms in achieving sustainable competitive advantages by facilitating information sharing across the SC which could lead to the building of long-term relationships among the SC partners (Zhang, Van Donk, and van der Vaart, 2016). Implementing IT is necessary for aligning the entire SC from downstream to upstream and building inter and intra-firm interactive relationships (Martinelli and Tunisini, 2019). Enterprise Resource Planning (ERP) was implied as a set of tools that allows integration at internally between departments as well as with customers and suppliers by allowing real time information exchange and storage. This provides an easy of data accessibility to make sound decisions at any time regarding demand and supply.

Based on those past theoretical literatures' implications, the internal-external integration approach was found to be the key element of VI. As a result, the study intended to take Internal, supplier, and customer integration as an important element of Vertical integration.

2.2.7.1 Internal integration

According to Won Lee, Kwon, and Severance, (2007), Internal integration was described as a way of having easy access to key operational data from integrated database through integrated information system that links and shares various firm information's regarding inventory, production status and demand data in real time manner through the supply chain. Internal integration is a vital aspect of firm's dynamics, encompassing harmonious collaboration of internal functions and process to allow effective communication and teamwork between departments. It also implied as a crucial foundation for the subsequent external integration process with suppliers and customers (Basnet, 2013; Huo, 2012).

Internal integration is the extent to which a firm structures its own strategies, functions, and processes into a synchronized way, to fulfil customers order efficiently by creating keen integration b/n internal departments and with suppliers (Flynn, Huo, & Zhao, 2010)**.** This definition was used in this paper.

2.2.7.2 Supplier integration

Supplier Integration is a process by which firms move to the upstream of supply chain to own more of their suppliers (Sankar, Kannappan, & Lundquist, 2020). Supplier integration link the supplier as a strategic collaborator by establishing partnership between a buying and supplying firm with mutual ongoing relationship that involves a high level of trust, commitment, long-term contracts, joint conflict resolution, and sharing of information, risks, and rewards (Ellram, 1990). Supplier integration involves coordination of core competencies with critical suppliers (Flynn, Huo, & Zhao, 2010).

Firms engage in collaborations with suppliers to maximize the benefits of partnerships, on the aim of enhancing lead times, and quality (Cao *et al.,* 2009). And some authors also use the term downstream/uphill/backward integration to express supplier integration.

Stank, Keller, & Closs, (2001b), views supplier integration as a form of integration where a firm can cooperate with its key supplier through interconnecting their process for facilitating efficient flow of information, materials, knowledge, and experiences. And this definition pursued in this paper.

2.2.7.3 Customer integration

Customer Integration refers to a coordination process made with customers for cognizing and fulfilling the customer's specific requirements (Kumar *et al.,* 2017). And this requires communication of information. regarding their buying time, product preference and purchasing ability. Customer integration plays an important role for firms in several ways. It can help firms to secure the distribution channels of their products, especially in the markets with increased uncertainties. Customers are the major reason for the activation of the SC's processes, and they are also the ultimate destination of the supply chain process outputs (Potter, Towill, & Christopher, 2015). This paper pursued the definition forwarded by Kumar.

2.2.8 Supply chain performance

Measuring supply chain performance can provide managers an important information on the progress of the company which latter used to identify improvement areas and take corrective actions immediately. Additionally, having a know-how of the company progress also provides insight to reveal the effectiveness of strategies and to identify success and potential opportunities (Ramaa, Rangaswamy, and Subramanya, 2009). Several studies highlighted and put their implication on the need for the right type of performance metrics and measurement system used in the SC. Performance measurement refers to the art of quantifying the efficiency and effectiveness of one's actions. Effectiveness is the extent to which a

customer's requirements are met while efficiency measures how economically a firm's resources are utilized when providing a pre satisfied level of customer satisfaction (Neely, Gregory, and Platts, 1995).

Several past literatures had boldly appraised the metrics to measure SCP. In the late of 1980's, the council of Supply chain had developed a framework for benchmarking performance in the SC known as Supply Chain Operations Reference model (SCOR) which is built around four major processes, namely: plan, source, make and deliver. This model mainly aimed to provide guidance and develop balanced standard approach of measuring SCP through fixed metrics (Christopher, 2011). The framework provides five metrics towards measuring SCP. The model suggests that, the performance of entire SC is measured in terms of reliability (ability to produce on-time, at the right quantity & quality), responsiveness (cycle & lead time to produce & deliver), agility (ability to adapt changes), cost (Cost of goods Sold) and asset management (Inventory days & asset utilization) (Supply Chain Council, 2010).

On the other hand, Studies conducted around 1990's such as Pyke and Cohen, (1993); Lee and Billington, (1993); Altiok and Ranjan, (1995); considered cost, delivery time, and responsiveness as SCP metrics. Similarly, Beamon, (1999) also assessed and evacuated that SCP is measured through three metrics i.e., flexibility, output (volume), and resources. And the outcome of such assessment helped the researchers to choose the appropriate metrics for measuring SCP.

Since then, various researchers tried to develop benchmarks to measure the SC through considering strategic and operational factors related to efficiency and effectiveness. For instance, Li and O'Brien (1999) had proposed a model for measuring SCP for manufacturing industries. The model takes four criteria's such as Profit, Lead-time, Delivery promptness and Waste elimination as a performance indicator of SC. Additionally, Aramyan *et al.,* (2007) implied efficiency, flexibility, responsiveness, and quality as a criterion for measuring the performance of food supply chain.

The main purpose behind measuring performance is to obtain information about the status of the firm for taking actions that can leads to improved firm supply chain capabilities. Firms today try to measure their overall performance through taking criteria's such as financial measures, quality of the product they provide and the delivery capability. Some businesses need a measurement system to keep abreast of customer requirements e.g., ISO 9001, ISO/TS 16949, ISO 14001. To wind up, in an implication of SCOR model, this study conceptualized flexibility, responsiveness, quality, cost, and asset management as a metrics for measuring SCP of the firm beside their commonality of application in past literatures.

i. Flexibility

Flexibility can be defined as "the ability to which a company intends to respond to market changes e.g., significant increases in demand" (Beamon, 1999). In uncertain environment, supply chains must be able to respond to changes. Flexibility is seldom used in SC analysis and measures a system's (SC) ability to accommodate volume and schedule fluctuations from suppliers, manufacturers, and customers. Further, I. van Hoek, Harrison, and Christopher, (2001) implied flexibility as the management aspect of reacting to changes in demand by using the available resources of time, money, materials, people, plants, and suppliers. In the same instance, Rosenzweig, Roth, and Dean, (2003) defined it as" the ability of a firm to develop flexible operations in hypercompetitive environment to meet the frequent changes in volume, product mix and schedules occur".

From all definitions we can cognize that, flexibility possess the characteristics of "responding to changes" in market. This is a broad performance measure that includes: demand increases (volume), product range (mix), delivery flexibility, order handling (time), order size etc. In this study it implies the ability to which the firm can respond to changes in customer demand and sudden customer request as well as the firm capability of providing diverse product range to customer (Aramyan *et al.*, 2007).

ii. Responsiveness

As literatures implies, in supply chain, responsiveness is described in many ways such as delivery time, speed, lead-time, delivery promptness, cycle time etc. According to Lin, (2016), time would be viewed in two dimensions, Lead time, and Cycle time. Lead-time is the total amount of time starting from order entry, operations activities, to final delivery of the product to the customer. In other word lead time is the total time it takes from receiving order from customer, purchasing materials, processing, and delivering the finished product to the customer.

Lead-time importantly gauges the duration required to successfully start and finish certain task through following the necessary procedures (Christensen, Germain, and Birou, 2007). On the other hand, Cycle time is the time gap between completion of one task to another, i.e., from starting one task to start the same process or task again or it is the amount of time a team spends working on producing an item until the product is ready for shipment (Sunil Chopra, 2013). This implies that, cycle time is part of lead time.

The Association for Operations Management (APICS) defines responsiveness as the ability of firm to quickly perform tasks or the promptness ability of delivering product to the customer (Blackstone and APICS, 2010). In this paper responsiveness is defined as the firm capability of delivering the product quickly or on pre-stated agreed time interval (Gimenez, Van and Pieter, 2012).

iii. Quality

In supply chain, quality is also implied as one performance measurement factor. And it has been a major issue in the past literatures regarding its definition and dimensions. For instance, Juran *et al.,* (1999) forwarded two definitions for quality. First "Quality" is the features of the products which meets customer needs and thereby provide customer satisfaction". Secondly, "Quality implies absence of

shortcomings or defect or error that costs the company through necessitating rework. Low quality performance also bring distraction on the goodwill of the company through driving higher customer disappointment as well as claims and subject the company to reverse logistics costs incurred in the return of products for doing things right. For this reason, from cost perspective, quality is deeply tied to efficiency since “doing the right thing” (with the right quality) costs less than “doing things right” (correcting for quality after production). On the other hand, Aramyan *et al.,* (2007) measured quality in terms of appearance, taste, shelf life, healthiness, strength, product safety, reliability taking the food supply chain. Furthermore, Chan, (2003) views it as the extent to which the company product meets the customer specification and requirement and brought high customer satisfaction level.

