



ADDIS ABABA UNIVERSITY

DEPARTMENT OF MANAGEMENT

COLLEGE OF BUSINESS AND ECONOMICS

**THE EFFECT OF SUPPLY CHAIN INTEGRATION ON
ORGANIZATIONAL PERFORMANCE**

(CASE OF SELECTED EDIBLE OIL FACTORIES IN AMHARA REGION)

A THESIS Submitted to the College of Business and Economics

**Department of management in partial fulfillment of the Requirements for
the Award Degree of Master of Business Administration.**

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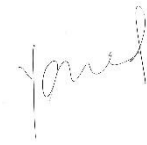
**THE EFFECT OF SUPPLY CHAIN INTEGRATION ON
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Declaration Statement

I, Melat Habtemariam, hereby certify that this thesis, submitted in partial fulfillment of the requirements for the Degree of Master of Business Administration at Addis Abeba College of Business and Economics, is the product of my independent research on the topic "The Effect of Supply Chain Integration on Organizational Performance The Case of Selected Food Oil Factories in Amhara Region" and complies with the rules of the University and meets the recognized standards with regards to originality. Additionally, every reference is acknowledged correctly.

Signature:_____

Date: 14/6/2023

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List of Abbreviations and Acronyms

Acronym	Definition
SCI	Supply Chain Integration
SC	Supply Chain
SI	Supplier Integration
CI	Customer Integration
EI	External Integration
II	Internal Integration
PP	P-P Plot
R ²	R square
SCM	Supply Chain Management
DU	Demand Uncertainty
MT	Metric Ton
ETB	Ethiopian Birr
LT	Litter
TAG	Triacylglyceride
RBD	Refined, Bleached and Deodorize
PLC	Private Limited Company
USD	United State Dollar
M ²	Meter Square
GSCM	Green Supply Chain Management
SSCM	Sustainable Supply Chain Management
VIF	Variance Inflation Factory
WA	Worku Aytnew Oil Factory
RBV	Resource Based View
CSA	Central Statistical Agency
OC	Organizational Capability
OP	Organizational Performance
EO	External organization
SRM	Supplier relationship management
IV	Independent Variable

Abstract

The purpose of the study was to examine the impact of supply chain integration on the performance of a selected food oil organization in the Amhara Region. Causal research was conducted, and data collection was acquired using questionnaire by sampling 135 member of the workforce which was then carefully scrutinized for consistency and continuity after formatting and processing. Multiple linear regression model was employed to foresee organizational performance from the dimensions of SCI, namely interna, external, information, measurement, customer, and supplier integration. The findings revealed that the six measurements of supply chain integration that were mentioned above explained 71.3% of the variance in organizational performance. Amongst all the independent variables, customer integration, information integration and measurement integration were found to be statistically significant with a p-value of less than 0.05, whereas internal, supplier and external integration were found to be statistically insignificant with a p-value greater than 0.05. Overall, the study summarized that out of all the independent variables, external integration, internal integration, and supplier integration were weighed less in relative to information integration, measurement integration and customer integration, indicating that former dimensions of SCI were not optimal in the organization. It is recommended that through system computerization, framework agreement and relationship management, all the six parameters of supply chain integration to be integrated at an optimum level towards attaining a highly effective OP.

Keywords: *supplier, information, performance, external, customer, internal, integration, measurement, and supply chain.*

CHAPTER 1

INTRODUCTION

This study's main goal is to present a thorough, quantitative, and integrative investigation of the impact of supply chain integration on overall organizational performance. In the study, the relationship between supply chain integration and organizational performance is examined along with evidence of correlation and regression analysis.

1.1 Background of the Study

According to Bogale (2016), a company's capacity to integrate its operations with those of its supply chain associates which are suppliers, distributors, wholesalers, retailers, and end customers, determines how successfully it can compete in the current market. As a result, the performance of each supply chain players individually and the performance of the entire supply chain itself is affected by each company in the chain. (2006) Sengupta, Heiser, and Cook.

Integration is the process of parties working together to produce a credible, practical, and unified framework. Zhao, Huo, and Flynn (2010) describes extent of SCI until a producer consciously collaborates with its SC associates and cooperatively have control over its intra- and inter-organizational processes.

Supply chain integration (SCI) is becoming increasingly important for long-term organizational success (Huo, Qi, Wang, & Zhao, 2014). If a company wants to thrive, it must closely cooperate with its customers and suppliers. Producers and their supply chain associates strategically collaborate (SCI) (Kumar et al., 2017; Flynn et al., 2010); (Devaraj, Krajewski, & Wei, 2007; Mohammadi, 2014) to maximize internal and external competencies and resources all the way through the SC. A technology called SCI improves each task that a business completes. Supply chain management (SCM) is an advanced system which incorporates supporting activities, from sourcing to post-sale services as a whole. According to Shafqat and Van Hoek (1998), supply chain collaboration is essential for boosting an organization's performance and achieving a competitive edge. SCI is widely acknowledged as being essential to achieving performance and competitive advantages (Khalid, 2021).

Large proportions of previous studies have focused on assessing the impacts of many types of SCI parameters like external and internal integration on business performance. Such ways of SCI model configuration is too abstract to capture the core measure of how effective the numerous SCI techniques are and so, it may be one of the key causes to the conflicting results in earlier SCI and company performance researches. For instance, the effectiveness of internal and external integration was affected differently by environmental unpredictability. As a result, a more thorough investigation into the effects of SCI on company performance is required (M. Kim & Chai, 2016).

As a result, it may be worth to study the function of SCI activities and processes on OP. Hence, this research will inquire into roles of SCI on the OP for selected edible oil factories in Amhara region.

1.2 Statement of the Problem

Supply chain integration's ultimate objective is "long-term, sustainable superior performance." The capacity of a manufacturing organization to become a fully integrated partner within a supply chain environment is now necessary for such improved performance (Cooper et al., 1997; referenced by Natnael, 2016). According to Green Jr., Whitten, and Inman (2008), supply chain strategies concentrate on how internal and external organizational processes can be integrated and coordinated throughout the supply chain to better serve final customers and consumers while improving the performance of the individual supply chain members.

In Ethiopia, there were around 34 enterprises producing edible oil, ranging from small-scale to large-scale industries, with a combined production capacity of 60,040, 000 kg/year, according to the Ethiopian Central Statistics Authority's (2015) report. Due to raw material shortages, a lack of timely and accurate information exchange, and other issues, the average performance capacity of the industries was only 23,585, 000 kg/year. Ethiopia has imported 479,188,725 kg of oil, according to the 2015 import database published on the revenue and customs office website. Oilseed production, on the other hand, involved more than 3 million farms and is the second-highest export earner for the nation after coffee (J.H.M. Wijnands et al., 2009). According to Arkebe (2015), the manufacturing industry in Ethiopia is hampered by a number of structural issues, including low productivity, low value, and a lack of global competitiveness.

Many people thought Ethiopia would no longer have a lack of cooking oil when the enormous edible oil factories, Phibela and W.A., were opened with governmental pomp, even to the point where imports would be completely replaced by local production. Cooking oil has increased in value and scarcity in Addis Abeba six months following the two giants' launches. Ethiopia presently imports 1.3 million liters of the daily over 2.7 million liters required. Despite a sharp increase from 228,800 liters per day last year to 992,876 liters per day this year, the country's medium- and large-scale companies' installed capabilities of 3.4 million liters are still far exceeded (Ethiopian Business Review 2021/2022).

Even with booming domestic output, there remains a monthly supply imbalance of more than 10.4 million liters. According to the government, Ethiopia's estimated monthly consumption has increased from 68 million liters in 2019 to 75.5 million liters in 2019. In a recent paper, the Ministry of Trade and Industry (MoTI) said that these numbers were accurate and that 40.4 million liters were imported on a monthly basis. The demand is substantially larger than the 0.72 liters per month FAO estimates for developing nations' normal per capita oil use. With a projected 110 million people living in Ethiopia, the monthly demand would be greater than 79.2 million (EthiopianBusinessReview 2021/2022).

According to the US Foreign Agricultural Service (USFAS), the actual global use of edible oil for 2020–21 will be 630,000 tons, or 700 million liters, of which 90% will be imported. The most common types of oil consumed are palm, sunflower, and locally produced niger seed oil. According to a study by USFAS, local factories can only provide 10% of the demand. This is in conflict with the most recent edible oil studies from MoTI, which claim that the proportion of local manufacturers has increased from 12 percent last year to 40 percent at the moment (Ethiopian Business Review 2021/2022). According to The Reporter 2021, Local producers satisfy only 12 percent of oil consumption, while the rest is covered by imports, mentioning the country needs 57.2 million liters of oil every month.

In order to meet the whole demand, which MoTI estimates to be 906.5 million liters for the current fiscal year 2021/22, imports would cost USD 993 million. In 2020, Ethiopia spent USD 749 million importing edible oil. In reality, according to a MoTI document, the proportion of domestic edible oil output to overall demand has climbed from barely 5 percent three years ago to 40 percent

at this time. This rise is mostly attributable to the opening of the Phibela and W.A. edible oil facilities this year. The former costs ETB4.5 billion and has a daily production capacity of 1.5 million liters, while the latter costs ETB5.2 billion and has a daily production capacity of 1.3 million liters. Phibela alone was forecasted to cover 60Pct of Ethiopia's total demand (Ethiopianbusinessreview 2021/2022).

Even these much anticipated factories, however, were unable to fully utilize their established capacity. For instance, according to MoTI data, Phibela has only generated 14.6 million gallons in the six months since its inception in February 2021. The plant uses just 5.4 percent of its installed capacity, which is close to its rival W.A., which uses 4.4 percent. Even while older factories are more efficient, they are still not using all of their potential. Shemu uses 32% of its capacity, Rongy 20%, and Hamaressa 10%. Even the decades-old Addis Modjo Edible Oil Factory is producing at 56Pct of its 50,000 liter-a-day capacity. The 30 medium and large oil plants, with daily capacities of at least 1,000 liters, have the facility to produce 3.4 million liters per day. Nonetheless, they produced on 998,876 liters per day this year (Ethiopianbusinessreview 2021/2022)

According to Sitara Ali, Executive Director of Shemu Edible Oil Factory, Oilseeds are highly inflated. Also, they are facing difficulty as they are not able to import crude oil and process it here owing to the inaccessibility of foreign currency (Ethiopianbusinessreview 2021/2022).

Oilseeds in excess of 6.5 million quintals per year is the requirement of oil manufacturers whilst refiners have a need of 1.2 million tons of crude oil per year, according to a study by MoTI. Ethiopia's annual oilseed production has been around 8.4 million quintals since 2016/7, but dropped to 7.8 million quintals in 2018/9, according to a National Bank of Ethiopia (NBE) report (Ethiopianbusinessreview 2021/2022)

Unstudied are the impacts of supply chain integration difficulties over organizational performances of oil production factories. Aiming to address the lack of SCI on the operated oil factory in the Amhara regional state, this paper is being written. SCI is a drawn-out process from raw material collection to ultimate consumer delivery. Due to the driving forces behind SCI—the movement of facilities, inventory, information, transportation, rising customer demand, as well as the fragmentation of the SC & its negative effect that SCI has on the performance of organization, this

study aims to pinpoint the issue and provide recommendations for applying supply chain integration to specific factories in the Amhara Region.

Hence, to get a generalization to the causal relationship b/n SCI & the performance of organization, this research is aiming in contributing towards measuring the impact of supply chain integration on organizational performance in the case of three well known oil factories.

1.3 Research Question

1. What is the nature of the correlations between supply chain integration and the overall performance of an organization?
2. What are the dimensions that comprise the extents of supply chain integration?
3. Up to what extent is companies' supply chain and OP measured?

1.4 Objective of the Study

This study has two sets of objectives: the general and specific objectives.

1.4.1 General objective

The general objective of this study is to assess the role of Supply Chain integration on organizational performances (the case of selected food oil factories in Amhara region).

1.4.2 Specific objectives

1. To assess organizational performance of oilseed products and manufacturing industries.
2. To identify factors of supply chain integration that affect organizational performance.

1.5 Significance of the Study

The present study has the following benefits:

To enhance integration of SC members and partners, this study initially aids the management of particular food oil factories, particularly department heads responsible for supply chain management, in their decision-making process and in implementing appropriate integration measures. This will result in improved efficiency and effectiveness of the chain system, which has

previously been hindered in achieving performance targets, and will also streamline the planning process.

Second, the study will be useful for future research on a related topic by academics and practitioners alike. Also, the study's final results offer food oil firms a wealth of information on how to improve the integration of the supply chain and adhere to their customer satisfaction and more to be productive.

Third, this research could be used as a potential information source towards follow-up researches on the management of seed oil exporter companies and supply chain integration. It should encourage other students to increase their understanding of research while providing access to anyone who wishes to look into or consult this topic further.

1.6 Scope of the Study

The goal of this study is to define how supply chain integration affects organizational performance. To achieve this goal, the research used a specific research methodology—explanatory design of quantitative approach—during a specific time period, namely during the year 2021/2022. It also used a specific sample of food oil factories in the Amhara region, located in Bure, Gondar, and Debremarkos. Data was gathered using a particular methodology from employees of three food oil plants. Only the performance of the organization's supply chain management department was conducted in this analysis. Organizational performance is a dependent variable that was included in the study along with independent factors (customer, supplier, information, measurement, internal and external integration), in addition to practices.

1.7 Limitations of the Study

The study assessed the effect of supply chain integration from the perspective of employees. This can be deemed as a limitation as it could be more complete if the perspective of customers would also be incorporated.

