

**SUPPLY CHAIN INTEGRATION OF OILSEED PRODUCTS AND
MANUFACTURING INDUSTRY IN WEST GOJJAM**

ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY



**SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING
(INDUSTRIAL ENGINEERING)**

By: Zelalem Girmaw

Addis Ababa, Ethiopia

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SUPPLY CHAIN INTEGRATION OF OIL SEED PRODUCT AND MANUFACTURING INDUSTRIES IN WEST GOJJAM

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By: Zelalem Girmaw

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Advisor: Dr. Gulelat Gatew

Co-Advisors: Mr. Shmelis .T (PhD Candidate

Addis Ababa University

Addis Ababa Institute of Technology (AAIT)

School of Mechanical and Industrial Engineering (SMIE)

Addis Ababa, Ethiopia

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ADDIS ABABA UNIVERSITY**ADDIS ABABA INSTITUTE OF TECHNOLOGY****SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING**

This is to certify the thesis prepared by Zelalem Girmaw, entitled: “Supply Chain Integration of Oilseed Product and Manufacturing Industries in W/Gojjam” and submitted in partial fulfillments of the requirements for the degree of Master of Science (Mechanical and Industrial Engineering) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by Examining Committee:

Dr. Gulelat Gatew (Ass. Prof.)

Advisor:

Signature

Date

Mr. Shimelis T.

Co Advisor:

Signature

Date

Dr. Ermias Tesfaye (Ass. Prof.)

Internal Examiner:

Signature

Date

Mr. Lelisa (Ass. Prof.)

External Examiner:

Signature

Date

Dr. Yilma Tadesse Birhane (Ass. Prof.)

School Dean:

Signature

Date

Dr. Ermias Tesfaye (Ass. Prof.)

Post Graduate Associate Director:

Signature

Date

Declaration

I, Zelalem Girmaw, declare that the Masters Research thesis entitled “Supply Chain Integration of Oilseed Agricultural Product and Manufacturing Industries in West Gojjam” is my original research work and no materials submitted previously for the award of any other academic degree. The research work done under the guidance of Dr. Gulelat and Shimelise .T (PhD Candidate), at Addis Ababa University, Addis Ababa Institute of Technology in School of Mechanical and Industrial Engineering.

BY: - Zelalem Girmaw

Signature:-_____

Date: - ____/____/____

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ABSTRACT

Supply Chain Integration can be defined as the way of make a network between suppliers and accompany to produce and distribute a specific product to the final buyer. Supply chain is the process of develop relation between supplier and customer. Nowadays, the field of supply chain is an important activity due to the expansion of oilseed farming investments. The previous studies on supply chain integration of oilseed products focused on export and import system to increase income, industry management to customer and retailer to industry. Study supply chain integration has a great advantage to resource scarcity and to increase the productivity of investor is to grade up manufacturing industries. West Gojjam, oilseed product investment is the research area in Supply chain integration of oilseed product challenged by transport, collect, quality assurance level, distribute oilseed product to smallholders and manufacturing industries.

This research focuses on propose supply chain integration model of oilseed for West Gojjam suppliers and manufacturing industries. Studying the supply chain integration of oilseed in this region helps to increase the potential of investors in rural area and reduce the scarcity of oilseed product for manufacturing industries to the end user.

In order to perform a good flow of raw material from investor to manufacturing industry a proper collection center, transportation, information, awareness creation are the dominant factor to minimize the scarcity of oilseeds in industry. In order to achieve the objective of the study different data gathering techniques include; litterateur review of different articles related to the concept of supply chain integration system, Micmac and SPSS scientific tools are applied. From the finding of the study, barriers and drivers influence the supply chain integration of oilseed smallholders and manufacturing industries in W/Gojjam.

Agricultural product collection center, distribution center, quality assurance level and transportation system are the challenge. Awareness in supply chain integration hinder farmers, investors and smallholder manufacturers. The factor reduces the productivity of investors, manufacturing industries and incomes. The barriers and drivers of supply chain integration analyzed by using SPSS factor analysis method. The result from MICMAC tool shows that, the factors such as collection center, awareness, transportation and quality assessment level are direct impact on the supply chain integration of oilseed product in W/Gojjam. The warehouse analyses by using MICMAC tool the result indicates that when the distribution center far from investment area the scarcity of oilseed increase and the quality level decrease. To alleviate the scarcity of oilseed product in W/Gojjam the researcher recommends implement the proposed supply chain integration model.