The definition of the term quality has been broadened to encompass many dimensions, resulting in a lack of understanding and subsequent lack of direction. And Chibba, (2007) implies the reason behind companies fail to make quality as a strategic competitive factor is their inability to clearly imply the specific quality dimensions that will make the product win the order in the market. In this paper quality refers to, the extent to which the product is free from defects and meets customer specification and thereby drives customer satisfaction" (Juran *et al.,* 1999).

iv. Cost

The most widely recognized method of evaluating SCP is through cost. In this regard, Bowersox and Closs (1996) characterized supply chain cost as the costs incurred in order handling, procurement, production, and inventory management. In other word SCM encompasses five major distinct classifications of costs where each play a crucial role on the overall efficiency of the supply chain, this cost includes, costs associated with production, transportation, handling, and storing materials. In

relation, Vaidya and Hudnurkar, (2013) defined cost as the summation of all costs including: warehouse cost, third party storage cost, order processing cost, direct labor cost, administrative and service costs.

Additionally, Cirtita and Glaser- Segura, (2012) also viewed SC cost as "the total costs associated with operating the supply chain". Building strategy based on reducing the overall costs entail to run out the advantages of reducing inventories, maximum utilization of resources, inventory turnover, and eliminating non-value adding activities. In this paper cost is conceptualized as the sum of material, production, distribution, and all costs associated with managing and storing raw material, work in process, finished, byproduct inventories (Ramaa, Rangaswamy, and Subramanya, 2009).

v. Asset Management

The SCOR model depicted asset management as one attribute for measuring the SCP. And according to this model, "asset management" implies the capability of the firm to utilize its resources. The model also implied reduction of inventory and in-sourcing vs. outsourcing as asset management strategies. And this performance is measured in terms of capacity utilization in effectively managing its assets to fulfil customer order (Supply Chain Council, 2010). Similarly, Bulsara, Qureshi, and Patel, (2014) conceptualized resource utilization capability as one metrics of measuring SCP in addition to output, flexibility, innovation, and IT.

As per past literatures theoretical and conceptual implication, this paper conceptualized cost, quality, responsiveness, flexibility, and asset management dimensions as SCP measures which was taken as effect variable. And vertical integration at the internal, customer and supplier level was taken as a cause variable to measure the change in SCP.

2.3 Empirical Review

This section tries to pinpoint some of the empirical studies implications regarding the relationship between supply chain integration, vertical integration, and supply chain performance.

2.3.1 Supply chain integration and supply chain performance

Various empirical studies had analyzed the effect of SCI on firms' performance. The study of (Vickery *et al.,* 2003; Vereecke & Muylle, 2006; Van der Vaart and van Donk, 2008; Kannan and Choon Tan, 2010; Wiengarten *et al.,* 2010) reveled that, keen SCI can lead firms and supply chain partners to improved performance. The study result of Huo, (2012) conducted on China manufacturing companies using structural equation modelling method also revealed that SCI at both Supplier, Internal and customer level had positive and significant effect on the company's performance in terms of financial measures, supplier management measures, and customer service factors. Further, Flynn, Huo, and Zhao, (2010) also revealed that SCI at internal, customer and supplier level can improve both operational and business performance.

At national level, few countable studies were conducted to analyze the trend between SCI and SCP. The case study by Getasew, (2017) and Berhane, (2019) revealed that SCI at customer, supplier and internal level significantly improved the service and operation performance of Ethio-telecom. Further, Akele, (2020) also found the positive effect of SCI on the performance of international humanitarian organizations. Supply chain integration at both internal and external level had significantly and positively affected the operation performance of wash sector (Zelalem, 2019).

2.3.2 Vertical integration and supply chain performance

Various researchers also tried to analyze the causal relationship between VI and SCP. The exploratory case study of Guan and Rehme, (2012) on Swedish timber manufacturers revealed that, VI, towards the

supplier's and customer can lead to efficiency since it allows better communication between supply chain actors, and this can ensure on time supply of raw material which allow firms to produce differentiated products and quickly respond to customer demands.

Vertical integration may also help firms to avoid the externalities that can occur specially when the firm products or service is subjected to quality debasement (Ellram, 1991). Additionally, the case study of Forbes and Lederman, (2010) on US airline industry concluded that, integrated airlines perform systematically better than nonintegrated airlines at the same airport on the same day in terms of flexibility, adaptability, and service quality. Additionally, Andreou, Louca, and Panayides, (2015) stressed that vertical integration can improve the inventory turnover rate which has direct effect on efficiency which can leads firms to better performance.

Additionally, Li and Tang, (2010) in their study also revealed that, vertically integrated firms are more likely to enhance their innovative performance compared to non-integrated firms. Similarly, Liu, (2016) also implied that, VI can improve innovative performance of firms but this performance is determined by the level of investment made at upstream and downstream level. Additionally, the extent of relationships between SC partners also determines the effectiveness of VI. And this investment decision must have to be mutually beneficial for SC actors when innovation is important at both levels, otherwise it creates problem that causes inefficiency in the SC.

Moreover, unlike the above implications, Li, Lu, and Tao, (2016) study on three cross-industry manufacturing firms from China and developed countries implied that, the practice of VI on firms with poor management capability can negatively affect their productivity, since VI creates an opportunity for rent-seeking by insiders. Desyllas, (2008) on his assessment on UK manufacturing firms also found that, vertical disintegration results in improved operating performance, particularly when disintegration occurs

as a reaction to poor performance. Further, Zhang, (2013) pointed that, the level of VI depends on the strategic choice of the firm. Based on this view, firms with cost leaders tend to change their VI level more than firms with differentiation strategies. In reference to the positive implications of majority of empirical studies, hypothesis was formulated as follows.

$\boldsymbol{H_1}$: Vertical integration dimensions positively linked to supply chain performance.

$\boldsymbol{H_0}$: There is no statistically significant relationship between VI and SCP.

2.3.2.1 Internal integration and supply chain performance

The effect of internal integration was analyzed by various scholars. From those, the empirical study of Zewdu, (2020) on the effect of internal integration on SCP of Ethiopian Pharmaceuticals Supply Agency revealed the existence of moderate positive effect relationship between the two. Additionally, the explanatory study by Tarigan, Siagian, and Jie, (2021) on Indonesian manufacturing firms also revealed that, internal integration exerted positive influence on relationship between SC actors, that can bring improvements on the overall SC agility and resilience performance which can lead SC firms to sustainable competitive advantage. Internal integration plays a moderating role between the effects of information, process, and strategic integration with suppliers. In addition, Zhang *et al.,* (2018) also inferred simultaneous integration at internal and supplier level can enhance firm performance Based on this implication the following hypothesis was formulated.

$\boldsymbol{H_{1a}}$: Internal integration is positively associated to supply chain performance.

$\boldsymbol{H_{0a}}$: There is no statistically significant relationship between internal integration and SCP.

2.3.2.2 Supplier integration and supply chain performance

Various studies also tried to examine the effect of supplier integration on the firm SCP. From them Arcuri and Giolli, (2022) reveled that, supplier integration can significantly mitigate supply-related risks and lead to improved scheduling and higher quality standards, since it enables firm to exert direct control over the production of its inputs. And this can maximize the overall performance of the SC. Similarly, the empirical study of Hansman *et al.,* (2020); Lin, Parlaktürk, and Swaminathan, (2013) also implied the role of VI towards the suppliers on significantly increasing the volume of production with improved quality. Additionally, the survey made by He *et al.,* (2014) based on Europe, Asia and America manufacturing firms implied the positive effect of supplier integration on customer integration and new product development capability of firms. Further, the structural equation modeling study of Zhang *et al.,* (2018) on Vietnam manufacturing firms revealed that, supplier integration positively associated with firm performance Internal integration enhances the effect of process integration with suppliers on firm performance. On this ground, the hypothesis was formulated as follows.

$\boldsymbol{H_{1b}}$: Supplier integration is positively linked to supply chain performance.

$\boldsymbol{H_{0b}}$: There is no statistically significant relationship between supplier integration and SCP.

2.3.2.3 Customer integration and supply chain performance

Customer integration provides ways of controlling efficiency gains and cost reductions in the supply chain (Rangan, Corey, and Cespedes, 1993). The empirical study of Chavez *et al.,* (2015) on Ireland manufacturing companies revealed that customer integration with timely exchange of information can improve firms' performance in terms of cost, quality, flexibility, and delivery. Customer integration along with technology can improve firms' financial performance (Abousamra, Ruzo, and Varela, 2017). Moreover, Lai, Wong, and Venus, (2014) inferred that, firms with high customers integration with the

support of EPR system had better performance than firms who are weak in customer integration. Similarly, Hassan, Abindin, and Nordin, (2018) also revealed the significant positive effect of customer integration on the sustainable performance of business organizations in terms of economy and environmental measures.

The alignment between Customer integration with market-oriented supply chain strategy as well as supply chain functions with marketing functions is the best way of obtaining best performance especially in the era of crisis since integration with customers aid firms to deal with market changes which leads to higher customer satisfaction level which also lead firms to achieve sustainable competitive advantage. Based on those implications the hypothesis is formulated as follows that shows the positive association between customer integration and SCP.