When we come to the issue of place, the result of the study might be reflected only in Amhara Region and may not reflect the feeling of employees in other places.

1.8 Key terms and terminologies

1.8.1 Supply Chain:

The term "supply chain" pertains to the activities involved in the creation and distribution of goods and services. It encompasses everything from the delivery of source materials from the supplier to the manufacturer through to its eventual delivery to the end user (Ronald et al. 2000, pp. 9).

1.8.2 Integration:

Integration is the fundamental method that involves the redefinition and interconnection of the various constituent parts of a system with the aim of creating a new and improved whole. In the context of the conventional supply chain integration, the boundaries that define the individual parts are frequently constrained by the limitations of the enterprise. The integration process places a significant emphasis on the establishment of strong linkages between different enterprises, particularly with regard to logistics (Springer Boston, pp. 887-891).

1.8.3 Supply Chain Integration:

Given the heightened global competition, organizations have developed cooperative and mutually advantageous relationships with their supply chain partners (Wisner & Tan, 2000). In this regard, Frohlich and Westbrook (2001) emphasized the necessity for organizations or businesses to undertake supply chain integration, to address new issues resulting from global competitive environment. Various research has proposed various definitions of supply chain. Hamid, Ibrahim, and Abdelkareem (2020) defined the integration of Supply chain is a collaborative process where businesses cooperate to obtain results that are acceptable to both parties. On the other hand, Zhao et al. (2008) explicated integrating supply chain as the degree to which an entity engages in strategic collaboration with its supply chain associates and oversees the intra- and inter-organizational operations to attain effective and efficient flows of goods, services, information, money, and decisions, with the goal of offering the greatest value to its customers.

1.8.4 Organizational Performance:

It assesses objectives & goals of organizations in three distinct areas: financial performance, market performance, and shareholder value. Financial performance pertains to an organization's outcomes concerning return on investment and return on assets. Market performance refers to a company's ability to produce and distribute its outputs in the most cost-effective way and to set a price that yields a reasonable amount to suppliers. Moreover, market performance refers to a

company's capability to fulfill the demands and expectations of consumers regarding the product or service produced. Some organizations measure market performance based on how much of the market they control relative to their competitors, while some gauge their ability to meet social responsibility, including environmental stewardship and community responsibility. Finally, the concept of shareholder value pertains to the intrinsic value that an individual with shares in a corporation holds. The above three determines whether or not an organization is achieving its goals (Jameadows.2017).

1.8.5 Supply chain management (SCM):

Supply chain management (SCM) has undergone significant evolution revolving around two fundamental dimensions, namely Green Supply Chain Management (GSCM) and Sustainable Supply Chain Management (SSCM). GSCM is focused on the collaboration between a firm and its suppliers to enhance the environmental performance of products and manufacturing processes. This paradigm shift necessitates a holistic environment concern, rather than the conventional association of success with financial parameters. By identifying costs, benefits, risks, and opportunities, GSCM integrates environmental issues into SCM processes to manage and reduce waste, ultimately aiming for waste elimination. In addition, GSCM has the potential to reduce both direct and indirect environmental impacts of a firm's final product. SSCM, on the other hand, is the newest field in the context of SCM, incorporating both social and environmental sustainability into supply chain practice and management.

1.9 Organization of the Study

There are five chapters in this work. Background information about the study is presented in Chapter 1 along with a problem statement, research aims, study significance, study scope, definitions of key terms, and study limitations. In Chapter 2's literature review, the reader is apprised of the pre-existing knowledge in this particular domain of research, consisting of both empirical and theoretical studies. The third chapter sets forth the methodology utilized, the data collection method and the data source, along with the data analysis procedure in the study. Chapter four comprises momentous analyses such as descriptive, correlation, and regression analysis. Lastly, the ultimate chapter expounds on the study's findings, proffers recommendations, and proposes avenues that may be used towards further researches.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The main topic of this chapter is the reviewed literature that the researcher undertook. The effectiveness of organizations is discussed in relation to the necessity for integrating SC partners, as well as a review of the numerous studies that have been undertaken by other scholars. The following topics are among those examined: the associations of SCI and OP, its causes and its advantages. This chapter also offers a thorough conceptual framework and the research gaps found.

2.1.1 Background of Ethiopia's Edible Oil Factories

Ethiopia is one of the world's centers of origin for a number of oil crop species, including rape seed, Niger/noug seed, and castor beans, and it has ideal agroclimatic conditions for the growth of oil seeds. Different regions of the nation produce linseed, soybean, peanut, sunflower, and safflower seeds, among other oilseeds. After China, India, and Sudan, Ethiopia is the fourth-largest producer of sesame seeds worldwide. The second most common oilseed crop in Ethiopia is niger seed, commonly known as noug, which accounts for slightly more than 25% of all oilseed output and 28% of the land devoted to oilseeds. All other oilseed crops farmed in Ethiopia, such as soybeans, linseed, groundnuts, cottonseed, etc., are virtually exclusively used domestically (FBPID, 2018)

Ethiopia imports the majority of its edible oil from other nations. For roughly \$474 million, Ethiopia purchased 479,000 metric tons of cooking oil in calendar year (CY) 15. More over 90% of this imported oil was palm oil, with the majority of it coming from Indonesia and Malaysia. Sunflower, soybean, and olive oils make up the remaining portion of imported oil (FBPID, 2018).

According to a study on Ethiopian oil crop production, the biggest obstacles are raising yields, lowering unit cost prices, and boosting export revenue. Ethiopia is simultaneously purchasing a number of oil alternatives despite the significant export of oil crops. Given its superior price to quality ratio in compared to locally produced oil, palm oil imported (duty and tax free) from Malaysia is especially popular for cooking. The production of edible oils from oilseeds in Ethiopia

is hampered by this (Ruters, Boere, Willems, Dawit, and Dolfen, 2015). In actuality, SME's have played a significant role in the nation's domestic edible oil production and consumer supply.

According to UNIDO (2011), 850 small-scale and micro oil processing facilities, or 95% of the manufacturing base of the edible oil sector, handle the majority of domestic oil processing. Furthermore, fewer than 2% of the oil crops used in edible oil processing enterprises are imported, in contrast to the majority of industrial and even food processing companies. This creates openings for pursuing more sectoral and governmental growth prospects (ILO, 2013).

The majority of oilseeds are locally crushed without being refined. For cooking, crude oil is popular in rural regions. The industry that was visited expected there to be 9 refinery processors. Only 20,000 tons of refined oil are produced annually in Ethiopia. On a village-level, more than 1,000 small (local) crushers are in use, the majority using Chinese or Indian machinery. The domestic market is served by products from the oilseed crushing and refining sector. Crude oil is used to make the majority of the oil. According to Wijnands et al. (2007), Ethiopia is a net importer of refined oil, mostly refined soybean and palm oil. Ethiopia still imports a lot of edible oil, primarily palm oil, despite the country's substantial sesame and linseed output, according to an analysis of domestic edible oil production by Ruters et al. (2015). The United Arab Emirates, Singapore, and Malaysia are the leading exporters of palm oil.

Only around 5% of the demand can be satisfied locally. Only 15 oil processing facilities process the 40,000 tons of high-quality edible oils that are consumed each year; the remaining 850 informal, small- and micro-scale cottage oil seed processors extract crude oil. According to Wijnands et al. (2009), only 20% of the edible oil used domestically is produced by oilseed crushers; the remaining 80% is imported as palm, sunflower, and soybean oils.

There are many regional small-scale processors in Ethiopia. The domestic production per year for medium and large-scale enterprises ranges from 5000 to 8000 tons. The predicted production is less than half of the total capacity. Hence, the nation imports a variety of oils, including palm and soy seed.

Table 2.1-1 Estimated Production Volume of Major Oilseeds (metric tons) from 2018-2019 in Ethiopia

CROP	2018/2019	2019/2010	VALUE CHANGE	VOLUME CHANGE
SESAME	300,000	340,000	40,000	13%
NIGER SEED	300,000	305,000	5000	2%
SOYBEAN	190,000	200,000	10,000	5%
TOTAL	790,000	845,000	55,000	7%

Table 2.1-2 Major oil seeds Crushed by local miller in Ethiopia

CROP	CRUSHED BY LOCAL MILLER (PERCENTAGE)
NOUG	85%
GROUNDNUT	35%
SUNFLOWER	32%
LINSEED	25%
RAPESEED	10%

2.1.2 Background of selected oil factories in Amhara region

1. Tsehay, the union of farmer cooperatives

In the north of Ethiopia, it has been working together with Agriculture since 2012. A lot has changed since then and there has been progress in different areas (internal capitalization, investments, skills and knowledge, market linkage). Tsehay Farmers' Cooperative Union Limited was founded in the year 2000 and has now grown into a union of 142 cooperatives, working in 10 woredas. The union consists of more than 120,000 small holder farmers, of which about 94,000 are male and 26,000 females. Tsehay union, buying mainly sesame, chickpeas, soybeans, green mug teff and spices from its members and selling various inputs (fertilizer, improved seeds), consumable products, insecticides and pesticides to its members at a discount. The Tsehay Farmers' Cooperative Union, an Ethiopian farmers' based union, has invested US\$2.46 million (70 million birr) in setting up a new edible oil processing plant in Amhara Regional State. The processing plant has a daily production capacity of refining 10,000lt of reports *Addis Fortune*. The oil factory uses different oil seed for processing plant to produce oil, which uses such as: - Sesame seeds, Niger seed, Sunflower and Peanuts.

2. PhiBela Edible Oil Factory

This edible oil factory has Refined, Bleached and Deodorized (RBD) Palm Fractionation Plant and Refined, Bleached and Deodorized (RBD) Soybean and Sunflower Refinery Plant. The complex covers 30 hectares of land leased from Amhara Regional Government at the industrial town of Bure. When this huge complex becomes operational, it will cover up to 50% of the edible oil demand of the country.

The following factories will operate in the same compound:

- A big refinery with a refining capacity of 1400 tons per day.
- Sesame oilseeds processing plant (to add value on the row sesame by hulling and roasting).
- Liquid soaps, solid soaps and detergents manufacturing factory.

The oil factory uses different oil seed for processing plant to produce oil, which uses such as: Soybean, Sunflower and Palm oil.

3. WA Oil Factory

WA oil managed to import and distributes ETB 5 billion (USD 200 million) worth of palm oil through its trading business. WA's founder vision and hard work in palm oil import and trading paid off and motivated him to invest in edible oil factory project under the name of WA Oil Factory and Distribution PLC. Founded by two Ethiopian Diaspora members in Germany in 2017, Sela Goja Oil Filtration Factory was established with the vision to provide Ethiopia with healthy and nutritious 10,000 liters of edible oil per day. Workeu Aytenew bought 50% share on it to ensure the business run with liquid working capital. WA oil managed to import and distributes ETB 5 billion (USD 200 million) worth of palm oil through its trading business. WA's founder vision and hard work in palm oil import and trading paid off and motivated him to invest in edible oil factory project under the name of WA Oil Factory and Distribution PLC. WA Oil Factory project was kicked off 4 years ago at Debre Markos in Amhara Regional State, Gojjam Zone on a leased land size of 101,103m² and its corporate office is headquartered at Addis Ababa, Bole Sub City.

The oil factory uses different oil seed to produce the refining oil such as mentioned below:
Groundnut, Nigger Seed, Sesame Seed, Soybean, Sunflower, and Palm.

2.1.3 Challenges faced by edible oil processing factories in Ethiopia

Oil factories reports challenges of their operations. The top four difficulties that more than half of factories confront are listed below:

1. Availability of working capital and foreign currency to purchase input and invest in factory improvement.
2. Procurement, including raw materials equipment, spare parts and packaging materials.
3. Competition, mainly from palm oil, which is government subsidized and from illegal imports.
4. Utilities and infrastructure, including consistent electric and water supply and availability of roads for shipping and distribution.

Additionally, less than half of factories mentioned the following challenges:

1. Unfair taxation practices, where some types of oil must pay VAT and others don't; lack of government support to the oil industry.
2. Lack of appropriately trained and capacitated staff.
3. Lack of warehousing and laboratory space.
4. Lack of physical factory space as many of the factories was operating out of rented houses and could not expand their operations; and
5. Lack of consumer demand for products

2.2 Concepts of SCI

Supply Chain Integration: refers to the extent to which an enterprise engages in strategic collaboration with its supply chain partners and manages intra- and inter-organizational processes in a collaborative manner. This definition is posited by Flynn et al. (2010) and underscores the importance of cooperation and coordination among supply chain actors.

Supply Chain: (Africa, Capati, Usman, & Juliano)(2013) stated a supply chain comprises a network of individuals, organizations, resources, activities, and technology involved in creating and selling a product. This network extends from the delivery of source materials from the supplier to the manufacturer, through to the eventual delivery of the product to the end user (Farhan, 2021).

Supplier Partnership: H. Deshpande (2017) defines it as a commitment made over an extended period of time, where parties agree to work together for mutual benefit. The partnership involves the risks and rewards of the association and relevant information sharing.

Firm Performance: is an idea that comprises comparing an organization's objectives and goals with its actual performance in three explicit areas: financial performance, market performance, and shareholder value. Financial performance is concerned with an organization's investment return and asset return. Market performance refers to the organization's ability to produce and distribute outputs in a cost-effective manner, while setting a price that brings reasonable returns to suppliers. Shareholder value, on the other hand, indicates the value that a person holding shares possesses in the firm (Jameadows, 2017).

Internal Integration: as defined by Kumar et al. (2017), refers to the tactically coordinated and aligned procedures & functions inside once firm. Its goal is to achieve optimal performance.