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LIST OF ABBREVIATIONS

SCM	Supply Chain Management
SC	Supply Chain
SCI	Supply Chain Integration
IAIP	Integrated Agro processing Industrial Park
DC	Distribution Center
ECX	Ethiopia Commodity Exchange
SCMC	Supply Chain Management Component
SCNS	Supply Chain Network Structure
SPSS	Statistical Package for Social Science
S	Significant Two Tailed correlation
CV	Control Variable
MRP	Material Requirement Planning
MICMAIC	Modelling and Cross Impact Matrix Multiplication Applied to classification
SCBP	Supply Chain Business Process
WG	West Gojjam
WR	Wholesaler and Retailer
FAO	Food Association Organization
ICT	Information Communication Technology
IT	Information Technology
GVC	Global Value Chain
WEF	World Economic Forum
SMSE	Small Medium Size Enterprise
CSE	Central Statistical of Ethiopia
UNIDO	United Nations Industrial Development Organization
MT	Metric Tones

CHAPTER 1: INTRODUCTION

1.1. Background of the Study

Supply chain integration in Global world, the extent of all activities in organization integrated with supplier and demand. Supply chain is the system of fulfill all activities involved in deliver a product from producer to the customer include raw materials, manufacture and assembly products, warehouse and inventory track, order entry and management, distribution across all channels, delivery to the customer, and information systems necessary to monitor all of these activities [1].

Supply chain integration essentially means that the information and communication systems of all stakeholders are able seamlessly exchange information through all planning, execution and completion of transport and logistics operations throughout a product's lifetime [2].

Supply chain integration recognized as an important factor to attain superior supply chain performance, as it offers a host of competitive advantages include complete transparency all the way from supplier to customer.

Agriculture is the backbone of the Ethiopia national economy [3]. It is a means of subsistence for more than 85% of the country's rural population, contributes more than 50% of the national growth domestic program, brings in 90% of its export earnings and provides employment for 88% of the labor force. Ethiopia's export relies heavily on selected agricultural commodities originating mainly from smallholder peasant farming, such as, coffee, hides and skins oilseeds are the most important export items in the order of priority [4].

Oilseeds contribute about 8.8% of the total export in 2002 with a grow share in export earns, in 2020 the export earn increase to 20% next to coffee [5]. Oilseeds are not only an export item but oilseeds are a mainstay of the rural and national economy of Ethiopia. After coffee, oilseeds are the second largest export earn for the country and already more than 3 million farms are involved in its production [6]. There is also large demand for it in the domestic economy since it is used to produce edible oil [7].

The distribution of oilseed product from small farmer to large supply retailer manufacturing industry passes different obstacles. The driving factors of supply chain are transportation; facilities, inventory and information are decline by supply chain obstacles like increasing variety of products; decreasing product lifecycles; increase demand customers; fragmentation of supply chain ownership; globalization; and difficulty execute new strategies.

Smallholders play a critical role in the global oilseed supply chain, both in terms of area under cultivation and in the volume of part produced. Thus, their involvements in sustainability initiatives are crucial to drive changes at origin. However, challenge affect integration of smallholders into sustainable supply chain and initiative focused supply chain. Small growers often lack the resources and capacity to pursue retailer [8].

The resource limited availability of improved seeds; most seed are grown from unimproved cultivate with low genetic type. Despite the release of a large number of improved pulse varieties, which are, adapted to a wide range of rainfall, soil and altitude regimes [9].

This study focus on supply chain integration of oilseed product in manufacturing industry and the major barriers of the supply chain between producers and manufacturing industry.

1.2 Problem Statement

Ethiopia is one of a comfortable environment in the world for agricultural farm oilseed product. Ethiopia has a potential as a major oilseed export is a result of suitable climate for annual oil seed product, cheap labor force and huge global demand for quality food oil [10]. It has a strong agricultural and consequently exports are dominated by agro-based sector [11]. The maximum area cultivated in summer season [12]. According to the instability of oilseed market the relation of demand and supply are vary. Depending on research gate sample 210 countries 441 thousand MT per day oilseeds consumed. In the last 2018, oilseed consumption increases from 75 to 210 million metric tons. Ethiopia annual food oil consumption from 1980 to 2014 the average value was 26.1 MT per day the minimum consumption 12 thousand MT per day and the maximum 61 thousand MT per day. Then Successful supply chain relation requires across functional integration and market stability [13].

How firms have come to integrate their raw material and information flow activities through successive process inside the organizations with their customers [14]. Based on, 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), West Gojjam Zone has a total population of 2,106,596 and 13,311.94 square kilometers total area. From the total population oilseed product farmers are 57 single crop farmer investors and 37, 236 are mixed crop farmers. Total oilseed product in one-year farm period 57,250 from single crop and 12, 750 mixed oilseed quintal per year. Still manufacturing industry wait to import raw material from other country [15]. Supply chain is the relation of demand and supply iterate in a smooth loop. However, the challenges in W.G affect the firm benefit and decline the market integration. Due to unwind flow of facilities, inventory, information and transportation barriers increased between supply and demand of oilseed manufacturing industry. Those subjected to stop from manufacture in the summer and two month in autumn season.