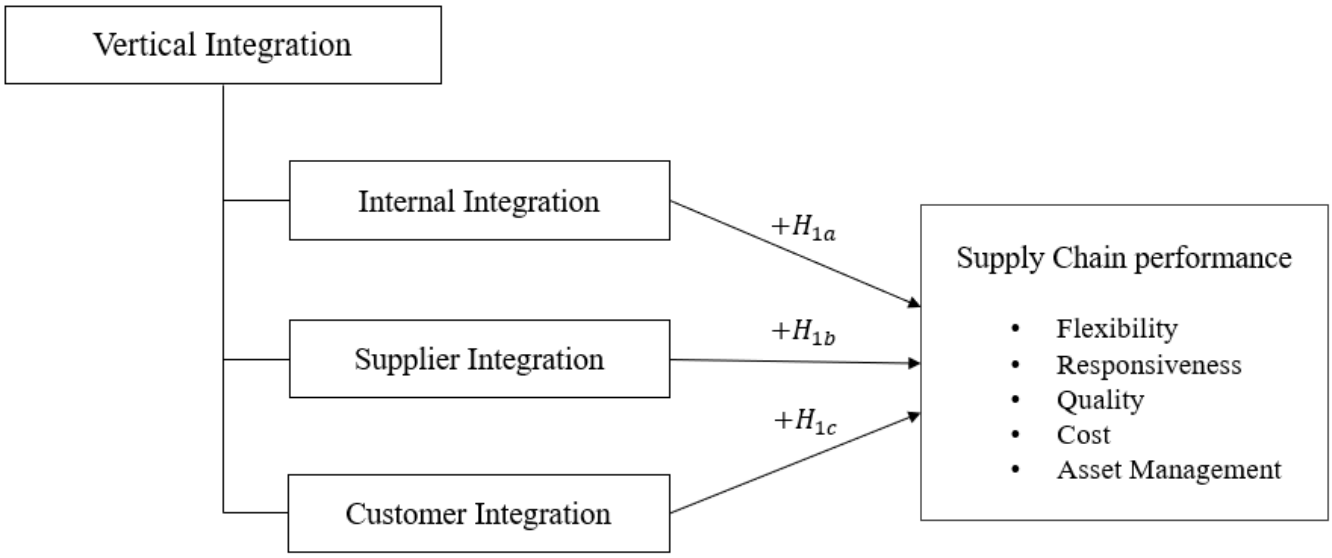
$\boldsymbol{H_{1c}}$: Customer integration is positively linked to supply chain performance.

$\boldsymbol{H_{0c}}$: There is no statistically significant relationship between customer integration and SCP.

2.1 Conceptual framework

Based on the theoretical and empirical literature implications, the study conceptual framework was delineated as follows.

Figure 1.1 Conceptual framework



Source: Adapted from Getasew, (2017)

2.2 Literature gap

As we have analyzed empirical literatures, the effect of VI on SCP isn't explored widely which implies the absence of sufficient studies conducted at global level. Additionally, the available studies also possess recency issue which was conceptualized as a literature gap. On the other hand, as per the review made on past literatures, at the continent and national level its effect on performance of various industries and firms remains unexplored. As a result, through conceptualizing those implication as a literature gap, the researcher had found his motivation and analyzed the practice effect of VI on the coffee SCP to bridge this gap and in expectation of providing theoretical, practical, and empirical implications for diverse stakeholders.

CHAPTER THREE

METHODOLOGY OF THE RESEARCH

3.1 Introduction

This chapter provides valuable insights into the methodologies pursued for conducting the study encompassing the study area, adopted research designs and approaches, population and sample, data types and collection procedures, as well as the analysis methods employed. And the section is wind up by implying ethical considerations contemplated through the study process.

3.2 Research approach and design

3.2.1 Research approach

The study employed a quantitative research approach, utilizing questionnaires to allow gathering of numerical data. The data collection process involves capturing the demographic information of the participants, including education level, enrolled department, job position, and service year. Furthermore, respondents were also expected to provide their perspectives on the practice of vertical integration within the company, specifically on the extent of integration among internal departments as well as on the firm integration practice with its customers, and suppliers. Additionally, data regarding the current SCP of the company in terms of flexibility, responsiveness, quality, cost, and asset management would also be collected so that the effect of each of the three vertical integration dimensions would be analyzed statistically latter, to identify the causal effect relationship between the variables. To do so, quantitative data analysis methods such as descriptive and inferential statistics was employed to identify patterns and relationships among variables numerically. Based on those numerical findings the researcher would draw objective conclusions as well as recommendations.

3.2.2 Research design

As the study aims to apprise the practice and effect of vertical integration on the SCP which measures the extent of practice of VI with its causal effect on SCP, both descriptive and explanatory research design was applied to describe the extent of the company VI practices at internal, supplier, and customer level (independent) as well as statistically measures the respective significance effect they had on SCP (dependent variable) respectively.

3.3 Population and sampling

3.3.1 Sampling design

This study was conducted taking Ethio-Gabana Trading plc as a subject company. The companies made his headquarter location at Addis Ababa city, Nifas silk Lafto and its production facility at Oromia special zone, Gelan city. The study targets 212 permanent employees of the company who work in eight different departments located at both locations, The head quarter encompasses departments such as Procurement, Export, Transport, Finance, HR & Property administration, sales, and marketing. On the other hand, production and quality departments had based their location at Gelan City.

3.3.2 Sample size

In order to achieve the intended objective of the study, employees who have knowledge and awareness about vertical integration with its dimensional effect was selected using one probabilistic sampling called "simple random sampling". And indicated in the earlier section the total population size is 212 which was very small. For this reason, for drawing representative sample inconsideration to time and budget constraint, a published formula of Yemane, (1967) was used with 5.71 % error margin to select a sample of 132 respondents using simple random sampling technique.

Simplified formula for sample size determination

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{212}{1 + 212(0.0571)^2} = 132$$

Where:

n: Sample size

N: Total population size

e: Level of precision (error level)

3.4 Data collection

The study wielded primary data that directly collected from sample of permanent employees of the company using survey and questionnaire method. The study had utilized instruments from past literatures to cope up with the issues of construct and content validity. Thus, for analyzing the extent of practice of internal, supplier and customer integration in the subject firm, questionnaires developed by Marin, Alfalla, and Medina, (2013) were adapted as indicated in 2nd part of the appendixes. And also, as a measure of SCP in terms of flexibility and cost, the instrument was adopted from Kaliani Sundaram, (2012). Additionally, as a measure of SCP in terms of responsiveness and quality the questionnaire developed by Masa'deh *et al.*, (2022) was used. Lastly, for measuring the asset management performance, the inquiries were adapted from Charkha and Jaju, (2014). And all SCP instruments are indicated at the 3rd part of the appendixes.

3.5 Data analysis method

As implied before, the study follows both descriptive and explanatory design with quantitative research approach which requires architecting and coding of instruments for collecting numerical data and describe the population characteristics as well as explaining the cause-and-effect relationship between independent variable (VI) and dependent variable (SCP) numerically through the application of statistical methods. Based on this view, descriptive statistical methods such as frequency, percent were used to

analyze the demographic characteristics of the respondents. Additionally, Mean and standard deviation were used to analyze the extent of practice of internal, supplier and customer integration at the company as well as for cognizing the current SCP of the company.

On the other hand, inferential statistical analysis methods such as Pearson correlation were used to verify the existence of relationship among dependent and independent variables. Moreover, multiple regression with linearity assumptions tests such as multicollinearity test, analysis of variance, autocorrelation test, normality test, and test for outliers was conducted to check the significant effect of independent variables (internal, supplier and customer integration) on the company SCP (dependent variable). And all the collected data were analyzed using SPSS software Version 20. Finally, hypothesis testing was conducted to verify the support and failure of the formulated hypotheses from past empirical study implications.

3.6 Scale Reliability and Validity

3.6.1 Validity test

The quality and credibility of the research heavily determined by validity and reliability of instrument. Validity is a measure of testing whether "the instrument measure what intends to measure". Validity can be classified as construct, content, or etc. This study has resolved the issue of content and construct validity through adapted instruments that were developed, tested, and passed those validity tests in the past literatures.

3.6.2 Reliability test

Reliability implies the degree to which a measuring instrument contains variable errors, that can produce inconsistent result if the instrument used to measure the same variable at different point of time (Wilson, 2014). Test of reliability was conducted to check the internal consistency of instruments using Cronbach alpha for both independent variable (internal. Supplier & customer integration) and dependent variable

(SCP). And constructs that has Cronbach alpha (α) value of greater than 0.70 were accepted and those with underscore of less than 0.70 were removed and replaced by other instruments. As the result of reliability under Table 3.1 below shows, all constructs have scored Cronbach alpha (α) score ranging between 0.713 to 0.795. The VI dimensions such as internal, supplier and customer integration scored Cronbach alpha of 0.790, 0.795, and 0.727 respectively which was an acceptable level of internal consistency (Ware and Gandek, 1998). On the other hand, the dependent variable shows a Cronbach alpha value of 0.703 which also fall under an acceptable level of internal consistency.

Table 3.1: Reliability of the variable's (Cronbach's alpha).

Variables	**Original N of items**	**N of Items deleted**	**Cronbach's Alpha**	**Final N of Items**
Internal Integration	4	-	0.790	4
Supplier Integration	4	-	0.795	4
Customer Integration	4	-	0.727	4
Supply chain performance	18	1	0.703	20

Source: Survey 2023

3.7 Ethical considerations

Ethics determines the value of the study. For this reason, for ensuring ethicality, the researcher had conducted the study overtly (transparently) through providing information disclosure for the subjects regarding the aim and purpose of the study. In addition, the respective response of the respondents was kept confidential in addition to ensuring anonymity of participants in the questionnaires design process. This would ensure respondents that, the information they provide can't not be traced back to cause any responsibility, harm or damage to them and their company. Further, in the researcher's side, to ensure ethical procedures, the data was analyzed with honestly, objectively, and carefully. Additionally, intellectual properties were respected, through implying references for every information's taken from other people's work.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

As mentioned before, this study tried to appraise the practice and effect of vertical integration on the supply chain performance taking Ethio-Gabana trading plc as a subject. As a result, this chapter presents and discusses the study's findings and test result of hypotheses.