External Integration: refers to the capacity of more than two organizations establishing shared values that serves them as a guide towards their interactions while working together. This is also known as external relationship management, as described by Close (2011).

Information Integration: involves the coordination of information transfer, collaborative communication, and supporting technology among firms in the supply chain. Kumar et al. (2017) provide an extensive definition of this concept.

Supplier Integration: as defined by Baharanchi (2011), encompasses a variety of activities that involve working closely with suppliers such as supplying high-quality products, product development processes, process and specification change information sharing, flexibility of order fulfillment, exchange of technology, and design support activites.

Customer Integration: is the act of including end users within the supply chain ecosystem, which provides an overview of their requirements and specific needs. This, in turn, enables firms to better serve their customers, as noted by Lotfi, Mukhtar, Sahran, and Zadeh, 2013)

Measurement Integration is the evaluation of the supply chain's performance at its entirety, while holding each business unit responsible towards attaining its respective goals. Scheinbaum (2011) provides comprehensive explanation of this concept.

2.3 Dimensions of SCI

2.3.1 Supply Chain Integration

The chain of supply encompasses every entity participating towards satisfying end users' demands; as a result involving suppliers, producers, distributors, retailers, wholesalers and end users of the product. Within an organization, SC encompasses parties related with the fulfillment of client orders, such as marketing, finance, distribution, operations, and customer service (Lotfi et al., 2013). The depth to management of inter- and intra-organizational procedures and strategic cooperation within the supply chain is referred to as Supply Chain Integration (SCI) (Flynn et al., 2010). While preceding studies had focused solely on integrating information amongst end users, manufacturers, suppliers and distributors, SCI can also encompass material flows, components, cash flows & resources (Flynn et al., 2010).

Integration of supply chain can be divided into two categories: external and internal integration (Sagawa & Nagano, 2015). The term external integration entails the collaboration and coordination of external supply chain partners with the organization (L. Zhao et al., 2013). External SCI can be categorized into supplier and customer integration or process & product integration (Huo et al., 2014); Jahre & Fabbe-Costes, 2008). IV describes depth of how manufacturers organize their strategies, processes and internal practices, to fulfill customer demands. This entails systemic coordination among organizational departments through shared information to better understand and respond to end user demands (Flynn, Koufteros, & Lu, 2016). Supplier-customer integration addresses the relation b/n a specific company & its suppliers or end users. Product integration involves the participation of suppliers and customers in the development of new products (Wagner & Bode, 2008), while process integration involves the coordinated design & application of SC operations amongst suppliers & users. Its aim is omitting non-value adding practices and

improving the pace & flow of information, material & cash flow over the entire supply chain (Wagner & Bode, 2008) ;(Kim et al., 2012; Huo et al., 2014).

The classification is advantageous in that it provides a means of examining impacts of external integration across the supply chain, rather than just analyzing the separate roles of integration between suppliers and consumers. Additionally, this allows development of integrated strategies across the entire supply chain by combining relationships with suppliers and customers.

2.3.2 Uncertainty of SCI

Changes in the state of the environment and our incapacity to predict their effects on businesses and how they will affect them constitute uncertainty (Milliken, 1987). Flynn et al. (2016) categorized unpredictability of SC as micro & macro-levels. Micro-level uncertainty emerges within recurring procedures of companies, and it is found in work environments with lesser complication(Flynn et al., 2016). Uncertainty emerges when variability in information & material flows in value & time occurs (Efstathiou,Sivadasan, Frizelle, Shirazi, & Calinescu 2002).

Micro-level uncertainty deals with data forecasting by means of distribution, like customer need variability for instance. (Flynn et al., 2016). As SC complexity increases, necessity of information also rises (Rogers,Leuschner, & Charvet 2013).

Table 2.3-1 Classifications of SCI

Classification of SCI	Author(s)
External and Internal Integration	Li (2015). Drage et al. (2004)
Internal, Customer & Supplier Integration	Amin Afshar & Fazli (2016),Boon-itt & Pangpanarat (2011),), Flynn et al. (2016),Flynn et al. (2010, Hasseini&Sheiki (2013), Zhao (2015),Orghazi (2009),Kim (2009).
Internal, Process and Product Integration	Fabbe-Castes & Jahre (2008), Huo et al. (2014)

Source: (Spring &Stevenson 2007)

Macro-level uncertainty of SC deals with dynamic environment, where circumstance is abstract & uncategorized, like dealing with natural disasters or unpredicted changes of end user's needs (Flynn et al., 2016). Hendijani & Saeidi Saei (2020) provide additional types of macro-level uncertainties encompassing wars, terrorist attacks and accidents. The major sources of uncertainty at the macro-level are shifts in economic conditions, competition intensity, and turmoil in industry, market and technology (Lu & Shang, 2017).

Hendijani & Saeidi Saei (2020) argue that close coordination with both suppliers and customers is a feasible solution to mitigate uncertainty. From customer side, customers of firm like retailers and wholesalers, which are closer to end consumers in the SC, could provide improved demand prediction by collecting more precise information about end users' demands. Gaining access to correct information on demand variations becomes even more important in the case of uncertain demand. This aids in preventing the bullwhip effect and the detrimental effects it has on business performance. From supply perspective, earlier participation of suppliers in NPD is crucial & can minimize costs related to the unpredictability of NPD, positively impacting both financial and operational performances. Even if the impacts of environmental unpredictability on organization's performance seems negative, it may have positive impacts in reality. Environmental uncertainty could present higher depth in manufacturing flexibility (Patel, Terjesen, & Li, 2012), which ultimately results in better performance of organization. Customer participation and process flexibility are reinforced by uncertainties in demand and technology dimensions (Feng, Sun, & Zhang, 2010).

2.3.3 Uncertainty in Demand of SCI

One type of micro-level uncertainty is Demand uncertainty (DU) which can have a considerable influence over the performance of a firm (Flynn et al., (2016). Demand uncertainty (DU) indicates the level to which demands of clients change with time (X. Zhao, Xie, & Zhang, 2002). It is one of the external factors in which companies deal within SC (Flores, 2002 & O'Leary-Kelly). (Hendijani & Saeidi Saei, 2020) they contend that DU can be viewed as residual b/n genuine market needs & predicted orders of customer within a firm. In reality, DU alludes to challenges in forecasting upcoming demand features of organization's consumers (Farahani, Rezapour, Drezner, & Fallah, 2014).

2.4 Concepts and Definitions of Operational Performance

Supply chain strategy, which originated from overall company strategy, gave rise to the idea of SC operational performance. According to (Chopra and Meindal (2007) and George (2007), a competitive strategy is "the set of customer needs that it seeks to satisfy through its products and services". Each firm tries to choose a distinct competitive strategy that fits with its goals, then it looks to find the resources and competencies to make it happen. For instance, one firm seeks to offer high-quality items at a high price, another aims to offer a high availability of a range of

products with fair quality at a low price, and still another organization aims to offer too many (George, 2007).

2.4.1 Organizational Performance

Organizational performance describes how good a firm could attain its market oriented objectives and financial targets (Lakhal 2009). Short-term goals of SCM is ultimately, reducing inventory and cycle time, and to increase productivity while in the long run, the goal is to increase profit and market share for every party involved within the chain of supply (Narasimhan et al., 2008). Financial indicators have been used as a scale for comparison amongst firms and for analysis of the behavior of firms with time (Holmberg 2000). Any organizational initiative comprising supply chain management should ultimately lead towards improved firm performance. Many previous research scaled the performance of a firm with the use of market and financial criteria, encompassing profit margin on sales, market share, the growth of market share, return on investment (ROI), sales & ROI, and general competitive placement illustrated with constructs such as Price/Cost. It is the firm's capacity to compete against major competitors on the basis of lower quality and price (Li et al., 2006). Other measurements of organizational performance by using customer measurement includes customer satisfaction, delivery and after sales service (Murali, Pugazhendhi, & Muralidharan, 2016). Internal business operation is one of organizational performance measurement includes the efficiency of the organization meet the objectives (Miller C.2010). In addition to this organizational performance can be measured by using learning and growth which is related to employee's productivity for innovation and understanding new way of performing operation (Short J.C and Palmer T.2003).

2.5 Measuring Organizational Performance

"Influence of packaging geometry and material properties on the oxidation kinetics of bottled virgin olive oil," Journal of Food Engineering, 2003, pp. 189–197, vol. 57, no. 2. claims that several varieties of oil seeds are used to manufacture edible oils. The oil from the oil seeds must then be extracted. Mechanical or chemical methods can be used to accomplish this. To physically extract oil, oil seeds can be either crushed or centrifuged. Although the yield or oil recovery from this process is rather modest, it prevents some potential harm to the oil's quality and stability. Oil

can be extracted chemically using a solvent (such as n-hexane), which is a quicker procedure, produces greater yields, and prevents heat-related damage that might happen with mechanical operations. Oil processors can collect roughly 99% of the oil included in the seeds by combining the two techniques.

After extraction, the crude oil needs to be processed and filtered. To produce oil of edible quality, this procedure eliminates unwanted substances such foreign debris, gums, free fatty acids, wax, color pigments, and odorous chemicals. Remaining solvents, peroxides, triglycerides, and other substances that cause rancidity are removed by processes including distillation, winterizing, bleaching, and deodorizing. Cooking oils can also be created using hydrogenation.

Oil processing also involves packaging, which must be selected to minimize exposure to light, oxygen, temperature, enzymes, and other environmental conditions that might shorten shelf life. Antioxidant tocopherols (vitamin E) are frequently added to stabilize certain oils and lengthen their shelf lives. Edible oils are packaged in a variety of ways, such as tin cans, glass bottles, PET or HDPE plastic bottles, and paper-based cartons, the latter of which being the most popular.

The choice of packaging is typically made based on marketing and financial considerations. However, the kind of packing materials used, the shape of the packaging, and the methods used to fill and close the containers may have a considerable impact on the quality of the oil over the storage period.

Hence, by using **Processing Technology, Processing Capacity & Packaging and Distribution** as the major tools or parameters of measuring the performances of the organizations in the selected edible oil factories, a comparative data was analyzed to identify the current performances of the three selected oil factories in Amhara region.

2.6 SCI and Organizational Performance Relationship

SCI could positively impact organization performance (Tarifa-Fernandez & De Burgos-Jiménez, 2017). Communication along the firm's employees and external partners could improve with SCI, resulting in better informed decision making and higher quality, according to information processing theory. Additionally, a firm could attain needed data related to technology, demand, and strategy in a timely fashion with the utilization of SCI. This results in enhanced coordinated & aligned actions between SC associates, decreased waste & delivery of products at a faster rate

and at less cost to the clients (Kou & Lee 2015). Internal integration is able to enhance internal practices & mitigate occurring of not value added & repeated actions in the organization, ultimately resulting a higher quality production at minimal costs (Flynn et al., 2010). External integration could assist by gathering data related to supply chain including data about suppliers' activities and client needs on time, which in turn results in better coordination and collaboration amongst SC entities, and removing inefficiencies within the entire supply chain (Swink, Narasimhan, & Wang, 2007).

According to earlier research SCI has favorable effects on a firm's financial and operational performance in the form of internal and external integration (Flynn et al., 2016). According to one research, SCI improved supply chain performance in terms of inventory turnover, production flexibility operational performance, order fulfillment rate, and overall logistics costs (Kumar et al., 2017). According to a different study (Othman et al. 2016, 2016), SCI improved the efficiency of logistics. Internal and product integration were found to have a favorable effect on operational performance across enterprises (Cao, Huo, Li, & Zhao, 2015).

In a specific research, researchers identified SCI including external and internal integration with customers & suppliers had favorable impacts towards financial performance. Additionally, operational performance is positively impacted by internal integration (Hendijani & Saeidi Saei, 2020) a study on manufacturing firms revealed that all SCI dimensions were useful to companies' financial and general performance. The performance of the company and external integration with suppliers and clients were found to be positively correlated (Flynn et al., 2010). According to (Fazli & Amin Afshar, 2016), SCI improved the operational and financial performance of businesses. An other studies identified internal integration enhances external integration, and the two work together to improve business performance both directly and indirectly (Hendijani & Saeidi Saei, 2020).

2.7 Challenges of SCI

The challenges in resource allocation to customer systems in supply chain integration are influenced by various factors such as transportation, product quality, and quantity delivery. These factors pose significant obstacles to the integration process, which can be further compounded by a multitude of variables. Some of these variables include substantial changes in demand, supply, quality, and product relations. Additionally, there may be a lack of formal product transport

protocols and performance measurement for product quality process efficiency. Transport delays for oilseed products can also negatively impact their market value and increase the likelihood of failing to meet consumer demands. Furthermore, inadequate examination, evaluation, and introduction of new technologies in the local market can further hinder the supply chain integration process.