1.3 Research Question

1. What are the current supply chain integration practice of oilseed products and manufacturing industries in W/Gojjam?
2. What are the typical barrier that hinders supply chain integration of oilseed products and manufacturing industries in W/ Gojjam?
3. What type of supply chain integration system can address the existing problem of oilseed products and manufacturing industries in West Gojjam?

1.4. Objectives

1.4.1 General objective

The general objective of the study is to develop supply chain integration model for oilseed product and manufacturing industries in W/G.

1.4.2 Specific objectives

1. To study the current supply chain integration practice of oilseed products and manufacturing industries in W/Gojjam.
2. To analyze the barriers typically found in oilseed products and manufacturing industries in W/Gojjam.
3. To assess the barriers classification method.
4. To propose supply chain integration model for W/Gojjam

1.5. Significance of the Research

The findings of the research will benefit farmers, investors, small enterprisers all lay on the line of supply and demand of manufacturing industry, by reducing the gap between farmer product and manufacturing industry lead-time, work in process inventory, distance covered by the product in the production centers and simplify the process planning and production schedule. The farmer was benefit on the market cost viability and agro-process industry used in demand balancing.

1.6. Scope of the Research

As it discussed in the problem statement, factors affect the Supply chain integration of oilseed product manufacturing industry. This study mainly focuses on the barriers of supply chain integration of oil seed products and manufacturing industries in W/G.

1.7. Organization of the Research

The research divide in to five chapters. Chapter one introductions about supply chain integration, background of the study, problem statement, objectives of the study, its significance and the scope. Chapter two reviews related literature on the subject such as previous studies and findings, basics of supply chain, supply chain integration,

demand and supply balance and the gap between the past papers. Chapter three discusses research methodology and research design which includes selection of working principle of the study body. Chapter four data collection and analysis of proved data and discusses the analysis result. Chapter five contains conclusion, recommendation and future researches directions.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The traditional supply chain consists of a network of suppliers, manufacturers, distributors, retailers and consumers. For many years, American manufacturing companies dominated the Supply chain management process and therefore, little attention concern given to macro factors such as culture. Today the new global supply chain involves countries Asian, Middle Eastern countries and the dominance once held by American firms is fading. As a result, acceptance is a crucial aspect of any organization's sustainability strategy in today's global landscape [16].

2.2 Supply chain integration

Buyer-supplier relationships in the supply chain are one of the most important elements of supply chain integration. On the other hand, most Western literature focuses on inter-organizational relationships between the suppliers and buyers [17]. Supply chain collaboration is widely studied from many different points of view sources and collaborative concepts began to be widespread in the areas of supply chain [18].

In the supply, chain of oilseed product the producer ringing the main issue attraction between upper level and lower level delegation. An internal disruption may signal to the market that something is wrong with the internal control mechanisms such that future disruptions, and hence lower cash owns or higher systematic risk, may be more adaptable. Develop an integer-programming model, based on an incapacitated facility location formulation of supply chain [19].

2.2.1 Supply Chain

Supply chain is the collection of processes and resources required to make and deliver a product to the final customer [20]. The overall performance of a supply chain driven by its design and its operation facility, inventory, transportation and supplier interaction. Supply chain processes need to designed, managed and coordinated as a unit [21].

SCI implies collaborative inter- and intra-organizational management on the strategic, tactical and operational levels of activities their corresponding materials, funds and information flows that, starting with raw materials suppliers, add value to the product to satisfy the needs of the final customer at the lowest cost and the greatest speed [22]

Supply chain integration describes the concept of integration as a mechanism to support business processes across the supply network to overcome intra- and inter-organizational boundaries [23]. Supply chain integration strictly related to coordination mechanisms and in particular implies that business processes streamlined and interconnected, both inside and outside company boundaries [24]. Elsewhere, defined SCI as comprehensive collaboration between SC network members in strategic, tactical and operational decision-making [25].

Table 2. 1: supply chain components

Supply chain	Facility	No. of plants, their locations and capacities
		No. of warehouses/distribution centers (DCs)
		No. of retails outlets and their locations
	inventory	Inventory control strategies
		Storage facilities
		How costs are balanced against service
		Transportation and storage resources
		Warehousing, distribution and logistics strategies
		Modes of transport used
		Inventory control strategies
	supplier	How are they got
		In-house vs. outsourcing balance
		Human Resources

According to Thomas Kuhne distribution, develop on the existent by adding system variable point.