For informatory purpose, the adapted questionnaires were designed in five-point Likert scales from 1 to five which represent degree of agreement and disagreement on the provided statement. And 1,2,3,4, & 5 represent strong disagreement, disagree, neutral, agreement, and strong agreement respectively. And inquiries about demographic profile of respondents the inquiry questionnaires were designed in multiple choice options. In data collection process from the distributed 132 questionnaires 128 (97 %) of them were completed, returned, and used for analysis.

And the results are presented and discussed procedurally beginning from descriptive analysis result on the demographic information of the respondent's analyzed using mean and standard deviations. The second section of this chapter presents the inferential analysis result of Pearson correlation and Multiple regression. First correlation analysis result conducted to gauge the degree of relationships between vertical integration dimensions (independent variable) and supply chain performance (dependent variable) would be presented. And then regression analysis result followed and presents the statistical significance of the relationship between variables.

4.2 Descriptive statistics

4.2.1 Demographic characteristics

The demographic characteristics of the respondents such as level of education, job position, working department and years of service were analyzed. And as shown in the above Table 4.1 below, from the total of 128 respondents, 82 (64 %) of them holds a bachelor's degree while 20 (16 %), and 26 (20 %), achieved master's degree and college diploma respectively. On the other hand, none of the respondents achieved PhD degree. However, as per the data inference, since majority of them holds a university degree and above, it was believed that they can comprehend and respond to the questionnaires easily.

Regarding the job position of the respondents, 61 (47.7 %) of them leveled under Mid-position, while 35 (27.3 %), 18 (14.10 %), and 13 (10.20 %) were at the senior, entry, and managerial job levels respectively. In relation, 85 (66.4 %) of respondents had served the company 2 to 4 years while 23 (21.5 %) and 3 (2.3%) of them had service year of 5 to 7 and more than 7 years respectively. The rest 17 (13.3 %) has less than 2 years' service. Based on this view, as most of respondent's has served the company for more than 2 years, their expertise and experience, can help them to strictly scrutinize and understand the questionnaires through binding with their wide range of information and experience so that they can respond to the inquiries thoroughly.

Further, Production, quality, and procurement departments had taken the lions share from the total sample of respondents accounting 58 (45.3 %), and 14 (10.9 %) each respectively. The rest 11 (8.6 %), 10 (7.8 %), 9 (7 %), and 6 (4.7 %) had made their working location at finance, export, transport, sales & marketing, and HR & property administration departments respectively. Selecting respondents from different departments will help to gain insights and understand how VI affected each of these areas' performance from different angles.

Table 4.1: Demographic characteristics of respondent's analysis

		Frequency	Percent	Cumulative Percent
Education	Collage diploma	26	20.0	20.0
	Bachelor's Degree	82	64.0	84.0
	Master's Degree	20	16.0	100.0
	PhD Degree	0	0.0	100.0
Total		**128**	**100**	
Position	Entry level	18	14.1	14.10
	Mid-Level	61	47.7	61.8
	Senior level	35	27.3	89.1
	Managerial Level	13	10.2	99.2
	Executive level	1	0.80	100
Total		**128**	**100**	
Working year	Less than 2 years	17	13.3	13.3
	2 to 4 years	85	66.4	79.7
	5 to 7 years	23	18.0	97.7
	Over 7 years	3	2.30	100
Total		**128**	**100**	
Department	Sales and Marketing	6	4.7	4.7
	Export	10	7.8	12.5
	Procurement	14	10.9	23.4
	Finance	11	8.6	32.0
	Transport	9	7.0	39.1
	Quality	14	10.9	50.0
	Production	58	45.3	95.3
	HR & property administration	6	4.7	100
Total		**128**	**100**	

Source: Survey 2023 on demographic characteristics of respondents.

4.2.2 Vertical integration practice

This section attempted to statistically analyze and describe the extent of practice of vertical integration at internal, supplier and customer level in the subject company using descriptive analysis methods such as means and standard deviations. In this regard, respondents were provided with a statement on the practice of vertical integration at internal, supplier and customer level and they were requested to label their level of agreement on the provided five-point Likert scale. And as shown in the table 4.2 below, the mean score for vertical integration dimensions (internal, supplier and customer integration) ranges between

4.40 and 4.68 with standard deviation range between 0.320 and 0.364. The total mean score value for the three VI dimensions is 4.54 with standard deviation of 0.361. And this implies that the company has been strongly implementing vertical integration. Notably, the data reveals that, the company has robust integration with its customers, with mean score of 4.68 (SD= 0.290). Furthermore, the collaboration between internal departments is also prominent, with mean score of 4.55 (SD=0.360). Additionally, even though the intensity of supplier integration was slightly lesser compared to internal and customer integration, the company has been affirming collaborative relationships with its suppliers too with mean value of 4.40 (SD=0.334).

This aspect implies the company's commitment for fostering effective integration at both internal and external level. And according to Duong and Ha, (2021) integration this can enhance exchange of information across the SC which can reduce the bullwhip effects. It also helps to predict potential risks and cognize customer demands. And this collectively creates a favorable prospect for improving the company performance.

Table 4.2: Practice of vertical integration statistics

		Internal integration	Supplier integration	Customer integration	Vertical integration
N	Valid	128	128	128	128
	Missing	0	0	0	0
Mean		4.55	4.40	4.68	4.54
Std. Deviation		0.360	0.334	0.290	0.361

Source: Survey 2023 on practice of vertical integration.

The analysis result of each of the three VI dimensions is presented in the following sections.

4.2.2.1 Internal integration

Statements indicating the practice of integration among various departments within the firms were provided to the respondents. They were requested to indicate their level of agreement or disagreement with the given statements and their responses are outlined in Table 4.3 below.

Table 4.3: Internal Integration items mean and STD.

Items		N	Mean	Std. Deviation
II1	Our company encourage employees to work together to achieve common goals, than Individual competition.	128	4.58	0.360
II2	Departments in our company communicate frequently with each other.	128	4.52	0.340
II3	All department managers work together well on all important decision.	128	4.57	0.307
II4	Our company uses an enterprise resource planning (ERP) application system to collect, store, and communicate real time information's to all departments.	128	4.53	0.494
	Internal Integration	128	4.55	0.394

Source: Survey 2023

As shown in the table 4.3, internal integration items' mean values range from 4.52 to 4.58, with standard deviations ranging between 0.307 to 0.494. The overall analysis result of internal integration items compels a mean value of 4.55 (SD=0.394) which suggests the existence of widespread consensus among employees regarding the robust implementation of internal integration within the company. On this ground, higher level of integration among departments was attributed to the utilization of ICTs specifically "Enterprise resource planning (ERP)" systems, which enables collection, storage and sharing of real time information which has an add-on impact on the total SC performance.

4.2.2.2 Supplier integration

Respondents were requested to indicate their level of agreement with the provided statements regarding the practice of supplier integration. And their responses are disclosed in Table 4.4 below.

Table 4.4: Supplier Integration items mean and STD.

Items		N	Mean	Std. Deviation
SI1	We maintain close communication with our suppliers about inventory, availability, quality, and delivery status.	128	4.55	0.317
SI2	We maintain cooperative relationships with our suppliers.	128	4.39	0.401
SI3	We share and communicate our production plan with our suppliers to prevent delay.	128	4.28	0.335
SI4	We strive to establish long-term relationships with suppliers.	128	4.38	0.438
	Supplier Integration	128	4.40	0.320

Source: Survey 2023

Table 4.4 reveals, most of respondents gave their consent that the company has maintained close communication with its suppliers concerning inventory, quality, and delivery status, with a mean score of 4.55 (SD=0.317). They also believe that efforts are made to foster long-term and cooperative r/s with suppliers, indicated by mean values of 4.39 and 4.38 respectively. Further, respondents also in agreement that production plans are shared with suppliers to prevent delays, with a mean of 4.28 (SD=0.438). The overall mean score 4.40 (SD=0.320), suggests keen practice of supplier integration.

In general, the data suggests that the company maintains close communication with its suppliers regarding various aspects, and there is an emphasis on establishing cooperative relationships and long-term partnerships. And the company is better to look forward on utilizing an integrated system for sharing inventory and production related information with its suppliers. According to Cassetta *et al.,* (2019) utilization of IT technologies in SCI is crucial as it enables swift exchange of a larger and intricate amount of information to optimize production schedules, lower inventory needs and accelerate decision-making processes.

4.2.2.3 Customer integration

For unveiling the practice of customer integration within the company, respondents were provided with serious of statements so that they label their level of agreement regarding the implementation of these practices. These statements aimed to assess the extent to which they believed customer integration practices were taking place. The detailed is depicted in Table 4.5 below.

Table 4.5: Customer Integration items mean and STD.

Items		N	Mean	Std. Deviation
CI1	We frequently are in close contact with our customers.	128	4.67	0.307
CI2	Our customers give us feedback on our quality and delivery performance.	128	4.73	0.371
CI3	We strive to be highly responsive to our customers' orders.	128	4.70	0.402
CI4	We share our production plan with our customers.	128	4.62	0.398
	Customer Integration	128	4.68	0.364

Source: Survey 2023

As depicted in the table 4.5, the customer integration dimension was evaluated using four items. The results indicate that the company demonstrates a strong level of customer integration across these dimensions with a total mean value of 4.68 (SD=0.364). This implies high consensus among respondents that their company frequently communicate with its customers and takes constructive feedbacks regarding quality and delivery performance aspects with mean value of 4.67 (SD=0.307) and 4.73 (SD=0.371) respectively. The respondents also reflected their agreement on that their company strives to be highly responsive to customers' orders and shares its production plan with mean score of 4.70 and 4.62 respectively.