2.8 Research Gaps

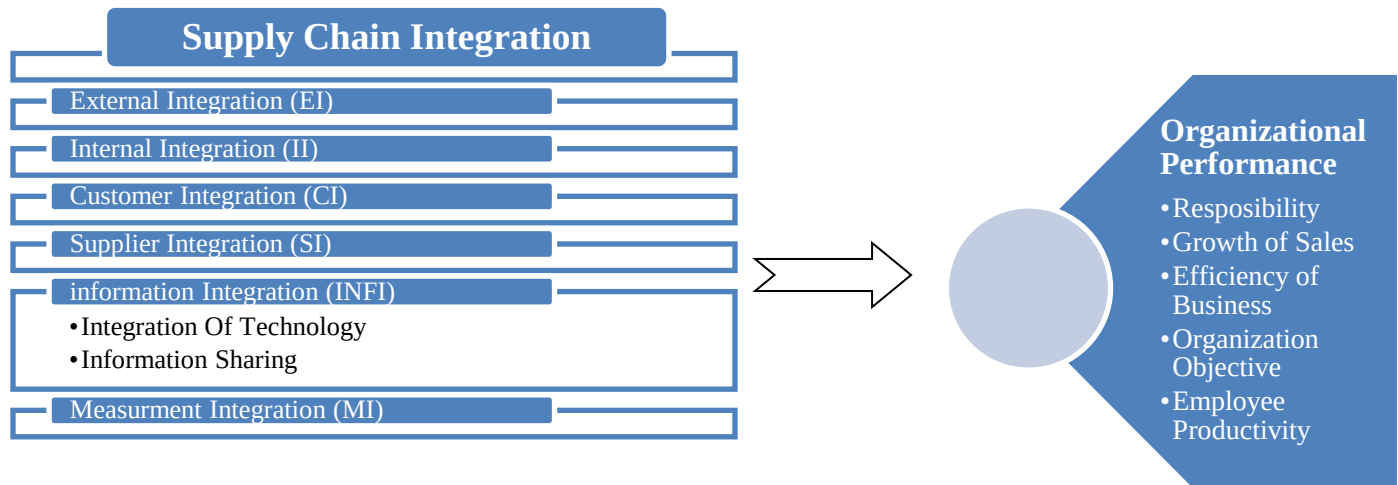
The term "Supply Chain Management" (SCM) refers to a wide range of activities, including obtaining raw materials from suppliers, keeping those materials on hand, manufacturing products, contracting out the manufacturing to outside firms, storing the finished goods at various distribution points throughout the distribution network, and sending them to the intended customer. The entire process must be carried out as efficiently as possible to reduce the consumption of resources, lower the associated costs, and ultimately boost the growth of the company's sales. There are numerous holes in the management and integration of the supply chain that must be filled in order to achieve competitive growth, and this can be done through innovation using integration and cooperation for the company (Srinivas).

Previous studies that have already been completed are generally focused on identifying difficulties or measuring organizational or company overall performance or competitive capacities. Therefore, supply chain integration in edible oil factories needs to be seen from all angles.

2.9 Conceptual Framework & Design

In order to further this work, the conceptual model listed below based on a quick literature review was done. The framework demonstrates different connections between research variables that were made following careful consideration of the literature.

Figure 1 Conceptual Framework



Source: *Scheinbaum, A. C., 2011; Hussein et al., 2014*

The provided graphic offers a concise depiction of the current study's variables. The variables examined include a company's internal and external integration within its supply chain, as well as integration with its customers, suppliers, and information systems.

One crucial dependent variable that is explored is the level of an organization's performance, which encompasses various aspects such as accountability, dependability, flexibility, excellence, and timeliness. Moreover, the model posits that there is a correlation between supply chain integration and organizational effectiveness. Specifically, the model demonstrates both direct & indirect effects of SCI on performance of organizations through supply chain management.

2.10 Hypothesis

Based on the assumed causal relationship given in the conceptual model the following hypotheses were developed for testing.

H1. Internal integration has a significant and negative effect on the operational performance of the enterprise.

H2. External integration has a significant and negative effect on the operational performance of the enterprise.

H3. Information integration has a significant and positive effect on the operational performance of the enterprise.

H4. Customer integration has a significant and positive effect on the operational performance of the enterprise.

H5. Supplier integration has a significant and positive effect on the operational performance of the enterprise.

H6. Measurement integration has a significant and positive effect on the operational performance of the enterprise.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

The study employed an explanatory research design to explain and interpret the casual relationship between supply chain integration variables and organizational performance. Explanatory research design is used to explain and interpret a cause and effect relationship situation and phenomenon (Creswell,2004). Therefore, the current study aims to increase the understanding of a contemporary topic while describing the behavior of the sample group. One independent variable in the study, supply chain integration, is present. Information has been gathered from managers and professionals of organizations that work with oil seeds and perform related task functions. Examining the effects of the integration of supply chain on the performance of organizations. in Amhara area food oil organizations is the primary goal of this study.

3.2 Research Approach

The study employed mixed research approach i.e., both quantitative and qualitative research approach. This approach enables us to conduct the current research using quantitative measurements for quantitative data by collecting all relevant information using structured questionnaire and for qualitative data using key informant interview. Hence, the primary attention of this inquiry rested on the formulation of research inquiries and study goals, which were satisfactorily accomplished across various phases of the study.

3.3 Population of the Study

A population is made up of all people or things (units of analysis) that possess the desired characteristics. In statistics, sampling is the process of selecting a subset of a population of interest (also known as a "sample") in order to make observations and statistical inferences about that population (Bhattacharjee, 2012). The target population of the study consisted of permanent employees of particular food oil producers in the Amhara region. The workers who can understand the topic and provide the necessary response to the study's research questions will be picked as the target population.

According to calculations of sample size, the three food oil firms that were selected as the study's target organizations are mentioned below because they routinely export the most food oil from the Amhara region. Inside the factories, the individuals chosen for the samples hold a variety of jobs, including supply chain, operation, logistics, and procurement directors, among others.

3.4 Sampling Technique

The investigator used stratified sampling technique to find equitable distribution of sample size in to account the different subgroup of the population (different organization and helps guarantee that the sample accurately represents the population on specific characteristics. The respondents were selected from each stratum by using stratified random sampling and by applying the principle of the proportional sample selection method. The sample size of each stratum (each organization respondents) is proportional to the size of a stratum.

Due to the huge size of the population, the lack of availability and willingness of some employees, as well as the fact that it was financially prohibitive, the researcher did not gather data from all employees of the food oil enterprises. For these reasons, the researcher employed permanent staff members from the companies, including management and expert staff from certain food oil plants in the Amhara Area.

3.5 Sample Size Determination

It would be very expensive to collect data from all of these employees, so the researcher used Toro Yamane's (1973) sample size determination formula to determine the sample size that is representative of the entire population. There were 203 employees working directly related to the food oil production and management department, which was the study's target population. The sample size is calculated using the formula $n = \frac{N}{1 + N(e^2)}$. Where n denotes the sample size, N is the population size, and e denotes the error term; assume that the sample size will be determined by this method at $e=0.05$ with a 95% confidence level. Based on this, 135 samples from the three oil production factories—35 samples from the Tsehay union of farmer cooperatives, 40 samples from the PhiBela business group, and 60 samples from the WA oil factory—were included in the study.

Table 3.5-1 Distribution of Organizational performance in each company

Name of the organization	Place of the factory	Numbers of Employee	Sample No of Employee	Invested capital	Refining production capacity	Land coverage
Tsehay Union Oil Factory	Gondar	59	35	70 Millioin	10,000 Ltr Oil per day	8734 SqM
PhiBela Business Group	Burie	66	40	4.5 Billion	1.5 million Ltr Oil per day	300,000 SqM
WA Oil Factory	Debre Markos	78	60	5 billion	1.3 million Ltr Oil per day	101,103 SqM
Total		203	135			

Source: *Survey Data, 2023*

N = Population of study

K = Constant (1)

e = degree of error expected

n=sample size

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

$203/1 + 203(0.05)^2$

$203/1 + 203(0.00250000000000000005)$

$203/1 + 0.5075000000000001$

$203/1.5075$

$n = 134.66003316749584$

3.6 Data Type and Source

Primary and secondary data sources represent the two distinct classifications of data sources. The researcher skillfully employed structured questionnaires to procure primary data from the sample respondents. To complement the study and augment the findings of other scholars in the domain, the researcher also resorted to secondary data. This type of data originates from periodicals, business newspapers, journals, and library books.

3.7 Data Collection Procedure

The researcher's primary tool for acquiring data was a questionnaire, which was utilized to gather quantitative data from the forementioned sources. The questionnaire was adapted from Abdulhakim Haji with a few minor adjustments that were pertinent for this study. The questioners were conducted in Amharic and translated to English from selected employees in the edible oil factories for the purpose of this study.

Flynn et al. (2016) claim that the questionnaire's extensive use in studies supports its high reliability and validity. Questions will be used to gauge the constructs of SCI and firm performance. It is one of the top questionnaires being developed and will be used in the research (Hendijani & Saeidi Saei, 2020). When designing and manufacturing new products, suppliers and customers are involved in product integrity discussions (Hendijani & Saeidi Saei, 2020). Factors including product demand, orders placed to create demand, and demand forecasts were used to measure demand uncertainty (Flynn et al., 2016). Operational performance will be assessed in relation to the primary competition using criteria including delivery speed, flexibility in product diversity, production capacity change and support services.

Firstly, accuracy of the information gathered by the questioner was verified. Whether the survey was correctly completed and coded for analysis. The statistical software for social sciences (SPSS) was used to enter all the data, which was then analyzed using descriptive and inferential statistics. A measure of internal & scale consistency or reliability and Cronbach's alpha was used to make the reliability analysis.

3.8 Data Analysis Method

The data analysis and presentation in this study utilized the Statistical Package for Social Science (SPSS) software version 20. The statistical tools employed included descriptive analysis, correlation, and multiple regression analysis. The purpose of the analysis was to determine whether there were significant relationships between variables. Once the data were collected, the next step involved the use of the forementioned tools to analyze the data.

Descriptive Analysis

The presentation of the descriptive analysis involved the use of tables and percents in providing concise representation of the data. Summary statistics were computed for each variable in the

study, including mean scores, percentages, ratios, standard deviation, and frequencies. The tables were presented to facilitate ease of interpretation.

Correlation analysis of Pearson

In this study Pearson's correlation coefficient was employed to ascertain the associations between supply chain integration and organizational performance.

Multiple Regression Analysis

Multiple regression analysis was employed to explore the role of supply chain integration on organizational performance.

A multiple regression model is used to establish influence of six independent SCI variables on the performance of organization. This relationship was established through regression analysis. Overall means were computed for each SCI variable & compared to mean OP. Based on their relationship, the model was derived by utilizing the assumptions of multiple regression analysis, which included a linear relationship between Y and each of Xi's, nonexistence of multicollinearity among the independent variables, normality distribution and homoscedasticity. The equation of regression is as follow:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon$$

Where: Y is organizational performance.

β_i (i = 0 – 6) is the regression coefficient.

X1 – External Integration

X2 – Internal Integration

X3 – Suppliers Integration

X4 – Customers Integration

X5 – Information Integration

X6 – Measurement Integration

ϵ – Error Term or Unexplained variables not explained by the model

F-test employed in assessing significance of regression and the R^2 was used in assessing the proportion of variance in Y that can be explained by X. Correlation analysis was employed to determine strength and direction of the association b/n the independent and dependent variables, with a 95% confidence level.

Dependent variables: organizational performance

Independent variables: supply chain integration

3.8.1 Validity

Literature-based questionnaires are created to assure the validity of the results. The data were gathered from trustworthy sources, from respondents who were employees and managers, and they were directly relevant to the topic, therefore the results were free of substantive errors from the questionnaire's design and data processing. internal validity, content validity and Construct validity are three aspects of a research tool's validity. Construct validity, which examines the correspondence between the questions and the expected responses, is tested in this study. By organizing the questionnaire in accordance with the precise aims, this validity is ensured.

3.9 Ethical Consideration

An ethics approval deemed acceptable by Gondar University was obtained for the purpose of data gathering. To ensure the confidentiality of the gathered information, all identifying details such as the name of the respondents were excluded. The respondents were notified that the research and data acquired through the use of instruments would solely be utilized for academic purposes. Furthermore, it was demonstrated, procedure of gathering data was completed with the willingness of the respondents to collaborate. They were also guaranteed a copy of the completed and published research.

CHAPTER 4

ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents and discusses the final results as well as the process by which the results were obtained. Additionally, the contextual knowledge of the participants is articulated. Ultimately, the statistical techniques employed for examination were expounded upon, comprising of a correlation assessment, descriptive analysis, and multiple regression appraisal through the utilization of SPSS software.

4.2 Response Rate

All 135 questionnaires that were distributed have been returned, culminating in 100% response rate. This rate is deemed acceptable and satisfactory for the purpose of analysis.

4.3 Data Validity and Reliability

The process of choosing which scales to incorporate in a study is of utmost importance in the pursuit of dependable scales. The notion of reliability encompasses several facets, wherein primary concern being internal consistencies of scale. It specifically relates to the extent of coherence observed among the constituent items of the scale. Cronbach's alpha coefficient is one of the most widely used indicators of internal consistency. Ideally, a scale's Cronbach alpha coefficient should exceed 0.7.

Table 4.3-1 Reliability Statistics

Reliability Statistics	
Cronbach alpha	No. of Items
.962	29

source: Survey Data 2023

The reliability statistics encompass a total of 29 items, which have been identified as questions 1 through 29 in the questionnaire. A detailed compilation of the components encompassed within the reliability statistics assessment has been provided in the table for item total statistics denoted as 4.2, which is presented hereafter for purposes of reference.