The impact of e-commerce on supply chain relationships [26]the impact of e-commerce on supply chain is time emendable. A supply chain can be define as three or more organizations directly li by one or more of the flows of products, services, finances, and information from a source to a customer [27].

Management of the supply chain is essentially management of the relationships and activities among the member organizations [28].The goal of supply chain management for member organizations to work together in close, long-term relationships to increase the competitive advantage of the supply chain as a whole [27]. The ratio of online business trade to traditional channels projected to vary greatly by industry [29]. Challenges that frequently enrolled in the speed of business and the level of connectivity. In organization supply, chain can lead to higher levels of certainty and change the traditional structures into high success.

Table 2. 2. Supply chain decision strategy

Supply chain integration decisions Strategy	Tactical	Operational
Whether or not to integrate reverse logistics with the forward logistics	Decide transportation means and establish transportation routes	Logistics and operations scheduling
Allocate adequate financial resources	Establish operational policies (production and inventory)	Emphasize cost control
Categorize and define SCI Policies	Define SCI policies for each Item	SCI acquisition activities
Determine reasons, stakeholders, and issues related to SCI	Define technical support to offer (In-store, subcontractors, etc.)	Consider time value of re SCI
Evaluate internal expertise in SCI and decide about outsourcing a few or all SCI activities	Do the SCI activities (transportation, warehousing, remanufacturing, etc., in-house or subcontract)	Train personnel on SCI concepts and practices

Theory-build by qualitative research design method, results of this research underscore the importance of managing relationships to reduce uncertainty by working collaboratively toward a shared understanding of what information is relevant and how the information is most advantage used. The effective management of information flows among supply chain members is critical to gain competitive advantage in the e-commerce environment.

2.2.1.3 Types of Oilseed Product

The worldwide major oilseeds are Soybean, rapeseed, cottonseed, sunflower seed, groundnut, palm, copra, Sesame, Castro seed, maize oil and coconut oil. The major producers of oilseeds countries are USA, China, Brazil, India, Malaysia, Indonesia, Central Europe, Canada, and Argentina. According to FAO database the world oilseeds production is 449 million tons for 2010. Ethiopia has 4,500m above sea level altitudes with very different climates and produce 60 million tones oilseed. This enables Ethiopia has potential a wide range of oilseeds, in which it has a long traditional work method.

Oilseeds are the second largest export item for the Ethiopia after coffee in which more than 3 million smallholders are involved in its production. Exports actually consist of sesame and Niger seed, for which there is a growing demand in the world market. Ethiopia ranks among the top five

world producers of sesame product. It is also an important producer of Niger seed [30]. Determinants of export performance divide into external and internal components. External components include market access entry and a country's location verses international markets.

Internal components are relate to supply chain conditions foreign demand influenced by various elements. First, it is strong link to geography or the structural component. Typically, countries at the center of a fast growing region are more likely to benefit than countries situated outside that region. Second, it is like to relate to competition and trade policy or the market components, which could have, in principle, a similar impact on trade than geography. Finally, both the quantity and quality of physical infrastructures are the development components expected to play important roles [31]. Findings states, country market level and supply chain system related internal and external component complicated continuous model of Supply chain [32] . Study was to help managers solve problems for consider inventory, costs, and design in SCM and reduce inventory cost by decrease production lead- time according to capacity of each node in the supply chain studies. Supplier, factory, distributor, customer, notation, input parameter, and decision variable mathematical model construction account. Computerized decision -making tool use numerical syntax focused on the production stage of a supply chain to optimize the production system. In the aspect of quantity discounts, only the consumer and vendor were asses the idea. In fact, only a partial stage of a supply chain was elaborate the advantage and impacts in the economy [33]. Import oilseed product is the disruptions to a firm's operations and supply chain can be costive to the firm and investors.

Many companies subjected to such disruptions, and the impact on company value varies widely. Large sample empirical analysis of quantitative archival data the rate of improvement to operational efficiency can magnify the impact on firm value of some disruptions while, little impact on other disruptions. The stock market distinctions system consider both in the nature of the disruption and the characteristics of the disrupted firm are members of a supply chain and their relationships [34]. The objectives to compile a bibliographic summary of the accessible papers which generally define a supply chain, the types of supply chain integration and their key players, based on the existing integration. It is also aim to highlight the importance such scarcity areas, as perfor-

mance measurement, from the side of the relationships, business enterprise. Supply chain integration distinctly not complete in a single definition of company, but supply chain integration is entered connected of two or more integrated company to share their common use.