In general, the findings highlight that the company has close contact, receives feedbacks, and strives to be highly responsive to customer orders, and share its production plans. These factors demonstrate a strong

commitment to customer integration, which can contribute to improved customer satisfaction and overall SC performance. In support, the finding of Pakurár *et al.,* (2019) suggests, utilizing ICTs, assessing relationship dynamics, joint planning, proactively anticipating customer demands, and diligently evaluating satisfaction levels through demanding feedbacks are the most significant means for establishing robust and mutually beneficial relationship with customer.

4.2.3 Supply chain performance (SCP)

This section attempted describe the measures employed to gauge the company SCP, through unveiling the key metrics utilized and the respective results obtained from the analysis, regarding the SCP of the company under scrutiny. By exploring these measures and results, we gain a comprehensive understanding of the company's performance dynamics and its implications. The overall result of SCP items is summarized in the table 4.6 as follows.

Table 4.6: Summary of Supply chain performance metrics statistics

Supply chain performance metrics statistics

		Flexibility	Responsiveness	Quality	Cost	Asset Management	Supply chain performance
N	Valid	128	128	128	128	128	128
	Missing	0	0	0	0	0	0
Mean		4.75	4.67	2.98	2.96	4.84	4.04
Std. Deviation		0.234	0.313	0.323	0.347	0.271	0.233

Source: Survey 2023

As Table 4.6 data implies, flexibility, responsiveness and asset management have scored highest mean scores of 4.75, 4.67 and 4.84 respectively. This indicates the company capability of highly adapting changes and highly responding to its customer demands. However, the company has lower performance in terms of quality and cost with mean scores of 2.98 and 2.96 respectively. The aggregate result of SCP metrics shows a mean score of 4.04 (SD=0.233), indicating that the overall performance of the supply chain is in a good level. The detail of each metrics described as follows.

4.2.3.1 Flexibility

The respondents were requested to state their level of agreement on the provided statements regarding the company flexibility performance. As the survey result illustrated in Table 4.7 below shows, significant number of respondents agree that the company can effectively accommodate demand variations, with a mean score of 4.72 (SD=0.301). This demonstrates the company's ability to adapt its operations to fluctuations in demand, ensuring continued customer satisfaction.

Similarly, respondent's express their consensus that, the company can adjust its production levels based on changes in demand, as indicated by a mean score of 4.78 (SD=0.343). This highlights the company's agility performance in scaling its production up or down to align with demand. Moreover, the data demonstrates that the company is well-positioned to provide diverse coffee type, variety and grades as well as accommodate new markets or customers, with a notable mean score of 4.82 (SD=0.241) and 4.68 (SD=0.298). This reflects the company's potential to expand its market share and effectively serve a broader customer base. The aggregate survey result suggests a strong level of flexibility with mean score of 4.75 (SD=0.246).

Table 4.7: Flexibility items mean and STD.

Items		N	Mean	Std. Deviation
FL1	Our company can respond to and accommodate demand variations, such as seasonality.	128	4.72	0.301
FL2	Our company can easily increase and decrease its production levels based on change in demand.	128	4.78	0.343
FL3	Our company can quickly provide diverse coffee variety, types, and grade to our customer's.	128	4.82	0.241
FL4	Our company can accommodate new markets or new customers.	128	4.68	0.298
	Flexibility	128	4.75	0.246

Source: Survey 2023

4.2.3.2 Responsiveness

The participants were asked to indicate their level of agreement concerning the company's supply chain responsiveness capability.

Table 4.8: Responsiveness items mean and STD.

Items		N	Mean	Std. Deviation
RS1	Our company has a superior on-time delivery performance to its customers.	128	4.61	0.317
RS2	Our company can deliver products to its customers by the agreed timetables without delay.	128	4.82	0.297
RS3	Our companies fulfill its customers' orders in short lead time.	128	4.46	0.355
RS4	Our company continuously evaluates and improves its processes to fulfill its customer orders quickly.	128	4.78	0.311
	Responsiveness	128	4.67	0.313

Source: Survey 2023

As delineated in Table 4.8, substantial number of participants expressed a higher level of agreement that their company has a superior on-time delivery performance to its customers with a mean score of 4.61 (SD=0.317). Similarly, there is higher level of consensus (mean score of 4.82, SD=0.297) among respondents that the company delivers products according to agreed timetables without delay. Additionally, the data implies that the company's has continuous performance evaluation and corrective measures for boosting the performance of processes and operations to quickly respond to customer orders with mean of 4.78 (SD=0.311).

Additionally, participants implied that the company has the highest capability of fulfilling its customer orders within a short lead time with mean score of 4.46, (SD=0.355). This signifies the company's agility and responsiveness in meeting customer demands promptly. The overall survey result of the company responsiveness performance shows a mean score of 4.67 (SD=0.313) which implies keen level of SC capability in terms of responsiveness metrics.

4.2.3.3 Quality

For assessing the company supply chain performance in terms of quality metrics, several statements were provided to participants, and they were asked to indicate their level of agreement. The responses to these measures are presented in Table 4.9 below.

Table 4.9: Quality items mean and STD.

Items		N	Mean	Std. Deviation
QL1	Our company source and produces quality coffee that meet customer demands.	128	2.68	0.361
QL2	Our company produces quality coffee with lower defect level.	128	2.85	0.348
QL3	Our company produce products as per our customer's quality specification without deviation.	128	2.99	0.341
QL4	Our company has strong quality control measures in place to ensure consistent quality throughout the production process.	128	3.40	0.411
	Quality	128	2.98	0.323

Source: Survey 2023

As indicated in the above table, respondents had a relatively low agreement level (mean score of 2.68, SD=0.361) that the company sources coffee that can meet the customer quality demands. Similarly, respondents reflected a lower level of agreement (mean score of 2.85, SD=0.348) that the company can adhere to its customer quality specifications. Additionally, majority of participants showed lower level of agreement on the company's capability of producing coffee as per the customer specification with mean score of 2.99, (SD=0.341). But respondents believe that their company has strong quality control measures in place to ensure consistent quality throughout the production process with mean score of 3.40 (SD=0.411). The overall mean score for the quality measures stands at 2.98 (SD=0.323), indicating low level of company performance in terms of quality which requires the company to take continuous quality management measures to address these gaps and ensure consistent delivery of quality products that meets customer demands through consulting with its suppliers.

4.2.3.4 Cost

The participants were presented with a set of statements that imply the company's SCP in terms cost. And their respective responses to these measures are delineated in Table 4.10 below.

Table 4.10: Cost items mean and STD.

	Items	N	Mean	Std. Deviation
CS1	Our company negotiates and purchase coffee with least reasonable and favorable price.	128	4.51	0.321
CS2	Our company has lowest total cost of production, including re-work cost.	128	2.60	0.403
CS3	Our company has lowest distribution cost, including transportation and handling cost	128	2.41	0.351
CS4	Our company has lowest Cost associated with holding (storage) inventory	128	2.32	0.318
	Cost	128	2.96	0.347

Source: Survey 2023

As the data in Table 4.10 reveals, there is high level of agreement (mean score of 4.51, SD=0.321) among respondents that the company can negotiate and acquire coffee at favorable price terms. In contrast, participants indicated relatively lower level of agreement that the company cost of production, including re-work cost, transportation, handling, and storage costs aren't minimal with a mean score of 2.60 (SD=0.403), 2.41 (SD=0.351) and 2.32 (SD=0.318) respectively. The total mean score for the cost measures shows 2.96 (SD=0.347), which implies lower company performance in achieving efficiency throughout the supply chain to enhance the company's competitiveness and financial performance.

4.2.3.5 Asset management

The statements that imply the asset management capability of the company was provided to the respondents and their response was summarized in the table 4.11 below.

Table 4.11: Asset management items mean and STD.

Items		N	Mean	Std. Deviation
AM1	Our company uses all its production machines, equipment's, transportation vehicles, human, and financial resources optimally.	128	4.94	0.178
AM2	Our company has effective systems and processes for tracking and managing inventory levels	128	4.88	0.228
AM3	Our company has high return on assets	128	4.72	0.255
AM4	Our company maintains accurate records of asset performance, maintenance, and depreciation.	128	4.81	0.242
	Asset Management	128	4.84	0.271

Source: Survey 2023

According to the data in Table 4.11, respondents strongly in agreement (mean score of 4.94, SD=0.178) that the company utilizes all its resources. Similarly, participants expressed their high level of agreement (mean score of 4.88, SD=0.228) that the company has effective systems and processes for tracking and managing inventory levels since it uses ERP systems that communicate real time information's regarding inventory level. This suggests that the company has established robust inventory management practices, enabling efficient tracking and control of inventory.

Further, respondents have also shown a higher level of agreement (mean score of 4.72, SD=0.255) that the company has higher return on assets as well as maintains accurate records of asset, maintenance, and depreciation with mean score of 4.81 (SD=0.242). The overall, mean score of the asset management measures stands at 4.84 (SD=0.271), which level the company in the highest asset management performance level.

4.3 Inferential statistics

4.3.1 Correlation analysis

Correlations gauge the linear relationship between two variables. The correlation coefficient value range between -1 to 1, which each value indicates the strength of the relationship. Values closer to the absolute 1 signify the existence of strong relationship, while values near 0 and -1 suggest weak and strong negative linear relationship between variables respectively.

Based on this view to analyze the relationship between and with VI dimensions of internal, supplier and customer integration (independent variable) and supply chain performance (dependent variables) Biverate Pearson correlation was conducted. Correlation Coefficients indicate the strength and direction of relationship among variables with their respective statistical significance of their relationship. The total correlation between independent and dependent variables is summarized in the Table 4.12 below.