Table 4.3-2 Reliability Item-Total Statistics

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
The integration of supply chain and the sharing of information greatly facilitate the process of making sourcing and tendering decisions.	89.65	416.845	.469	.530	.962
There exists an integration of external supply chain that expedites the flow of physical goods and financial resources.	89.83	423.618	.341	.394	.963
The distribution and delivery of goods are facilitated at the designated time and location owing to the seamless integration of the supply chain, effective sharing of information, and efficient coordination.	89.63	413.790	.573	.658	.961
There is integration among planning, resources & objectives with EO	89.47	409.220	.616	.722	.961
Monitoring stock movement made it easier because of the collaboration between	89.60	410.997	.639	.644	.961

logistics, warehouse/inventory management and procurement.					
There is functions and activities internal integration	89.72	409.389	.671	.727	.960
inter and intra organizations' communications are optimized with the established SC integrated systems and technologies.	89.71	412.961	.583	.557	.961
there is access to tracking Partners of SC performance, Due to technology and information integration,	89.46	409.189	.692	.685	.960
As a result, SC Integration of suppliers database is maintained easily.	89.43	416.631	.531	.651	.961
logistics services are improved, With an integrated supplier's supply chain	89.51	410.867	.608	.712	.961
With SC Integration the organization is provided the ability to relate with suppliers quickly and easily.	89.27	404.185	.723	.780	.960
SCI leads to better SRM.	89.41	406.829	.770	.758	.960
The integration of supply chain has resulted in a more effective management of supplier relationships.	89.30	403.841	.721	.712	.960
SC Integration has significantly contributed to enhancing services,	89.50	411.760	.694	.688	.960

goods & work quality provided to recipient.					
SCI process enhanced speed of service delivery.	89.69	401.029	.732	.796	.960
easily and quickly delivery of services was enabled by Customer integration	89.74	406.117	.711	.747	.960
because of SCI, the speedy customer collaboration has been maintained	89.69	408.201	.661	.708	.960
access to tracking SC associates performance exists. because of the fusion of technology and information	89.69	409.568	.701	.727	.960
Analysis of SC was completed using an integrated SC measurement and information	89.70	406.872	.719	.770	.960
logistics services are improved with an integrated supplier's supply chain	89.69	405.232	.676	.694	.960
There exists external Supply Chain integration that fastens flows such as funds and physical.	89.66	404.209	.758	.786	.960
With the establishment of integrated Supply Chain (SC) technologies and systems, the communications between inter and intra organizations are optimized	89.69	404.475	.766	.792	.960
due to information sharing, SC integration and	89.58	400.953	.743	.786	.960

coordination, Distribution and delivery is made at the right time and place					
With the implementation of integrated supply chain technologies and systems, communication between inter- and intra-organizations' are optimized	89.71	403.469	.730	.806	.960
The efficiency of the business and process.	89.64	405.493	.732	.776	.960
Employee productivity	89.58	410.553	.647	.693	.961
Effectively organizations meet their objective	89.72	404.712	.738	.790	.960
The growth of sales	89.98	407.692	.707	.741	.960
The alignment among business functions, as well as those function' alignment with the organization's strategy	89.61	405.624	.688	.682	.960

Source: Survey Data, 2023

The results of the reliability test, which yielded a coefficient of .962, demonstrate the presence of internal consistencies within the data constructed in the questionnaire. The output includes four additional columns. The first two columns, appearing after the names of item, indicate impact on overall variance and mean if the specific item was taken out of the measuring range. Conversely, the final 2 columns furnish valuable info & warrant careful examination. The corrected item-total correlation column, in particular, shows how closely each item corresponds with the scale's overall score. Low correlations imply that the item assesses a variable different from the scale's overall measure. All relationships in this study are strong and favorable. The value of α , if the corresponding unit is removed, shown on the right-hand column (Alpha if Item removed). Our goal is to find components that, if eliminated, would improve alpha, and boost the scale's internal

consistency. Our research shows that removing just the second question would increase scale's validity employed (0.960): Q2 alpha .963.

Removal of other item would, in fact, decrease the questionnaire's reliability. Consequently, eliminating the second question is not a prudent course of action, given that the difference in reliability is negligible and could be attributed to chance. It is important to note that exclusion of this item would alter all values, since the overall scores obtained would change as a result of this removal. Internal, Content and Construct validity are the pillars upon which the research tool's validity is based. One of these three types of validity examined in this study is construct validity, which takes into account the correspondence between the questions and the anticipated responses. By organizing the questionnaire in line with the precise aims, this validity is ensured. Measuring the produced data to confirm that it is free of measurement error is a crucial criterion for establishing validity (Mat Roni, 2015). Consequently, the results generated by the questionnaire are accurate, as shown by the reliability test result described above, which showed a negligible (less than .3) measurement error.

4.4 Respondents' Demographic Information

4.4.1 Respondents' Gender

The study's breakdown of participants by gender indicated that out of the 135 participants, the male gender constituted 60% of the sample, while the female gender made up 40% of the respondents.

Table 4.4-1 Gender Data

SEX		
	N	%
Female	54	40%
Male	81	60%

Source: Survey Data 2023

4.4.2 Educational Background

Participants who took part in the present study possess a wide range of educational backgrounds, as evidenced by the data presented below. A majority of the respondents, comprising 72.6% of the sample, held either a first or second degree. Specifically, individuals holding a first degree represented 59.3% of the total sample, whereas those with a Diploma accounted for 20% of the responses. Certificate holders constituted a relatively small proportion of the sample, comprising 7.4% of the total.

Table 4.4-2 Level of Education

LEVEL OF EDUCATION		
	N	%
Certificate	10	7.4%
Diploma	27	20.0%
Degree	80	59.3%
Masters	18	13.3%

Source: Survey Data 2023

4.4.3 Position in the Organization

The participants were requested to specify their respective job titles, which encompassed varied position compositions. They were presented with a range of options to select from. The results presented in the table below reveal that the respondents consisted of individuals operating in supply chain, operations, logistics, procurement, finance teams, among others, amounting to a total of 100%. This substantiates that the respondents involved in this research were competent professionals who possess a thorough understanding of the challenges surrounding SCI and organizational performance.

Table 4.4-3 Position in the organization

What role do you have within the company?		
	N	%
SC	10	7.4%
Operation Director	17	12.6%
Logistics Director	21	15.6%
Procurement Director	10	7.4%
Finance Team	9	6.7%
Other	68	50.4%

Source: Survey Data 2023

4.4.4 Experience

The goal of the current research project was to determine the respondents' tenure at the time of the study. Outcomes, which are depicted in Table 4.6 below, validate that a mere 3.7% of the respondents have been actively operating for more than a decade while 20.7% of them have been engaged for a period ranging from 6 to 10 years. A significant proportion of the participants, accounting for 43.7%, have a work experience of 2-5 years, whereas the remaining 31.9% have been active for approximately 2 years. According to the table, 64.6% of the workers have more than 10 years of experience, making them seasoned experts who can assess the link between SCI and success in their own organizations.

Table 4.4-4 Stayed at the Organization

How long have you worked at this organization?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<2 Years	43	31.9	31.9	31.9
	2-5 Years	59	43.7	43.7	75.6
	6-10	28	20.7	20.7	96.3
	Over 10 Years	5	3.7	3.7	100.0
	Total sum	135.00	100%	100%	

Source: Survey Data 2023

4.5 Descriptive Analysis of Scope of Supply Chain Integration

This investigation's main goal is assessing the influence of SCI on effectiveness of the firm. According to Likert scale, 5 denotes significantly high level whereas 1 denotes nonexistent, the respondents were asked for feedback on the depth of SCI within their firms. The following sub-themes were provided along with the results. Standard deviation was used to examine the data in detail. When compared to the mean value, insignificant standard deviations indicate that the data points are not close to the mean, while considerable standard deviations indicate that the data points are distant from the mean. A metric of how well the mean represents the data (Field, 2009) is Standard deviation.

Table 4.5-1 Descriptive analysis for independent variables

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
External Integration	135	1	5	3.18	.753
Internal Integration	135	1	5	3.18	.794
Customer Integration	135	1	5	3.15	.869
Supplier Integration	135	1	5	3.43	.815
Information Integration	135	1	5	3.14	.852
Measurement Integration	135	1	5	3.17	.991
Valid N (listwise)	135				

Source: Survey Data 2023

The survey's findings indicate that the average values of each IV— which are integration of Internal, External, Suppliers, Information, Measurement and Customers falls within a moderately higher range, with information integration and supply integration having average values that range from 3.14 to 3.43, respectively. Standard deviations for these variables range from .753 to .991, with measurement integration having the largest deviation and external integration having the lowest, according to this research. This result indicates that the firm has high degrees of supply chain integration, even though internal, external and supplier integration of independent variables have lower levels relatively compared to other IV. The findings of Uwamahoro, 2018 which demonstrate the mean values of each independent variables are high, are largely congruent with the amount of supply chain integration in the company as disclosed by this survey. Given that independent variables with high mean values tend to yield insignificant levels, this suggests a causal link between mean values and significance level.

Table 4.5-2 Descriptive analysis for dependent variables

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The efficiency of the business and process.	135	1	5	3.19	1.038
Employee productivity	135	1	5	3.23	.985
Effectively organizations meet their objective	135	1	5	3.10	1.060
The growth of sales	135	1	5	2.83	.997
The alignment among business functions, as well as those function' alignment with the organization's strategy	135	1	5	3.22	1.104
Organizational Performance	135	1.0	5.0	3.11	.857
(listwise) Valid N	135				

Source: Survey Data 2023

In this study, the dependent variable used is the performance of the organization. Descriptive analysis on organizational performance presented in Table 4.8 based on the respondents' viewpoints. The respondents provided a mean of 3.23, indicating that the company has above moderate efficiency of employee productivity and alignment among business functions in the selected factories in the region relative to other variables. The efficiency of business and process is confirmed by responses with a moderate result of mean 3.19. The respondents also agreed that organizations effectively meet their objectives, with a mean of 3.10 indicating that the company is meeting its objectives. However, the responses showed that the growth of sales is the lowest with a mean of 2.83 compared to other performance measures. This implies that the company needs to improve the growth of the sales market by implementing different mechanisms such as increasing the market share of the company, utilizing marketing strategies like NPD, advertising, and CRM to identify customer needs and demands. Overall, the company is performing above moderate, especially in terms of employee productivity and alignment among business functions, with a mean of 3.23. This indicates that the descriptive statistics of organizational performance result in an overall performance of 3.11, falling above a moderate extent for the company.

4.6 Measuring Operational Performance of Selected edible oil factories

4.6.1 Processing Technology

Depending on the type of edible oil being processed, different types of processing technologies and methods should be used. For example, rapeseed, maize, cottonseed, sesame seed, and linseed oils must pass through a full refining process (including degumming, neutralizing, washing, drying, bleaching, and deodorization). On the other hand, Niger seed, groundnut, and sunflower seed oils need only to pass through a semi-refinery system (neutralizing, washing, and drying only). The 2 factories which are Phibela and WA produce oils that should pass through a full refining process as it shows on their comparative analysis on the table the 2 companies have mean of 2.5, only Tsehay Union have semi refining processes with a mean of 1.0.

Table 4.6-1 Comparative Table of oil Processing Technology of Factories

Factory Name

Process of oil refining Technology they use	Mean	N	Std. Deviation
full refining process	2.5000	2	.70711
semi-refinery	1.0000	1	.
Total	2.0000	3	1.00000

Source Survey Data 2023

ANOVA Table

		Sum of Squares	df	Mean Square
Factory Name * Process of oil refining Technology they use	Between Groups	1.500	1	1.500
	Within Groups	.500	1	.500
	Total	2.000	2	

Source Survey Data 2023

Edible oil can be refined through mechanical pressing or solvent extraction, or a combination of both. In the assessed food oil factories, 2 of them (Tsehay Union & Phibela) use a mechanical pressing method which they are with a mean of 1.5 on the table WA uses use both methods with the mean of 3.00.

Table 4.6-2 Comparative Table of oil Method of Refining Technology of Factories

Factory Name

Method of Refining	Mean	N	Std. Deviation
mechanical pressing	1.5000	2	.70711
Both(Mechanical &Solvent Method)	3.0000	1	.
Total	2.0000	3	1.00000

Source Survey Data 2023

ANOVA Table

		Sum of Squares	df	Mean Square
Factory Name * Method of Refining	Between Groups	1.500	1	1.500
	Within Groups	.500	1	.500
	Total	2.000	2	

Source Survey Data 2023

4.6.2 Processing Capacity

The size and capacity of the factory is reflective of the total volumes (and potential volumes) of edible oil which can be produced. Edible oil producers can be categorized into small (up to 500 Liters/day), medium (500-5,000 Liters/day), and large (5,000 Liters/day or more), based on their reported design capacity. Two-thirds of factories (WA & Phibela responding factories) fall under the Large category with the mean value of 2.500, Tseahay Union categorized as small capacity of processing with a mean of 1.00 as it shows on table 4.11.

Table 4.6-3 Comparative Table of oil Processing Capacity of Factories
Report

Factory Name

Process Capacity	Mean	N	Std. Deviation
MEDIUM-5000-10000L/DAY	1.0000	1	.
LARGE->10000L/DAY	2.5000	2	.70711
Total	2.0000	3	1.00000

Source Survey Data 2023

ANOVA Table

		Sum of Squares	df	Mean Square
Factory Name * Process Capacity	Between Groups (Combined)	1.500	1	1.500
	Within Groups	.500	1	.500
	Total	2.000	2	

Source Survey Data 2023

4.6.3 Packaging and Distribution

Understanding the types of packaging and distribution channels can provide some insights into the population that has access to and may be consuming the various types of edible oils. This will be important for prioritizing support for fortification within the industry to maximize the reach and impact among vulnerable populations.

4.6.3.1 Packaging Sizes Available

Many kinds of packaging are used for edible oils, including tin cans, glass bottles, PET or HDPE plastic bottles, and paper cartons. Of the 3 assessed edible oil factories, Most factories sell their edible oil in a variety of packaging sizes. Tsehay union package their oil in ½ and 1 Liter containers which the table 4.12 shows & WA & Phibela package from 3-20 Liter containers or package in barrels which the table below show us their mean 2.500.