Today, business units do not think over all wide with each other individual on the market, but as members of a supply chain, deliver goods or service to their consumers in joint collaboration. Participants cooperate in the process of purchase, production and sell; their mutual interest is to satisfy consumer demand, thus all the basic material and spare parts producers, product assemblers, processing units, wholesalers and retailers are parts of a chain. Collaborated supply chain view of companies is a business philosophy found on trust, commitment, and cooperation mutual objectives and executive managerial support, as well as the acceptance and understanding of mutual dependence, evolutions of trade competition supply chain management system [35]. Develop software to automatically control a manufacturing company and maximize profits while compete with adversarial manufacturers for limited and variable product demand and component supply. Trade computation game for supply chain creates simulation to distribute flow service. Trade agent computation supply chain management server has two main tasks run individual games and support competition management system.

2.2.1.2 Supply Chain Literature Summary

Table 2. 3: Supply chain literature summary

Problem	Method	Finding	Limitation/Gap	Author
The impact of e-commerce in supply chain	Theory building by qualitative research design method.	The importance of managing to reduce information degradation used to tap the main root.	Does not consider the quality assurance level and the work habit, how to satisfy customer.	Susan L. Golicic, Donna F. Davis, Teresa M. McCarthy and John T. Mentzer
Distribution of raw materials	Both theoretical and holistic model develop	SC is the total chain of exchange from original source of raw material, through various firms involved in extracting and processing raw materials, manufacturing,	Product or service to the end customer, linking flows from raw material supply to final delivery	Saunders, (1997)

		assembling, distributing, and retailing to end customers.		
When Supply-Chain disruptions	sample empirical analysis of quantitative achievement	The rate of improvement to operational efficiency can magnify the impact on firm value.	The study not quantifies the supply chain line and the impact of distribution center in oilseed product.	Ananth Ramany , 2012
Members of a supply chain and their relationship	literature review of supply chain and supply chain management	Collaborated supply chain view of companies is a business philosophy founded on trust, commitment, and co-operation mutual objectives and executive managerial support, as well as the acceptance and understanding of mutual dependence.	Reflect the integration point together but note consider the working habit, information flow and the awareness of each individual point.	Ványi Noémi, 2011
The Impact of Industry on the Supply Chain	Structured literature review.	Traditional barriers for products and their value proposition a extremely extended therefore, existent value chains and the respective. Supply chains are to re-thought.	Technology influence only in import and export system to reduce delay time, But the trend forgot working habit and actors of supply chain integrations.	Hans-Christian Pfohl, Bourka Yahsi and tamer Kurnaz ,2015
The role of human factors in supply chains	Qualitative method, the cognitive aspects, are those that actually make or break an organization	Recruitment and promotion based on knowledge, skills and competencies used to develop supply chain integration.	Knowledge use to solve the limitation of management system but not consider the stage of supply chain level and information flow system	Marinko Jurčević, D.Sc. Morana Ivaković, Darko Babić,

Evolution of a supply chain management game	Hypothesis formulation	Simulation experiment design and analysis to increase the scientific value of competition results. Working against the need for agent development during running competitions.	The hypothesis consider supplier capacity but not the barriers inventory system, distribution center, work habit and awareness development.	Joakim Eriksson, Niclas Finne and Sverker Jansson, 2006
How to integrate supply chain distribution	Narrative	Identifies the importance of integration within supply chain.	The assessment consider the importance but not list the drawback of supply chain.	Ellram Cooper, (1993)
How to develop new supply chain management	Conceptual way	Highlights the importance of supplier relationships in achieving supply chain objectives.	Define the supply chain relationship but not show how to integrate and handle the goals.	Berry et al, (1994)
How to increase SC relationship and cost reduction	Qualitative assessment	Signifies of SC importance relationships, customer focus and cost reduction	Consider only the cost reduction but not attempt the focus area.	Christopher, (1998)
The case for production planning and distribution of industry	An exple- tory case study	integration of production distribution system by increasing level of benefits and complexity	The system is representative and logic when production is pulled and constrained not reflect the integration of industry system	Fabio Nonino, (2007)
How to develop supply chain management in financial service industry	Exple tory research based on al- tretaur re- view and case study	Ability to link financial matching activates to supply chain further business process	Small number of sampling case	Alea Fairchild, (2005)
Simultaneously integrate customer and supplier	Hypothesis by hierar- chical re- gression analysis	Customer integration positively impact on efficiency	Consider only the focal up- stream and downstream integration	Pamela Danese , (2011)

2.2.1.2 Literature Review Summary

The developed models not consider how to integrate transportation system, information system and the advantage of developing a collection and distribution center to deliver products from investors to industries. They miss proper network design leads to high expense. The scarcity of product happen due to lack of optimization technique. The other limitation of the researchers are they did not pay an attention the impact of drivers and barriers of supply chain integration. Even if the products will not give awareness and cheek quality producer in the required period of time which has negative effect in the consumption of oilseed product for industries manufacturing process. In supply chain integration, there are different uncertainties affect the system. The most literatures, relive the uncertainties of supply chain, quantity, quality, awareness, work culture, distribution center and transportation are not taken in to considerations in order to avoid the uncertainties that make to satisfy the customer needs. Most of the literatures deal in to products with export, and cost minimization system. To come up cost minimization of products and scarcity assess the integration of oilseed producers and manufacturers. Therefore, this research focuses on supply chain integration theoretical model by analyzing the barriers and drivers of supply chain integration and how to develop a transportation model with proper collection and distribution center in order to avoid scarcity of oilseed products in manufacturing industries of W/Gojjam.