Table 4.12: Bivariate Pearson's Correlation between independent and dependent variables.

		Internal Integration	Supplier Integration	Customer Integration	Supply Chain Performance
Internal Integration	Correlation	1	0.517**	0.443**	0.541**
	Sig. (2-tailed)		0.00	0.00	0.00
Supplier Integration	Correlation	0.517**	1	0.537**	0.523**
	Sig. (2-tailed)	0.00		0.00	0.00
Customer Integration	Correlation	0.443**	0.537**	1	0.479**
	Sig. (2-tailed)	0.00	0.00		0.00
Supply Chain Performance	Correlation	0.541**	0.523**	0.479**	1
	Sig. (2-tailed)	0.00	0.00	0.00	

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

Source: Survey 2023

As shown in the Table, the correlation analysis was conducted to examine the relationship between vertical integration dimensions (internal, supplier and customer integration) and with SCP. The Bivariate Pearson correlation matrix between VI revealed the existence of moderate positive correlation between internal, supplier and customer integration, with r value ranging between 0.443 and 0.537 and P value of

< 0.01. Thus, the results inferred the existence of moderate positive correlation between internal and supplier integration ($r = 0.517$, $p < 0.00$). Similarly, there was also moderate positive correlation between supplier integration and customer integration ($r = 0.537$, $p < 0.00$). Additionally, internal integration also found to possess moderate positive correlation with customer integration ($r = 0.443$, $p < 0.00$).

The bivariate Pearson correlation (r) result also revealed the relationship between VI dimensions (internal, supplier and customer integration) and SCP. And the result shows that, Internal Integration has a moderate positive correlation with SCP ($r = 0.541$, $p < 0.00$). Similarly, Supplier integration has also moderately positively correlated with SCP ($r = 0.523$, $p < 0.00$). Additionally, customer integration has also found to have moderate positive correlation with SCP ($r=0.479$, $p < 0.00$).

4.3.2 Regression analysis

To determine the statistical significance of the relationship between the independent and dependent variables, a regression analysis was conducted. However, before conducting multiple regressions, it was necessary to ensure that certain assumptions were met, including validity, reliability, multicollinearity, normality, linearity, variance analysis, autocorrelation, and test for outliers. To address these assumptions, the following steps were taken in this study:

Content and construct validity was ensured by conducting a thorough review of relevant literatures and adapting instruments that have been tested, passed, and utilized in the past studies. This approach helped to ensure that the measurement tools used in this study are accurately captured the intended constructs.

Additionally, the reliability tests were conducted to check the internal consistency of the instruments using Cronbach's Alpha, and the instruments passed the test by scoring an acceptable level of Cronbach alpha score greater than 0.70 as presented in Table 3.1.

Moreover, multicollinearity test, analysis of variance, autocorrelation test, Variance analysis with balanced data (ANOVAb), normality test, and test for outliers was conducted to assess whether the assumption in the regression model where met or not. And the result is presented in the following section.

4.3.2.1 Multi collinearity test

To check multicollinearity, the Variance Inflation Factor (VIF), eigenvalue, and tolerance were analyzed. These statistical measures help to assess the degree of multicollinearity among the independent variables.

Table 4.13: Collinearity Diagnostics statistics

Model	Dimension	Eigenvalue	Condition Index	Collinearity Statistics	
				Tolerance	VIF
1	(Constant)	3.992	1		
2	Internal Integration	0.003	34.53	0.694	1.441
3	Supplier Integration	0.003	36.54	0.614	1.628
4	Customer Integration	0.002	44.32	0.674	1.484

a. Dependent Variable: Supply Chain Performance

Source: Survey 2023

Table 4.13 presents the results of the collinearity diagnostics statistics for the regression model. In the realm of regression model assumption test of diagnostics statistics, on way of verifying multicollinearity predominantly relies on the value of tolerance and its inverse test measure, referred to as the variance inflation factor (VIF) (Midi, Sarkar, and Rana, 2010).

The VIF is a measure of multicollinearity in a regression analysis which indicates the variance of the estimated regression coefficients is inflated due to high correlation among the predictor variables. VIF value of < 10 indicates the presence of multicollinearity issue while value of 1 indicates low degree of correlation between predictors in the regression model (Friendly and Kwan, 2009). Based on this view, as per the collinearity statistics for result inference under Table 4.13, predictor variables: Internal Integration, Supplier Integration, and Customer Integration implies VIF values of 1.441, 1.628, and 1.484

respectively which was less than the recommended value of < 10, indicating the existence of moderate correlation between predictor variables which doesn't cause significant problem on the regression model.

Tolerance is also another measure of collinearity, its value ranges between 0 and 1 where value of 0 implies the presence of collinearity among predictors in the regressors model while value of 1 or closer to 1 indicates perfect specificity of the predictors (Imdadullah, Aslam, and Altaf, 2016). Thus, our test implies a tolerance score for predictors: Internal integration, Supplier integration, and Customer Integration implies a value of 0.694, 0614, and 0.674 respectively which shows the presence of moderate level of correlation between predictor variables which again proved lack of collinearity issue that can cause disturbance in the regression model.

4.3.2.2 Normality test

This assumption was formulated to assess whether the data follows a normal distribution or not. Normality test of the distribution can be analyzed through graphical approach, which involves scatter plots, residual, and histogram. Normally distributed data in the histogram visual estimation is conducted to assert whether normality exists. And if the distribution plot made a bell shape, it is considered normal (Rani Das, 2016). As per the histogram inference on appendix II, the visual estimation of the graph exhibits a bell shape which indicates the normal distribution of residuals.

Additionally, a P–P plot (probability–probability) was plotted and envisioned for assessing how closely the data sets agree to each other. If the graph looks like straight line (no curve) then, it contains no outliers and the assumption thought to be fulfilled (Hess, 1995). And as shown in the appendix II the data was closer to making a straight line which implies the absence distribution that creates disruption under the regression model and again asserts the fulfilment of normality assumption of the regression model.

4.3.2.3 Linearity test (Homoscedasticity)

A common approach to checking assumptions of the general linear model is to examine the presence of a linear connection between the independent and dependent variables. The test suggests that their relationship might be represented by a straight line, indicating a linear association assuming that the correlation between these variables adheres to a linear pattern (Schützenmeister, Jensen, and Piepho, 2012). Based on this view, Q-Q plot indicated in appendix III shows a lower level of volatility towards both ends which clearly shows the data fitness in to straight line without further departure from the linear regression line which verifies the satisfaction of linearity assumption on the regression model.

4.3.2.4 Analysis of variance (ANOVA) and Autocorrelation

Table 4.14: Analysis of variance and autocorrelation

Multiple regression analysis (ANOVA)						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	Sig
1	0.633	0.401	0.387	0.28179	1.885	0.000^a

a. Predictors: (Constant), Customer Integration, Internal Integration, Supplier Integration
b. Dependent variable: Supply chain performance

Source: Survey 2023

Table 4.14 presents the results of the multiple regression analysis test of ANOVA. The R value of 0.633 indicates the existence of moderate positive correlation between the predictor variables (internal, supplier and customer integration) and the dependent variable (SCP). The R-squared value of 0.401 (coefficient of determination) indicates that, approximately 40.1% of the variance in SCP (DV) can be attributed to the three predictors (IV) (Lee and Rhee, 2000). The standard error of estimate value of 0.28179, implies average level of error in predicting the dependent variable (SCP) based on the included predictors.

Further, the Durbin-Watson statistic conducted to detect the presence of autocorrelation in the residuals of a regression model shows a value of 1.885. This value suggests the presence of slight positive

autocorrelation but not severe since a value between 1 and 2 is generally considered acceptable, indicating that the residuals having some positive correlation but are not strongly dependent on their lagged values which implies normal distribution.

4.3.2.5 Variance analysis with balanced data (ANOVAb)

Table 4.15: Variance analysis with balanced data

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.596	3	2.199	27.687	0.000
	Residual	9.846	124	0.079		
	Total	16.442	127			

a. Predictors: (Constant), Customer Integration, Internal Integration, Supplier Integration, b. Dependent Variable: SCP

Source: Survey 2023

The ANOVAb test results under Table 4.15 revealed that the regression model has a significant effect on the SCP. The predictors: Customer Integration, Internal Integration, and Supplier Integration, collectively explain a substantial amount of the variation in the dependent variable. The F-value of 27.687 implies the presence of relationship between predictors and the outcome (Lee and Rhee, 2000). Additionally, the p-value (Sig.) of 0.000 proved that the relationship has high statistical significance. The model explains approximately 40.1% (6.596/16.442) of the total variation in the dependent variable, with the remaining 60% being attributed to random variability (Residual) (Sarstedt and Mooi, 2018).

4.3.2.6 Test for Outliers

Table 4.16: Residual statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Cook's Distance	0.000	0.103	0.008	0.016	128

a. Dependent Variable: Supply Chain Performance

Source: Survey 2023

The data provided the statistics of the residuals, specifically focusing on Cook's distance. Cook's distance is a measure used to assess the influence of each observation on the overall regression model. In this case, the minimum Cook's distance is 0.000, indicating the absence of extremely high influence on the

regression model. The maximum Cook's distance is 0.103, suggesting that there is one or a few observations that has influenced the model. The mean Cook's distance is 0.008, indicating that, on average, the observations have a relatively low influence on the regression model. Generally, as the Cook's distance inference, the data have a relatively low to moderate influence on the regression model, which indicates the absence of extreme outliers or highly influential observations.