Table 4.6-4 Comparative Table of oil Packaging Sizes of Factories

Factory Name

Packaging Sizes	Mean	N	Std. Deviation
0.5-1L	1.0000	1	.
3-20L	2.5000	2	.70711
Total	2.0000	3	1.00000

Source Survey Data 2023

ANOVA Table

		Sum of Squares	df	Mean Square
Factory Name * Packaging Sizes	Between Groups	1.500	1	1.500
	Within Groups	.500	1	.500
	Total	2.000	2	

Source Survey Data 2023

4.6.3.2 Geographic Distribution of Products

Tsehay union distribute their products in local markets as the analysis show with a mean of 1.00 whereas the two factories (WA & Phibea) sell their products nationally with a mean of 2.500 as shown on the table 4.13.

Table 4.6-5 Comparative Table of oil Geographic Distribution of Products of Factories

Geographic Distribution of Products	Mean	N	Std. Deviation
Locally	1.0000	1	.
Nationally	2.5000	1	.
Total	2.0000	3	1.00000

4.6.3.3 Distribution Method

Tsehay union sell their products directly to consumers through markets or retail outlets whereas WA & Phibela sells through wholesale outlets having the same results on the analysis as we can see on their mean value of 2.500 shown on table 4.14.

Table 4.6-6 Comparative Table of oil Distribution Method of Factories

Factory Name

Distribution Method	Mean	N	Std. Deviation
through markets	1.0000	1	.
wholesale	2.5000	2	.70711
Total	2.0000	3	1.00000

Source Survey Data 2023

ANOVA Table

		Sum of Squares	df	Mean Square
Factory Name * Distribution Method	Between Groups	1.500	1	1.500
	Within Groups	.500	1	.500
	Total	2.000	2	

Source Survey Data 2023

As a result, it could be inferred from the interpretation of the comparative data that was analyzed that WA and Phibela edible oil factories are currently better performing than Tsehay Union Factory according to the measurement parameters of operational performance that were conducted within this study.

4.7 Organizational Performance and Integration of Supply Chain

Finding connection between SCI and OP is this study's second goal. The degree and direction of the linear link between two variables are described using the correlation analysis. This correlation is used to show the validity of a test scale by demonstrating a significant relationship between it and another accepted scale for a related construct, to demonstrate the reliability consistency of measurement on two occasions, to show internal consistency of scale items, and for theory verification to support hypotheses that predict the relationships between variables. The most well-known and often applied correlation for interval data is Pearson's Product-Moment Correlation (Beech 2006).

Table 4.7-1 Correlation's characteristics and Interpretations

Correlation	Interpretation
1	Perfect Positive/Negative Correlation
$\pm .70$ to $\pm .99$	Very High Positive/Negative Correlation
$\pm .50$ to $\pm .70$	High Positive/Negative Correlation
$\pm .30$ to $\pm .50$	Moderate Positive/Negative Correlation
$\pm .10$ to $\pm .30$	Very low Positive/Negative correlation
$\pm .0$ to $\pm .10$	Markedly low and Negligible Positive/Negative Correlation

Source: Beech, 2006

The demographic factors having been duly considered; a scale-typed questionnaire was administered to employees of three distinct food oil firms within the Amhara regional state. Subsequently, the data gathered was processed using SPSS version 20, and correlation analysis was conducted. Specifically, Pearson Correlation analysis was employed to establish the relationship that exists between the independent variables (Internal, External, Customer, Information, Supplier & Measurement integration) and OP, which serves as dependent variable.

The coefficient of Correlation (r) guides;

1. 0.1 to 0.10 Negligible association\ Very low relationship
2. From 0.11 up to 0.29 Low association\ Low relationship
3. From 0.30 up to 0.50 Moderate association\ Moderate relationship
4. From 0.51 up to 0.69 Substantial association\ Strong relationship
5. From 0.70 and Above Very strong association\ Very strong relationship

Source: Joe W.Kotrlík, J.C.Atheron, A. Williams and M. Kathan Jab(2011)

The outcomes of the correlation matrix analysis concerning every indicator of supply chain integration, namely Internal, External, Customer, Supplier, Measurement & Information Integration and their impact on organizational performance are presented in the below table 4.16.

Table 4.7-2 Correlation Matrix

Correlations								
		EI	II	CI	SI	INI	MI	OP
EI	Pearson Correlation	1	.590**	.561**	.595**	.541**	.502**	.494**
	Sig-2 Tailed		0.000	0.000	0.000	0.000	0.000	0.000
	N	135	135	135	135	135	135	135
II	Pearson Correlation	.590**	1	.637**	.672**	.732**	.646**	.613**
	Sig-2 Tailed	0.000		0.000	0.000	0.000	0.000	0.000
	N	135	135	135	135	135	135	135
CI	Pearson Correlation	.561**	.637**	1	.720**	.715**	.700**	.745**
	Sig-2 Tailed	0.000	0.000		0.000	0.000	0.000	0.000
	N	135	135	135	135	135	135	135
SI	Pearson Correlation	.595**	.672**	.720**	1	.744**	.673**	.686**
	Sig-2 Tailed	0.000	0.000	0.000		0.000	0.000	0.000
	N	135	135	135	135	135	135	135
INI	Pearson Correlation	.541**	.732**	.715**	.744**	1	.732**	.757**
	Sig-2 Tailed	0.000	0.000	0.000	0.000		0.000	0.000
	N	135	135	135	135	135	135	135
MI	Pearson Correlation	.502**	.646**	.700**	.673**	.732**	1	.774**
	Sig-2 Tailed	0.000	0.000	0.000	0.000	0.000		0.000
	N	135	135	135	135	135	135	135
OP	Pearson Correlation	.494**	.613**	.745**	.686**	.757**	.774**	1
	Sig-2 Tailed	0.000	0.000	0.000	0.000	0.000	0.000	
	N	135	135	135	135	135	135	135
** . Correlation is significant at the 0.01 level (2-tailed).								

Source: SPSS Output Data, 2023

The results of the Correlation analysis, as presented in table 4.16, reveal that there exists a significant, positive relationship between External Integration and organizational performance, as determined through inter-correlation analysis ($r=.494$, $n= 135$, $p<.0.01$). The relationship between the two variables is of moderate correlation.

Similarly, the Correlation analysis of Internal integration and organizational performance, using inter-correlation analysis, shows a significant and positive relationship between the two variables ($r= .613$, $n= 135$, $p<.0.01$). The relationship between the two variables is also significant with moderate correlation.

The test conducted by Pearson correlation for organizational performance and Supply integration shows a positive, significant and moderate correlation between the two variables ($r = .686$, $n = 135$, $p < .0.01$).

Furthermore, the Correlation analysis of Customer integration and organizational performance, as presented in table 4.16, reveals a strong, high, and positive correlation ($r = .745$, $n = 135$, $p < .0.01$). The relationship between the two variables is significant, as determined through inter-correlation analysis.

Likewise, the test conducted by Pearson correlation for organizational performance and Information integration shows a positive, significant, strong and high inter-correlation b/n the two variables ($r = .757$, $n = 135$, $p < .0.01$).

In comparison to other variables, Measurement integration and organizational performance were found to have a high Pearson correlation test result. The relationship between the two variables was found to be significant, positive, and of high, strong correlation ($r = .774$, $n = 135$, $p < .0.01$).

The Pearson product-moment correlation coefficient was used to examine the link between measurement integration and organizational performance. The correlation among independent variables was found to be below the limit of high correlation, as stated by Andy F. (2009), which is more than 0.8 or 0.9. Measurement integration & organizational performance showed highest correlation (.774), Information integration & organizational performance (.757) and Customer integration and organizational performance (0.745). The lowest correlation was scored between External integration and organizational performance (0.494). Thus, correlations between independent variables are less than .80. To conclude, the correlation of this study had a moderate relationship between External Integration and organizational performance. Internal integration and customer integration had a strong relationship with organizational performance. To improve efficiency and effectiveness, the integrative capabilities, whether external or internal, should be considered as an approach.

The present study reveals a robust association between Measurement & Information integration with respect to performance of the organization. Prior to main analysis, preliminary investigations were carried out to ensure the fulfillment of linearity, normality, and homoscedasticity assumptions. Notably, noteworthy positive correlation was found b/n high levels of organizational

performance and measurement integration. Based on the Pearson correlation coefficient, it may be concluded that organizational performance and supply chain integration have significant & favorable relationship, which is both high and moderate in nature. The Pearson correlation matrix demonstrated that all six dimensions of SCI had a statistically significant and positive correlation with organizational performance, which was above moderate and high in magnitude.

4.8 Regression Assumptions Analysis

4.8.1 Assumptions of Linear model

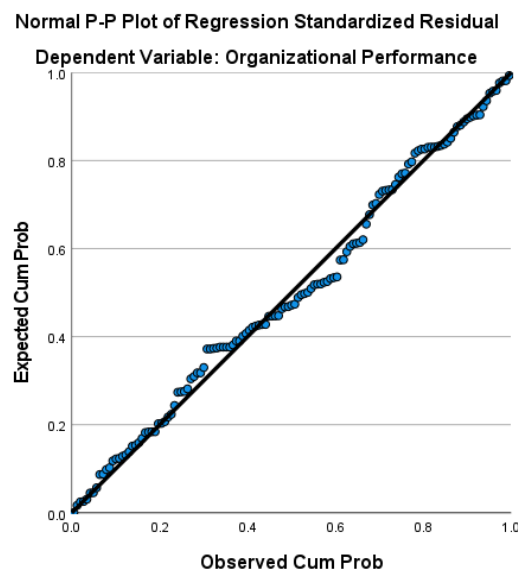
According to this presumption, residuals should show a linear connection with dependent variables score. Scatter plots illustrating the relationships among all explanatory variable & variable result can be used in evaluating this set of assumptions. Each scatter plot must clearly show linear connection b/n the variables helped by regression line. As an alternative, one might only compare the scatter plot of the actual outcome variable with the expected result. The distinction between outliers and influential examples is what the word "residual" alludes to (J, 2010). A simple outliers have a relatively small effect on the line, but produce a large residual, which represents the distance from a regression line. Significant case outliers significantly change regression line with the exception of being difficult to identify since there is lower residual than that of majority of sample points. Impact statistics, like Cook's distance statistic, may be used to analyze the scatter plot in order to spot spots that overly impact the model (Wang, Rosner, & Goodman, 2016). The scatter plot's examination reveals that the residuals are regularly distributed. Points are regarded as non-normal if they considerably stray from the diagonal line.

1. Linearity Assumption

Linearity assumption states that the residuals should be linear relationship with the predicted dependent variables scores. Linear relationship between independent variables and dependent variables, this set of assumption can be examined to a fairly satisfactory extent simply by plotting scatter plots of the relationship between each explanatory variable and the outcome variable. It is important to check that each scatter plot is exhibiting a linear relationship between variables (perhaps adding a regression line to help you with this). Alternatively, you can just check the scatter plot of the actual outcome variable against the predicted outcome. The term residual considered is the difference between outliers and influential cases a bit further (J, 2010). The

simple outlier influences the line to a far lesser degree but will have a very large residual (distance to the regression line). The influential case outlier dramatically alters the regression line but might be harder to spot as the residual is small - smaller than most of the other more representative points in fact. To examine the scatter plot, you can also use influence statistics (such as the Cook's distance statistic) to identify points that may unduly influence the model (Wang, Rosner, & Goodman, 2016). If it is looked at the scatter plots below, the plot of the below graph indicates that the residuals are normally distributed. Non-normal if points substantially deviate from the diagonal line.

Figure 2 Regression standardized



Source Survey Data ,2023

2. Multi-collinearity

Tolerance and VIF (variance inflation factor) are helpful indicators to determine whether a specific EV has significant link with other EVs (a problem in multi-collinearity occurs within the model). For instance, $VIF > 10$ and tolerance less than .1 (10%) both suggest multicollinearity. Therefore, VIF must be between 1 and 10, as VIF 10 implies the presence of multicollinearity (Ge, 2013). The Multicollinearity assumption, based on (Robert 2006), asserts that IV shouldn't get connected. When there is a strong correlation between them, multicollinearity becomes apparent. An unstable regression model is one where the predictor-predictor correlation is high ($r > .85$) (J, 2010). The correlations between the independent variables are shown in table 4.17, which includes the

integrations of internal, external, suppliers, customers, information, and measurement. All of them fall below the 0.87 correlation cutoff for the independent variables.

The correlation coefficient below the Multicollinearity test describes that both (VIF) and tolerance are more than 10% and lower than 10% respectively. For this study, Tolerance result is below the threshold and the VIF (variance inflation factor) below 10; thus, attaining the standard.