2.2.1.3 Comparison Decision from Literature Table and Stage of Supply Chain

According to, (Jayant, 2016) supply chain is the collection of processes and resources required to make and deliver a product to the final customer. Supply chain affected on the information of delivering time of e-commerce (Susan L. Golicic and Donna).

According to (Teresa) supply chain use for managing to reduce information degradation used to tap the main root.

According to, (Ványi Noemi) members of supply chain are listed to every situation to reduce flow gape .In the evolution of supply chain management trade agent computation game supply chain compensated in the simulation of each activities of quality, quantity, relevance of system and information type are the independents of supply chain integration (Joakim Eriksson, Niclas Finne and Sverker Janson).

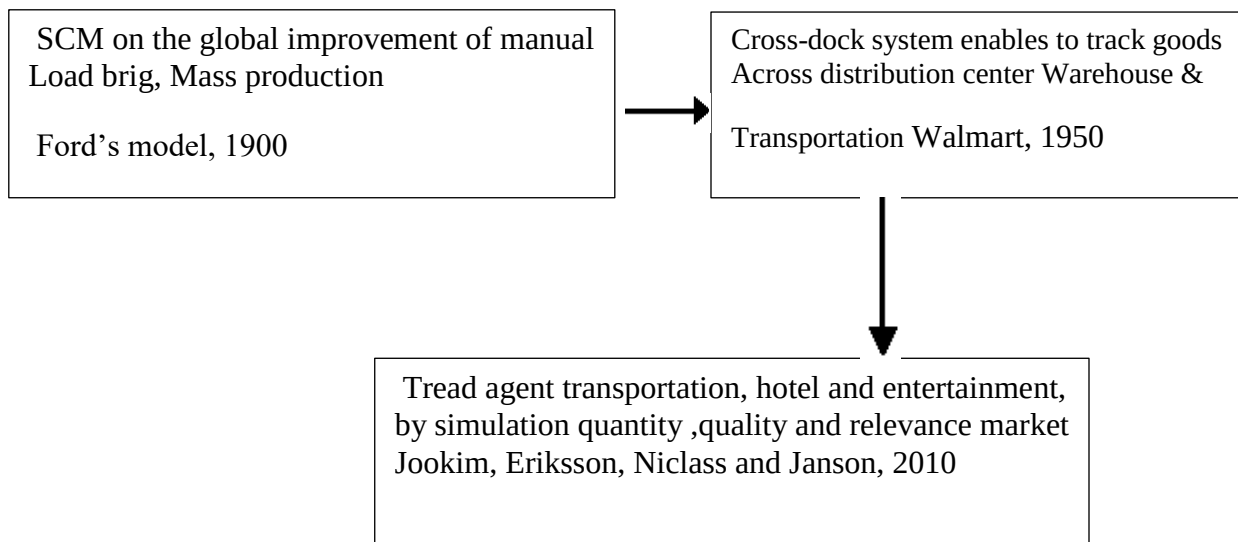


Figure 2.1. Stage of Supply Chain Evolution [36]

2.2.2 Supply Chain Models

The stage of supply chain development According to ,(Ford's model) in the innovation of mass production and manual use of palate traveling system in 1900's Supply chain develop to change the system in technological global way. Wal-Mart states, which supply chain integration emerged between cross - dock track to enable traveling of goods across their distribution center and warehouse viability. Nevertheless (Joakim Eriksson, Niclas Finne and Sverker Janson) Supply chain develop greatly to software in simulation system to compute the market by quality, quantity and relevance of the system to fulfill the total customer infrastructure in the market aspect hotel, transportation and entertainment. One is used in our country aspect it depend on the develop character of the market of supply and demand in the manufacturing industry. Supply chain oilseed product and manufacturing industry development of in Ethiopian low. Some industries go in the head of supply chain integration progress, there is challenge scarcity of resources and capacity to actively pursue to the retailer [8].