Since the entire regression model assumptions fulfilled, test of the statistical significance of the relationship between predictors and SCP was conducted and the result depicted in the Table 4.17 below.

4.3.2.7 Multiple regression analysis (ANOVA) for Coefficients and hypothesis testing

Table 4.17: Multiple regression analysis (ANOVA) for Coefficients and hypotheses testing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.405	0.420		0.962	0.338
	Internal Integration	0.322	0.083	0.323	3.867	0.000
	Supplier Integration	0.297	0.094	0.248	2.792	0.006
	Customer Integration	0.238	0.099	0.203	2.396	0.018

a. Dependent Variable: Supply Chain Performance

Source: Survey 2023

As the above result implies, the standardized coefficient of internal integration has the highest significant positive effect ($\beta = 0.323$, $p = 0.000$) on SCP. Additionally, supplier integration ($\beta = 0.248$, $p = 0.006$) and customer integration ($\beta = 0.203$, $p = 0.018$) also has significant positive effect on SCP. The overall, result suggest that Internal Integration, Supplier Integration, and Customer Integration are all significant predictors of SCP. However, as the standardized coefficient indicates, Internal Integration has the strongest effect on SCP, followed by Supplier and then Customer Integration. These results suggest that an increases in all vertical integration variables leads to improved SCP. This result rejects all the null hypotheses and supports an alternative H1a, H1b and H1c which were formulated in an inference to past empirical studies.

4.1 Discussion of results

This section presents the results of a study on the practice and effect of VI on the SCP of the company. The practice of VI was analyzed at internal, supplier, and customer level. And also, the SCP of the company was apprised using five metrics. Additionally, the relationships between the three vertical integration variables and SCP of the case company were analyzed. Thus, the result would be discussed as follows.

The descriptive analysis result reveals that Ethio-Gabana demonstrates a strong practice of vertical integration at both internal and external level. As the result revealed, the company exhibits a higher level of customer integration with a mean value of 4.68 which indicates the company commitment to meet its customer demands and ensuring high levels of satisfaction. In support of these, Pakurár et al., (2019) implied that, customer integration helps to cognize and fulfill customer demand and drive better SCP.

Furthermore, the analysis also revealed a keen internal integration (Mean 4.55) practice among departments. And as the result implied, strong internal integration was achieved through the utilization of Information and Communication Technologies (ICTs), specifically Enterprise Resource Planning (ERP) application systems. In line with this result, Amoako et al. (2020), emphasized a strong internal integration, enabled by ICT, allows firms to efficiently gather, analyze, and leverage information from external partners. Additionally, Song and Song, (2020) implies, this internal integration facilitated by ICTs enhances coordination and collaboration among diverse functions and leads to better SCP. Similarly, even though it is slightly lower compared to internal and customer integration the company also has a strong level of integration with its suppliers with a mean score of 4.40. This would be taken as an implication for the company's commitment to foster and develop collaborative and long-term relationships with its suppliers to enhance its SCP.

The overall result reveals keen practice of VI at both internal and external level with aggregate mean score of 4.54. Taking this in line with the implication Getasew, (2017); Nguyen, Phan, & Matsui (2021); Kaiser and Obermaier, (2020); Guan and Rehme, (2012), this higher level of integration at both internal and external level would impose significant add-on effect on the SCP of the firm.

Furthermore, the overall descriptive analysis result of the company's SCP demonstrated a mean value of 4.04 which implies a relatively higher level of SCP. However, the specific mean score of each of SCP metrics differs significantly. Thus, while the company exhibited relatively higher performance in terms of flexibility, responsiveness, and asset management with mean score of 4.75, 4.67 and 4.84 respectively, the major problem lies under quality and cost which has a mean score of 2.98 and 2.96 respectively. This demands the company to take quality control and efficiency measures to address these gaps.

Bivariate Pearson correlation analysis was also conducted to reveal the dimension of relationship among variables. The result revealed positive correlation between VI and SCP which supported H_1. The findings specifically provided that, internal integration exhibits a moderate positive correlation with SCP ($r = 0.541$, $p < 0.01$). Similarly, supplier integration also found to be moderately and positively correlated with SCP ($r = 0.523$, $p < 0.01$). Additionally, customer integration also showed moderate positive correlation with SCP ($r = 0.479$, $p < 0.01$).

Finally, the regression analysis result proved that vertical integration at internal, supplier and customer level significantly and positively affect the SCP of Ethio-Gabana. The finding shows that internal integration has a higher significant positive effect on SCP with ($\beta = 0.323$, p (0.000) and followed by supplier integration ($\beta = 0.248$, p (0.006) and customer integration ($\beta = 0.203$, p (0.018). And these findings support all the formulated hypotheses, H1a, H1b, and H1c that explained the positive effect of the three VI dimensions on SCP in reference to past empirical study implications.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes and draw conclusion on the major findings of the study on the practice and effect of vertical integration on the coffee supply chain performance of subject company. And ends with forwarding recommendations and further research implications.

5.2 Summary of findings

The study mainly conducted to analyze the practice and effect of vertical integration on the supply chain performance Ethio-Gabana Trading plc. The major findings of the study are summarized as follows.

The overall descriptive analysis result revealed keen practice of vertical integration at internal, supplier and customer level with Mean score of 4.55, 4.40 and 4.68 respectively. The overall mean of 4.54 shows the strong practice of vertical integration at Ethio-Gabana.

Additionally, the overall supply chain performance of the company showed relatively higher with mean score of 4.04. This was due to the variation on company SCP in each of metrics. Specifically, while the company possessed higher performance in terms of flexibility, responsiveness, and asset management with mean score of 4.75, 4.67 and 4.84 respectively, lower performance level was spotted in terms of quality and cost with mean score of 2.98 and 2.96 respectively.

Furthermore, the bivariate Pearson correlation analysis result conducted to examine the relationship between variables showed a presence of positive correlation between vertical integration dimensions (internal, supplier and customer integration) and SCP. Thus, Internal integration had a moderate positive

correlation with SCP ($r = 0.541$, $p < 0.01$), as did supplier integration ($r = 0.523$, $p < 0.01$) and customer integration ($r = 0.479$, $p < 0.01$).

Finally, the regression analysis revealed that vertical integration at the internal, supplier, and customer levels significantly and positively affected the SCP of Ethio-Gabana. Internal integration had the highest significant positive effect on SCP ($\beta = 0.323$, p (0.000)), followed by supplier integration ($\beta = 0.248$, p (0.006)) and customer integration ($\beta = 0.203$, p (0.018)).

5.3 Conclusions

In conclusion, the study findings implied that Ethio-Gabana had a strong practice of VI at internal, supplier, and customer level. The company exhibits strong integration with its customers followed by internal departments and suppliers. In this case, nature of the business was pointed as a major factor for establishment of keen integration with customers and supplier. On the other hand, higher internal integration was achieved through utilizing ICT specifically of ERP system which granted the company to have a well-coordinated process and operations.

Further, the survey result implied the company to possess enormous performance in terms of flexibility, responsiveness, and asset management which over shadowed its lower capability in terms of quality and cost and put the overall SCP of the company in to a relatively higher level.

The correlation analysis result found a positive correlation between VI dimensions and SCP. The Pearson correlation analysis showed that internal, supplier, and customer integration has moderate positive correlations with SCP. And the regression analysis result revealed that VI at internal, supplier, and customer level significantly and positively affect the SCP of the company, with internal integration having the highest significant effect and followed by supplier and customer integration.

5.4 Recommendations

Based on the findings and conclusions drawn from this study, the following recommendations are put forth:

- Ethio-Gabana can drive better SCP if the company fully integrates its process with its suppliers and customers through leveraging ERP system to facilitate seamless material, information, and knowledge flow.
- The quality performance of Ethio-Gabana can also be improved if the company internally strengthen its quality control measures through its production process and upgrade its level of integration with its suppliers.
- The cost performance of Ethio-Gabana can be improved with the improvement of quality which requires strong integration at both internal and external level with suppliers and customers.

Limitation and suggestion for further study:

- This study was conducted taking only a single company as a subject. For this reason, to gain valuable insights and comprehensive understanding of the effect of vertical integration, it is highly recommended to extend this study beyond company level through considering a multiple coffee export companies since conducting comparative analyses and identifying potential differences, can offer meaningful interpretations, and broad generalization of the study result which will contribute to the advancing of knowledge in the field of study area.
- To assess the practice, effectiveness and progress achieved through the implementation of vertical integration, it is highly advisable to conduct study specially in the case of coffee farmers and intermediaries in the coffee supply chain.

- It is recommended to revisiting the topic, to evaluate the advancements made by companies across the coffee SC through gaining valuable insights on the long-term effect of vertical integration initiatives. This continuous evaluation will enable the identification of areas of improvement, the measurement of performance trends, and the development of targeted strategies to further enhance the practice of vertical integration.
- Finally, the framework of this study considers only of five constructs as a measure of SCP and three dimensions of Vertical integration. In future studies in this area, it is important to add additional dimensions and factors related to SCP and VI to provide more complete view.

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Appendixes

Appendix I: Questionnaire

Addis Ababa University

School of commerce

Department of Logistics and Supply Chain Management

Dear Respondent

This research study is conducted mainly to analyze the impact of vertical integration on coffee supply chain performance of subject company for academic purpose to understand how well vertical integration would be practiced in the dimensions of Supplier, customer, and internally with its respective effect on the performance of the company in terms of flexibility, delivery, quality, cost and asset management performance metrics.