Table 4.8-1 Multi-collinearity Test of IV

Coefficients ^a										
Integration-Model		Coefficients-Unstandardized		Coefficients Standardized-	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Bound Lower	Bound Upper	Tolerance	variance inflation factor
1	Constant	.311	.200		1.553	.123	-.085	.707		
	External Integration	-.012	.072	-.010	-.162	.872	-.153	.130	.566	1.768
	Internal Integration	-.044	.082	-.040	-.530	.597	-.206	.119	.386	2.588
	Customer Integration	.269	.077	.273	3.474	.001	.116	.422	.363	2.754
	Supplier Integration	.076	.086	.073	.891	.375	-.093	.246	.338	2.962
	Information Integration	.280	.088	.278	3.174	.002	.105	.454	.292	3.430
	Measurement Integration	.313	.066	.361	4.731	.000	.182	.444	.383	2.608
▪ Dependent Variable: Organizational Performance										

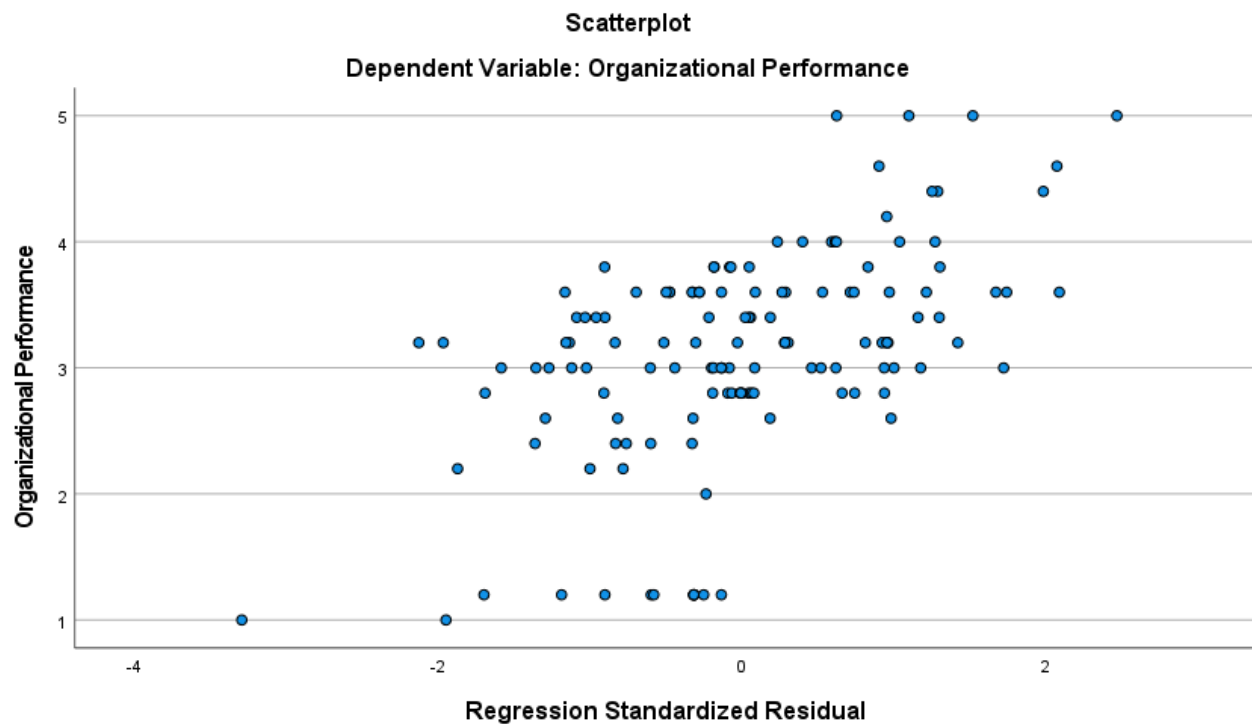
Source: SPSS Output Data 2022

3. Homoscedasticity

The concept of homoscedasticity entails residuals variance in relation to anticipated scores of dependent variables ought to be uniform across all projected scores. The error variance is presumed to be constant irrespective of the values of other variables. In graphical representation, the dispersion of evenly distributed dots serves as an indication of the homogeneity assumption (Mat Roni, 2014).

By displaying, residuals comparing to the values estimated by regression model & searching any indication which residuals fluctuate in such distinct manner, it is possible to verify that residuals don't change methodically with projected-values. Checkout the-following figure, data points looked to be dispersed rather randomly, and the projected residuals were split very evenly.

Figure 3 Homoscedasticity MRA



Source SurveyData 2023

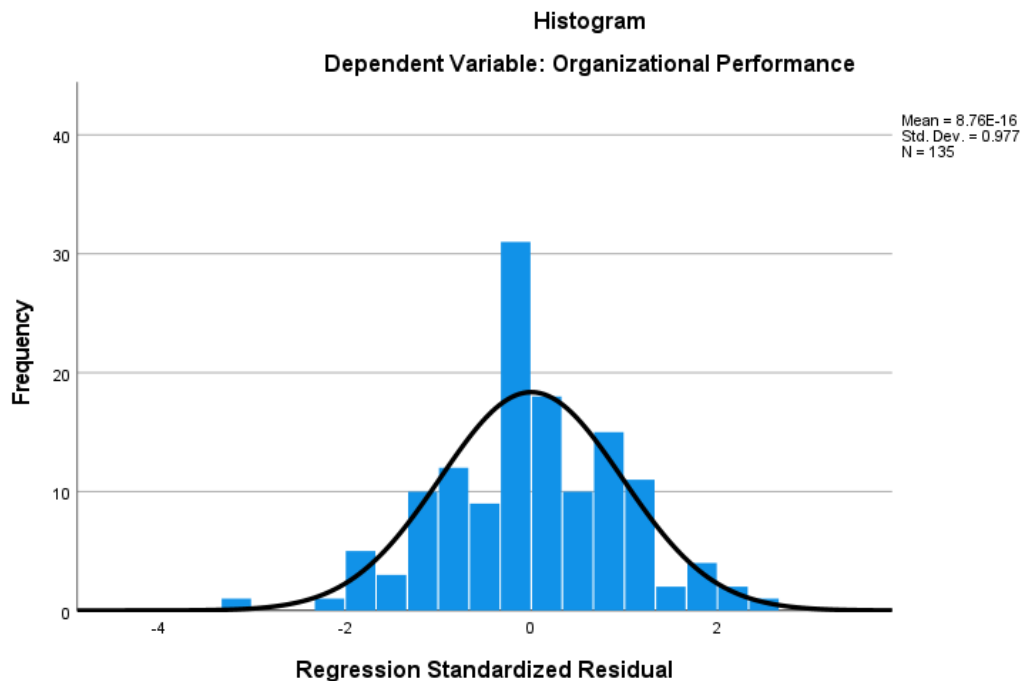
The above scatter plot represents what a scatter plot may be like if the homoscedasticity criterion is satisfied. The residuals exhibit equivalent variability at both higher anticipated values and lower predicted values, based on the observed data points, there appears to be a tendency to funnel towards both positive and negative ends of x-axis. These shows both lower and higher value estimation using our methodology is equally accurate.

4. Normally distributed residuals

To determine if the errors (residuals) in a model are normally distributed around the expected dependent variable scores, a histogram of the residuals can be employed. However, a histogram alone is frequently sufficient to determine if the distribution is normal, and a P-P plot should also be employed, as illustrated in the picture below. The anticipated and actual cumulative probability

match exactly, as can be seen in the picture below. This implies that the residuals are uniformly distributed normally. Therefore, the premise of normalcy is not broken by the results of this poll.

Figure 4 Normality Distributed Histogram



Source Survey Data 2023

4.8.2 Effect of SCI for the OP

Examining how supply chain integration affects an organization's performance is the third goal of this inquiry. It should be emphasized that correlation does not prove the presence of a Causal relationship because there might exist other unobserved factors connected to and responsible for the association that was found. A single ongoing dependent variable & numerous IV or predictors (typically ongoing) can be compared using multiple regression, which isn't one approach, rather a group of techniques (Beech, 2006). In this study, MRA analysis was carried out to determine the correlation b/n organizational performance and SCI (covering Internal, external, supplier, information, customer, and measurement integration). The variance that each model has been able to account for is shown in the Model Summary table. If IV significantly forecast DV, it will be seen from Sig. F Change value using this model. It is interesting that value of succeeding model includes each and every independent variable entered.

Population correlation coefficient (R), which assumes values between +1 and -1; 1 signifies a perfect positive linear relationship, 0 denotes no linear association and -1 indicates a perfect negative linear relationship (Ge, 2013).

According to the rule of Thumb, the model is strong fit. R^2 value as follows

1. <0.1 Poor fit
2. 0.11 to 0.30 Modest fit
3. 0.31 to 0.50 Moderate fit
4. 0.50 Strong fit

Source: (Muijs, p.166) cited in Habtamu

Finally, for R^2 Square result shows in the table 4.18 indicates, R^2 is coefficient of determination it tries to show that a changes in the dependent variable on independent variables. From the analysis, the R^2 is given as 0.713, which covered to percentage is given 71.30% which means that 71.30% changes in the dependent variable is accounted for by the independent variable. Thus, the according of the rule of thumb, the model R^2 is strong fit.

Table 4.8-2 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845a	.713	.700	.470
a. Predictors: (Constant), External, Measurement, Internal, Supplier, Information, Customer Integration				
b. DV: OP				

Source: Survey Data 2023

When the anticipated and actual values of a dependent variable are compared, R stands for the square root of R-Squared. A remarkable 84.5% correlation between the projected and actual organizational performance is revealed by the research. The outcome shows a significant link between the organization's expected and actual performance.

The amount of the variance in the dependent variable—the performance of the organization—that can be accounted for by changes in the independent variables is shown by the coefficient of determination, or R^2 . It denotes the amount of variation that the model can account for and shows how changes in supply chain integration practices, such as Measurement Integration, External Integration, Customers Integration, Suppliers Integration, Internal Integration, and Information Integration, affect organizational performance.

According to the analysis, the independent variables examined in this study—namely, external, internal, measurement, customers, information and suppliers integration—only account for 71.3% of the organization's performance, as shown by the R^2 of the chosen oil seed factory in the Amhara region. This suggests that 28.7% of the organizational performance is influenced by other SCI characteristics which weren't examined in this research. Therefore, more study should be done to look at additional supply chain integration aspects that affect how well the business performs.

Table 4.8-3 ANOVA

ANOVA						
Model		Squares Sum	Df	Square Mean	F	Sig.
1	Regression	70.286	6	11.714	53.101	.000b
	Residual	28.237	128	.221		
	Total	98.523	134			
a. DV: OP						
b. Predictors: (Constant External, Measurement, Internal, Supplier, Information, Customer Integration)						

Source Survey Data 2023

Based on the findings from Table 4.19, that model has a level of significance of $p=0.0005$. At a 95% confidence level, this number is less than the predetermined significance level of 0.05. Since the model successfully predicted how Measurement, External, Customers, Suppliers, Internal, and Information will affect organizational performance, it is considered statistically significant. The 5% level of significance's F critical value was 22. It may be concluded that the entire model is statistically significant because the computed F value is higher than the crucial F value (i.e., 53.10).

Table 4.8-4 Multiple Liner Regression Coefficients

Coefficients									
Model	Unstandardize d Coefficients		Standardize d Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Toleranc e	VIF
1 (Constant)	.311	.200		1.553	.123	-.085	.707		
External Integration	-.012	.072	-.010	-.162	.872	-.153	.130	.566	1.768
Internal Integration	-.044	.082	-.040	-.530	.597	-.206	.119	.386	2.588
Customer Integration	.269	.077	.273	3.474	.001	.116	.422	.363	2.754
Supplier Integration	.076	.086	.073	.891	.375	-.093	.246	.338	2.962
Information Integration	.280	.088	.278	3.174	.002	.105	.454	.292	3.430
Measurement Integration	.313	.066	.361	4.731	.000	.182	.444	.383	2.608
a. DV: OP									

Source Survey Data 2023

The regression coefficient represents the independent variable and its significant contribution towards accounting for the variance in the dependent variable. Based on the results obtained from Table 4.20 above, the regression equation can be expressed as follows:

$$Y = 0.311 - 0.012 X_1 - 0.044X_2 + 0.269X_3 + 0.0762X_4 + 0.280X_5 + 0.313X_6 + \epsilon$$

Where Y is Organizational Performance

X₁= External Integration,

X₂= Internal Integration,

X₃= Supplier Integration,

X₄= Customer Integration,

X₅= Information Integration

X₆= Measurement Integration

€= Error term

As a result of regression shown in table 4.20 indicates that there is an insignificant relation between external integration & organizational performance with Beta ($B = -0.010$, $P = 0.872$). So, *accept the null hypothesis that states external integration have insignificant & negative effect on organizational performance.*

And the regression model between internal integration and organizational performance had insignificant relationship with Beta ($B = -0.40$, $P = 0.597$). So, *accept the null hypothesis that states internal integration have insignificant & negative effect on organizational performance.* There is also insignificant relationship between organizational performance and supplier integration with Beta ($B = 0.073$, $p = 0.375$). So, *accept the null hypothesis that states supplier integration have insignificant & positive effect on organizational performance.*

The regression test in table 4.20 indicates that there is significant relationship between organizational performance and customer integration with ($B = 0.273$, $P = 0.001$). So, *reject the null hypothesis and accept the alternative hypothesis that states customer integration have a significant & positive effect on organizational performance.* Whereas information integration has significant effect on performance of organization with ($B = 0.278$, $P = 0.002$) *Therefore, also reject the null hypothesis and accept the alternative hypothesis that states information integration have a significant & positive effect on organizational performance.*

In addition, measurement integration has significant effect on performance of organization with ($B = 0.361$, $P = 0.000$). Therefore, *we reject the null hypothesis and accept the alternative hypothesis that states measurement integration have a significant & positive effect on organizational performance.*

The three IVs, customer, measurement, and information integration have statistical significance that is less than 0.05, according to the forementioned regression model. This demonstrates that the model's predictive ability to evaluate the impact of SCI on organizational performance is statistically significant. The three independent variables, supplier integration, internal integration, and external integration, all have statistical significance levels larger than .05. This suggests that this model's ability in forecasting impact of SCI on OP is statistically unimportant.