2.2 Supply Chain Management

Supply chain management divided into three main activities purchase, manufacture and transport. The role of human factors in supply chains [37], to call attention to the importance of human factors in the activity of each enterprise and the necessity of creating the structure of enterprises

and caring for organizational culture in line with available human resources. This paper also presents an overview of the structure of global supply chain networks and the human factors dimensions that affect their success.

Approach:-by qualitative method, the cognitive aspects are those that actually make or break an organization.

- ☐ High level of investment in training and training of employees at work
- ☐ High level of teamwork and team culture
- ☐ Development of multiple skills of employees
- ☐ Better communication of managers, employees, and better working relations
- ☐ Commitment to quality
- ☐ Stimulation of initiatives and suggestions of employees
- ☐ Creation of organizational status symbol

According to [38] illustrates the evolution of Supply Chain Management from a purchasing and supply perspective, as well as a transportation and logistics perspective.

2.3.1 The Impact of Supply Chain on Market Performance

The impact of supply chain management on competitive advantage and organizational performance [39] .This is empirically test a framework identifying the relationships among SCM practices, competitive advantage and organizational performance. The Impact of supply chain management on competitive organization practice, competitive advantage, and organizational performance. Structural model analysis validation displays the path diagram result from chain value.

Supply chain management practices defined as the set of activities undertaken by an organization to promote effective management of its supply chain. The results indicate that higher levels of Supply chain management practice can lead to enhanced competitive advantage and improved organizational performance. Competitive advantage can have a direct, positive impact on organizational performance. The flow of framework level in one direction not circulated there is one breaking point. Identify six aspects of SCM practice through factor analysis: supply chain integration, information sharing, supply chain characteristics, customer service management, and geographical proximity and just in time capability practice.

In supply chain management information shearing is regarded one of the main drivers to improve the overall supply chain integration. Supply chain coordination occurs when all stages of supply chain line toward the objective of benefits are maximized and total profitability supply chain based on shard information.

Lack of coordination results a significant loss of supply chain profit. Coordination among different stages in supply chain requires each stage to shear appropriate information to other division. Information shearing is the main advantage to success of the supply chain goal that jumps in front of integration direction implication. Information transferred in different way such like television, journals, photo, and all electronic media. Strategic suppliers develop the way of customer integration before plan the total supplier of manufacturing process output. Organization performances of supply chain management develop through the total integration of customer partnership value.

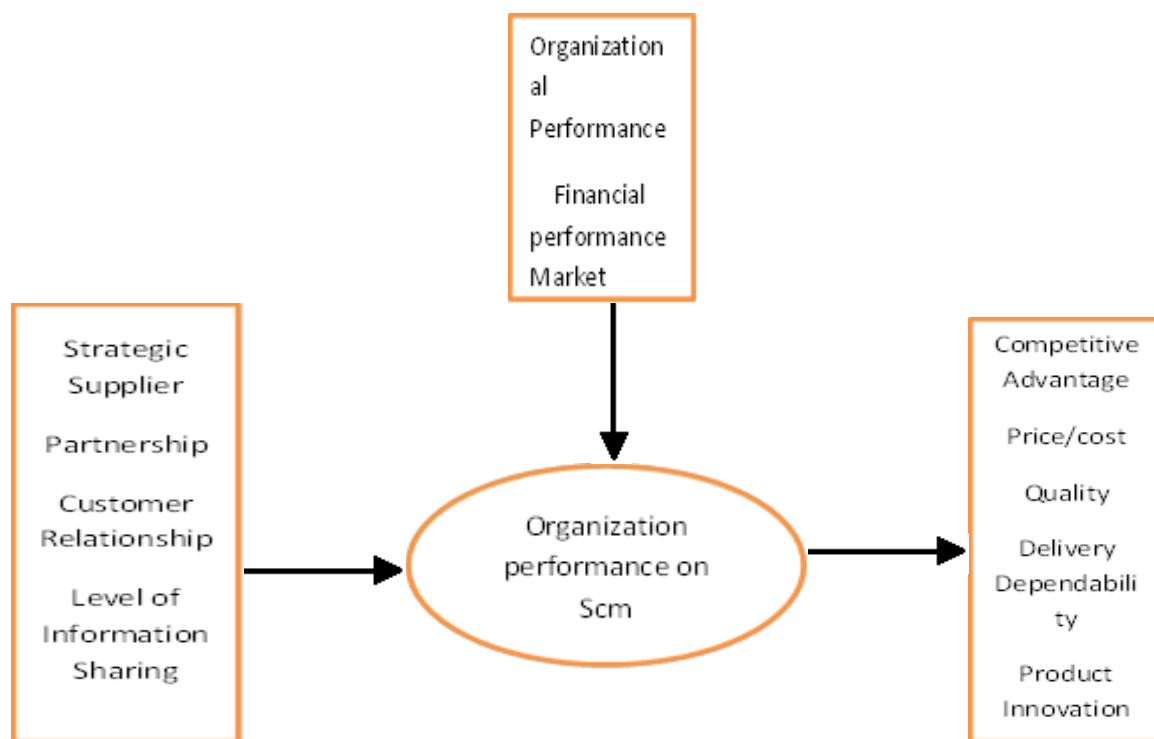


Figure 2.2. Chain practice flow chain [40]