Your participation in this study is essential to the study. On this ground, by completing the questionnaire, you will be contributing valuable information that will help to better understand the degree of impact relationship exist between them. Your responses will be kept confidential and will only be used for research purposes.

We encourage you to take your time and answer the questions to the best of your ability. Your input will be extremely helpful in our efforts to gain new insights into the coffee supply chain and with its effect on performance of the company.

Contact information.

If you have any questions or concerns about the study or the questionnaire, please do not hesitate to contact me.

Phone no: +251 973 05 98 40

Email: Seifuamey@gmail.com

Thank you in advance for your time and participation in this important research project.

Sincerely,

Amare Seifu

General Instructions

Thank you for taking the time to participate in this research study. Your honest and thoughtful responses will be greatly appreciated and will help us to better understand.

- To ensure the confidentiality of your responses, please do not include your name on this questionnaire.
- Please read each question carefully and mark ✓ the box that corresponds to your answer for part I questions and for part II circle ○ on your response number.
- If a question does not apply to you, simply leave it blank. Do not write anything on the questionnaire other than your responses.

Part I

Demographic information

A. **What is your education level?**

1. Collage diploma ☐ 2. Bachelor's degree ☐ 3. Master's ☐ 4. PhD degree ☐

B. **What is your current job position?**

1. Entry-level ☐ 2. Mid-level ☐ 3. Senior-level ☐ 4. Managerial ☐

5. Executive ☐

C. **How long have you been working for this organization?**

1. Less than 2 years ☐ 2. 2-4 years ☐ 3. 5-7 years ☐ 4. Over 7 years ☐

D. **Which department do you work in?**

1.Sales & Marketing ☐

2. Export ☐

3.Procurement ☐

4.Finance ☐

5.Transport ☐

6.Quality ☐

7.Production ☐

8.Human resource & facility administration ☐

Part II

The first section questionnaires assess the practice of Vertical Integration (VI) and second section has an inquires help to understand the impact of VI on the supply chain performance of the company.

Section one: Practice of vertical integration

For the following questions please circle the appropriate number that match your view for implying the extent to which you agree or disagree with each stated statement. The items are scaled by five-point Likert. And each scale numbers have their own indication. i.e. 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.

Scale	Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Internal integration (II)	(II1) Our company encourage employees to work together to achieve common goals, than Individual competition.	1	2	3	4	5
	(II2) Departments in our company communicate frequently with each other.	1	2	3	4	5
	(II3) All department managers' work together well on all important decision.	1	2	3	4	5
	(II4) Our company uses an enterprise resource planning (ERP) application system to collect, store, and communicate information's to all departments.	1	2	3	4	5
Supplier integration (SI)	(SI1) We maintain close communication with our suppliers about inventory, availability, quality, and delivery status.	1	2	3	4	5
	(SI2) We maintain cooperative relationships with our suppliers.	1	2	3	4	5
	(SI3) We share and communicate our production plan with our suppliers to prevent delay.	1	2	3	4	5
	(SI4) We strive to establish long-term relationships with our suppliers.	1	2	3	4	5
Customer integration (CI)	(CI1) We frequently are in close contact with our customers.	1	2	3	4	5
	(CI2) Our customers give us feedback on our quality and delivery performance.	1	2	3	4	5
	(CI3) We strive to be highly responsive to our customers' orders.	1	2	3	4	5
	(CI4) We share our production plan with our customers.	1	2	3	4	5

Section 2: Supply chain performance

Please read each statement carefully and indicate your level of agreement by circling the appropriate number. The scale is based on a 5-point system, where: (1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, and 5. Strongly Agree)

Circle the number that best represents your level of agreement with each statement. Please only circle one number per statement. Thank you for your participation**.**

Scale of SCP	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Flexibility (FL)	(FL1) Our company can respond to and accommodate demand variations, such as seasonality.	1	2	3	4	5
	(FL2) Our company can easily increase and decrease its production levels based on change in customer demand.	1	2	3	4	5
	(FL3) Our company can quickly provide diverse coffee variety, types and grade that can meet our customer's requirements.	1	2	3	4	5
	(FL4) Our company can accommodate new markets or new customers.	1	2	3	4	5
Responsiveness (RS)	(RS1) Our company has a superior on-time delivery performance to its customers.	1	2	3	4	5
	(RS2) Our company can deliver products to its customers by the agreed timetables without delay	1	2	3	4	5
	(RS3) Our companies fulfill its customers' orders in short lead time.	1	2	3	4	5
	(RS4) Our company continuously evaluates and improves its processes to fulfill its customer orders quickly.	1	2	3	4	5
Quality (QL)	(QL1) Our company source and produces quality coffee that can meet our customer demands.	1	2	3	4	5
	(QL2) Our company produces coffee with lower defect level.	1	2	3	4	5
	(QL3) Our company produces products as per our customer's quality specification without deviation.	1	2	3	4	5
	(QL4) Our company has strong quality control measures in place to ensure consistent quality throughout the production process.	1	2	3	4	5
Cost (CS)	(CS1) Our company negotiates and purchase coffee with least reasonable and favorable price.	1	2	3	4	5
	(CS2) Our company has lowest total cost of production, including re-work cost.	1	2	3	4	5
	(CS3) Our company has lowest distribution cost, including transportation and handling cost	1	2	3	4	5
	(CS4) Our company has lowest Cost associated with holding (storage) inventory.	1	2	3	4	5

Asset Management (AM)	(AM1) Our company uses all its production machines, equipment's, transportation vehicles, human, and financial resources optimally.	1	2	3	4	5
	(AM2) Our company has effective systems and processes for tracking and managing inventory levels.	1	2	3	4	5
	(AM3) Our company has high return on assets	1	2	3	4	5
	(AM4) Our company maintains accurate records of asset performance, maintenance, and depreciation.	1	2	3	4	5

Appendix II: Normality test

Figure 4.1: Histogram

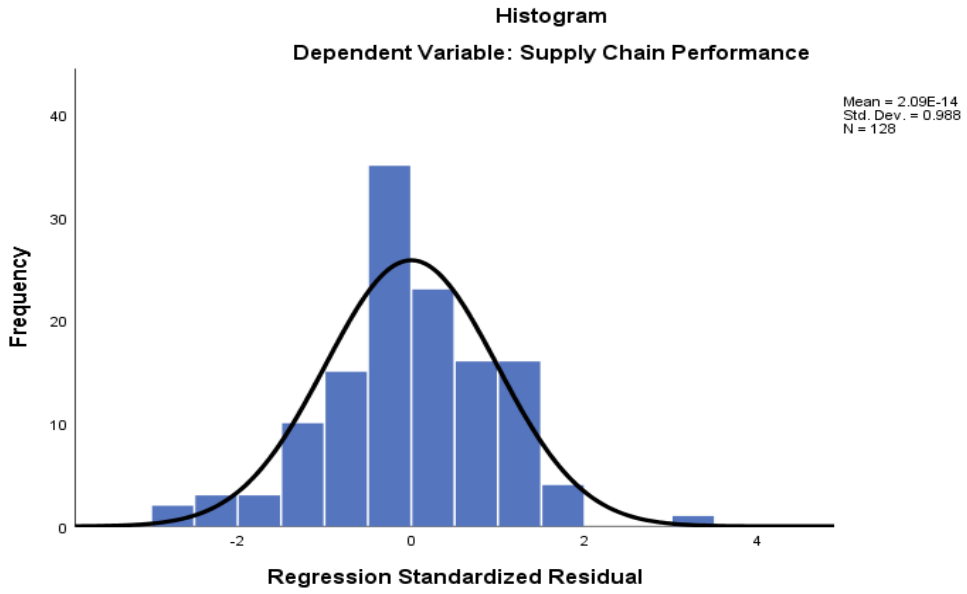
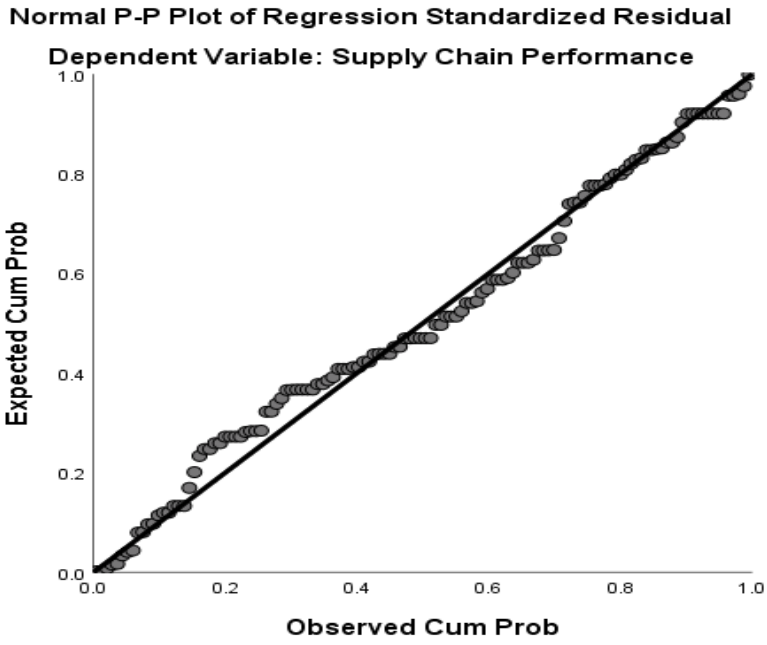


Figure 4.2: Probability-Probability plot



Appendix III: Linearity test

Figure 4.3: Quantile-Quantile plot (QQ-plot)