Therefore, it can be concluded that while external integration, internal integration, and supplier integration have no impact on OP, independent variables like customer, information, and measurement integration have a higher impact on that performance.

Based on the results, multiple linear regression equation determined that the organizational performance would grow by 0.311 constant if all independent variables were kept at zero. Internal integration would result in a factor of -0.044 loss in firm performance, whereas a decrease in external integration would result in a factor of -0.012 decrease in organizational performance. The study also discovered that successful supplier integration raised the firm's performance by a factor of 0.076. One unit Raising in measurement integration would result in 0.313 gain of performance in the company, one unit raising in information and customer integration would result in 0.280 and 0.269 increment in an organization's performance, respectively. Thus, one may say that practices of SCI & organizational success are positively correlated. These results are in line with existing literature that contends that supply chain management integration affects how well a business performs.

When findings in this study were contrasted to those earlier studies on SCI, it was discovered that there were no appreciable effects on increasing a firm's performance for supplier integration, external integration, or internal integration. The results of Uwamahoro (2018), Devaraj et al. (2007), and Chirchir and Richu (2013), respectively, are in agreement with this.

The outcome of the measurement integration has a considerable effect on the organization's performance. This result is consistent with the research conducted by Klemencic in 2006. With a coefficient of 0.313 and a very significant level of 0.000, the regression analysis in Table 4-20 demonstrates a favorable association between measurement integration and organizational performance. This suggests that through boosting the organization's effectiveness, measurement integration makes a significant contribution to its performance.

The impact of customer integration on organizational performance is a significant area of concern, as highlighted by recent research. According to the findings of one study, the effect of customer integration on performance was positive & statistically significant of 0.001 significance level. As per the result with Pearson and Carr (1999) work, who argues organizations that focus on maintaining close relationships with customers are better equipped to respond to their needs, resulting in greater loyal customer, repeated purchases, and willingness to pay premium prices for high-quality products, ultimately leading to increased market share. Other researchers, such as H. Padmanabhan and Whang (2007), have also noted the importance of customer relationship practices in improving organizational performance, including building long lasting relationships,

managing customer complaints, and improving satisfaction of customer. Differentiating products from competitors, organizations can sustain customer loyalty and provide added value to customers.

Similarly, the value of information integration in SCM has been extensively researched. Using a coefficient of 0.280 and a significance threshold of 0.002, one study (Wong, Lai, and Cheng, 2016) discovered a substantial association between information integration and organizational performance. This result is in line with Lalonde's (1998) theory that one of the five elements of a strong supply chain connection that affects organizational performance is information sharing. Other researchers (Kroes and Ghosh, 2010) have found that higher levels of information sharing are associated with lower total costs, higher-order fulfillment rates, and shorter-order cycle times. In order to achieve an integrated and effective supply chain, it is crucial to streamline material flow and make all information flow highly visible. However, some studies (Uwamahoro, 2018, Devaraj et al., 2007, and Chirchir and Richu, 2013) have found supplier, external, and internal integration do not have a significant impact on improving a firm's performance. Despite these mixed findings, the importance of information integration in supply chain management and customer integration in organizational performance cannot be overstated.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Main Findings

Basing up on the assessment's objectives, researcher has summarized the results of the study in the following paragraphs. The research on the current practices of food oil manufacturing industries has identified six dimensions of supply integration and their particular effects reflecting upon the performance of the organization. This paper identified a significant relationship between measurement, customer, information integration and organizational performance. However, there was no significant relationship between external integration, internal integration, supplier integration, and organizational performance.

To assess the reliability of the research, internal consistency was measured using Cronbach's alpha coefficient, which is a commonly used indicator. The Cronbach alpha coefficient of the scale should be above 0.7 for ideal results. The reliability test of this research resulted in a coefficient of 0.931, indicating good internal consistency in the data constructed in the questionnaire.

The investigation towards the magnitude of practices of supply chain integration highlighted that the parameters of information, external, measurement, supplier, internal, and customer integrations rated from one to six, correspondingly. A moderate magnitude of integration within supply chain application by the organization was suggested by the outcomes of the result as all variables fall above rate of 3.11, according to the scaling instrument conducted in the research.

The analysis revealed how the dependent variable that is performance of organization had high correlation towards internal integration (0.613), information integration (0.757), customer integration (0.745), supplier integration (0.686), measurement integration (0.774) and moderate correlation with external integration (0.494). The findings informs that the performance of organization alter with customer, measurement, and information integration. It also considerably changes together with measurement integration; adversely changes with internal integration but, it does not completely alter when supplier integration changes.

Ultimately, the goal of this study is to scrutinize the influence of supply chain integration on organizational performance. The findings disclose that, in the context of multiple linear regression analysis, the statistical significance level of customer, measurement, and information integration were less than .05, indicating the statistical significance of these parameters. Conversely, supplier, internal, and external integration exceeded the statistical level .05, implying the statistical insignificance of these parameters. The results recommend a change in the level of customer, measurement, and information integration in tandem with the performance of the organization could have fruitful impacts; however, a change in the level of internal, supplier and external integration in conjunction to the performance of the organization is not significant. As the model's coefficient of determination (R^2) indicates that supply chain integration explains 71.3% of the variance in organizational performance, 28.2% of performance of organization need to be interpreted by other constituents outside the scope of this study. The model's regression coefficients (β) for the independent variables of external, internal, supplier, information, customer, and measurement integration were found to be -.012, -.044, .269, .280, .076, and .313 in respective orders. Since the statistical values of information integration (.002), measurement integration (.000) and customer integration (.001) proved their significance, these variables have the ability to influence organizational performance. Overall, the model was suitable statistically in terms of foreseeing the performance of the organization, as $P < .0005$ which is obviously lesser than the statistical level of α .05.

5.2 Conclusions

The organization has displayed a notable degree of integration of supply chain execution, as all dimensions have exhibited a considerable rate of success, according to the survey instrument. While internal, supplier and external integrations demonstrated a slight degree of variance in conjunction to organizational performance; performance of organization and measurement integration showed a significant correlation on the other hand. Statistical significance was observed in customer integration, information integration, and measurement integration. Conversely, supplier integration, external integration, and internal integration displayed statistical insignificance. Therefore, the varying degrees of information, measurement and customer integration towards the performance of organization have proven to be relevant, whereas the varying degrees of external, supplier and internal integration in relation to organizational performance have not. The study suggests that 71.3% variance in performance of the organization

can be attributed towards integration of the entire supply chain, while 28.2% of the remainder could be attributed to other factors beyond the study's scope.

The performance of the organization is directly and positively influenced by customer integration and measurement integration. This is achieved through the development of relationships between customers and supply chain partners, as well as performance assessments that hold individual firms or units accountable for meeting deadlines. Information integration, which coordinates communication, transfer of information and technological support, has an indirect capacity towards better performance of the organization. The conclusive analysis of the structural model suggest the model has above moderate statistical influence towards foreseeing the research model. In conclusion, implementation of supply chain integration is a lengthy process that involves the collection of raw materials for production and distribution to the final consumer, and it presents many challenges. As such, managers must pay attention to all dimensions while minimizing the cost of processes and resources and maximizing the growth of sales and the efficiency of the business.

In summary, the results indicate a high extent of supply chain integration execution by the organization. The study highlights the significant relationship between information, customer, and measurement integration with organizational performance, while the relationship between internal, external, and supplier integration with organizational performance is insignificant.

5.3 Recommendation

The study's main outcomes and conclusion have been thoroughly analyzed and grounded. As per the results and gained insights from the study, these recommendations have been proposed:

The enhancement of current practices in supply chain integration should be considered and implemented within the organization to achieve optimal performance with all partners involved in the chain.

- Additionally, it is imperative to take into account any other supply chain integration elements that were not inspected in the scope of this paper which may explain organizational performance, and to address them in the hope of minimizing possible negative impacts of unexercised integration.

- The firm should strive towards creating and implementing all dimensions of supply chain integration to attain superior performance.
- Focus on activities to benefit with each other partners such as suppliers, customer importer and exporter for maximum potential to produce, distribute, and market significant volumes of fortified edible oils to benefit local communities.
- Those oil factories shall be engaged in more activities that complement and support cooperatives with farmer or other clusters of smaller-scale producers who could refine and fortify oils centrally to attain the increasing demand.
- It is highly recommended that the optimal level of integration for all six parameters of the supply chain which are examined in this study to be achieved through framework agreement, system computerization and relationship management to attain an optimal and productive performance of the firm.
- As internal integration, external integration, and supplier integration are not currently practiced at the optimum within the firm, it is worthy to make improvements towards these dimensions.

5.4 Further Study Direction

The study's geographic range was restricted to the Amhara region, and consequently, future research should consider enlarging this coverage to encompass all areas. Additionally, the examination was confined to chosen food oil factories in a single region; thus, forthcoming investigations must incorporate partner organizations, including suppliers, customers, and intra-organizations. Finally, it is recommended that future studies should focus on the variables found to be irrelevant in this research. Despite the significant contribution of this study to the SCI and performance literature, several limitations should be acknowledged. Firstly, due to the small sample size (135), a broad survey is recommended to offer a better understanding of the link between SCI and performance. Secondly, like many other studies, this research utilized only one informant from each company. Using a dataset with multiple informants could improve the validity of the findings. Furthermore, this study employs static cross-sectional data. Although causal interrelations were studied and could imply temporal aspects, gathering data over time from informants could offer richer implications. Future research may test the results of this study using time-series data.

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Appendices



DEPARTMENT OF MANAGEMENT

COLLEGE OF BUSINESS AND ECONOMICS

ADDIS ABABA UNIVERSITY

Greetings am a researcher from Addis Ababa University, this questionnaire is developed for an academic effort planned for the collection of data to conduct a thesis paper on the title “The Effect of Supply chain Integration on organizational performance on selected Food oil factories in Amhara region” in order to fulfill the University’s requirement set for awarding of a Master of Business Administration. The information obtained from this questionnaire will be kept confidential for academic purpose only. Hence, I am kindly asking respondents to give your candid information.

Please try to answer every question. The questionnaire seeks basic information, and you can tick the option that you chose.

General instruction

- It is not necessary to write your name
- Try to address the entire question given below
- Use (✓) mark for your choice in the given box

Thank you for your cooperation! Tel:-

Email: -

Appendix I Questionnaire

Instruction: Please Mark X where necessary.

I. Section A: Demographic Information (Make “X” Symbol for Your Answers)

1. Sex: ☐Male ☐Female
2. Age: ☐25 – 35 ☐ Between 35 – 45 ☐ Between 45 – 55 ☐ Above 55
3. Level of Education: ☐Certificate ☐Diploma ☐Degree ☐Masters ☐PhD
4. How long have you stayed at this organization?
 - A. <2years
 - B. 2-5 years
 - C. 6-10 years
 - D. Over 10 years

II. Section B: Extent of SC Integration please indicates the extent to which the following statements concerning the level of SC Integration within your organization occur.

1. What is your position in this organization?
 - a. Supply Chain
 - b. Operation Director:
 - c. Logistics director
 - d. Procurement Directorate
 - e. Finance Team
 - f. Other

Use the scale of:

1) Does Not Occur

2) Small Extent

3) Medium Extent

4) Large Extent

5) Very Large Extent

Statement	1	2	3	4	5
Extent Of Supply Chain Integration					
External integration					
Sourcing and tendering decisions are easily made due to SC Integration and information sharing					
There are external SC integration that fastens flows such as, physical and funds					
Distribution and delivery is made at the right time and place due to SC integration, information sharing and coordination.					
There are integration of objectives, planning, and resources with external organizations.					
Internal integration					
Monitoring stock movement has been made easier as a result of the collaboration between procurement, logistics and warehouse/ inventory management					
There are internal integration of functions and activities					
With an integrated SC technologies and systems established, inter and intra organizations' communications are optimized.					
Due to information and technology integration, there are accesses of tracking performances of SC partners.					
Supplier Integration					
A database of suppliers is easily maintained as a result of SC Integration.					
With an integrated supplier's supply chain, logistics services are improved					

SC Integration has provided the organization the ability to quickly and easily relate with suppliers.					
Supply chain integration is led to a better supplier relationship management.					
Orders are easily processed as a result of supplier integration.					
Customer Integration					
SC Integration has assisted in improving the quality of goods, works and services offered to the beneficiary					
The speed of service delivery has been enhanced due to the supply chain integration process					
Customer integration has enabled to deliver services easily and quickly.					
The speedy customer collaboration has been maintained as a result of SCI.					
Information Integration					
Due to information and technology integration, there are accesses of tracking performances of SC partners.					
With an integrated information and measurement SC, supply chain analysis has been done.					
With an integrated suppliers supply chain, logistics services are improved.					
There are external SC integration that fastens flows such as, physical and funds.					
Measurement Integration					
With an integrated SC technologies and systems established, inter and intra organizations' communications are optimized.					

Distribution and delivery is made at the right time and place due to SC integration, information sharing and coordination.					
With an integrated SC technologies and systems established, inter and intra organizations' communications are optimized.					

2. Section C: Organizational performance.

Please indicate the extent to which the following statement concerning the relationship that exists between your SCI and the performance of your organization occurs.

Use the scale of:

- 1) Very Low Extent 2) Low Extent 3) Moderate Extent
4) Great Extent 5) Very Great Extent

Statement	1	2	3	4	5
Organizational performance					
The efficiency of the business and process.					
Employee productivity					
Effectively organizations meet their objective					
The growth of sales					
The alignment among business functions, as well as those function' alignment with the organization's strategy					