2.3.2 Challenges of Supply Chain Integration

According to (Joakim, 2012), factors that make it difficult to determine and allocate resources to customer systems in supply chain integration, factors like transport, quality and the amount of

product delivery. The challenges of supply chain integration are caused due to different factors which are [41] the main challenges supply chain integration are:

- Lack of formal product transport procedures
- Lack of performance measurement for product quality process efficiency
- Large variations in demand,supply, quality and quantity of product relation
- Delaye time oilseed product transport this reduce their market value
- Risk of product balance into market wante
- Lack of local market competence in inspection, evaluation and new technology introduction

There are only a few companies that have formaliz information system and quality standard operating procedures for the management of supply chain integration.

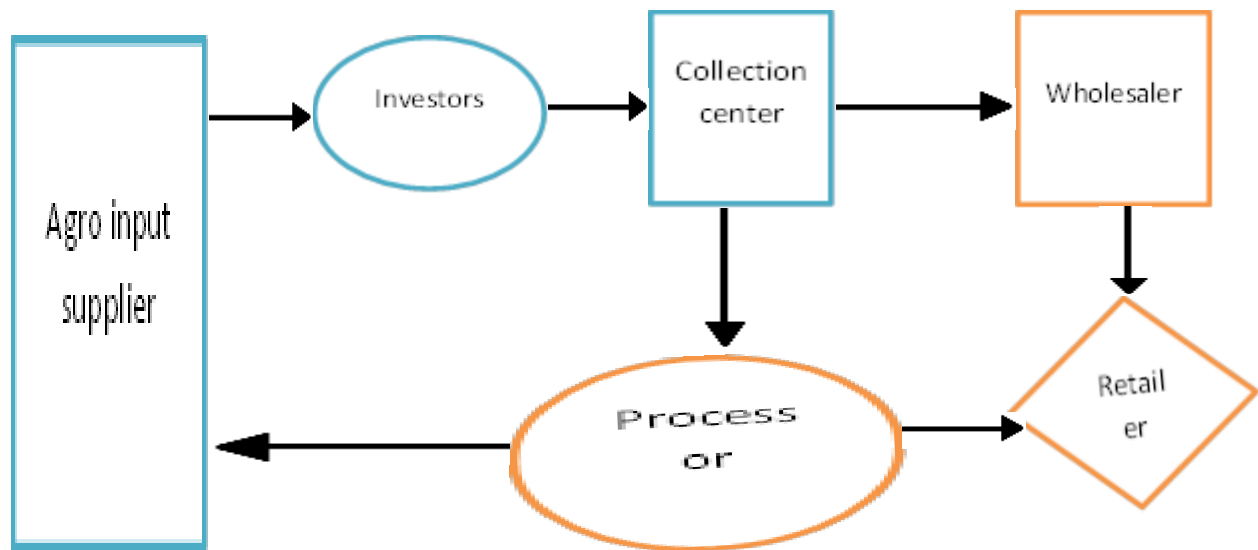


Figure 2. 3 *supply chain structure in oilseed*

Table 2. 4 Ethiopia oilseed consumption in average

Name type	00/01	½	02/03	03/04	04/05	05/06
Line seed	6	51	43	77	151	126
Niger seed	12	84	85	119	187	147
sesame	19	39	36	61	115	149
Ground nut	2	13	11	21	29	34
Sunflower	6	4	2	5	7	6
Rapeseed	15	17	20	29	36	24
Soybean	26	27	37	37	125	14

2.3 Supply Chain Integration Level

The interrelationship among the departments, functions, or business units within the firm that source make and deliver products and the external relationships with entities outside the enterprise, including the network of direct suppliers and their suppliers and direct customers and their customers [41].

Exploring the impact of Information Communication Technology on integration in supply chain [42] supply chain network explore to the complexity of ICT on the control of supply chain integration then empirical studies used to develop model. The study acquire the model develop from literature and incorporates areas of control, ICT, integration dimensions, ICT effects, influencing factors and supply chain integration. Supply chain integration composition of a whole by adding together or combining the separate parts [43].

External integration may also include operational integration such as optimizing processes and material flows between companies [44]. Supply chain control includes sales and operation planning, master planning, material and capacity planning, purchase and workshop planning, measurement and control planning are the three division of supply character.

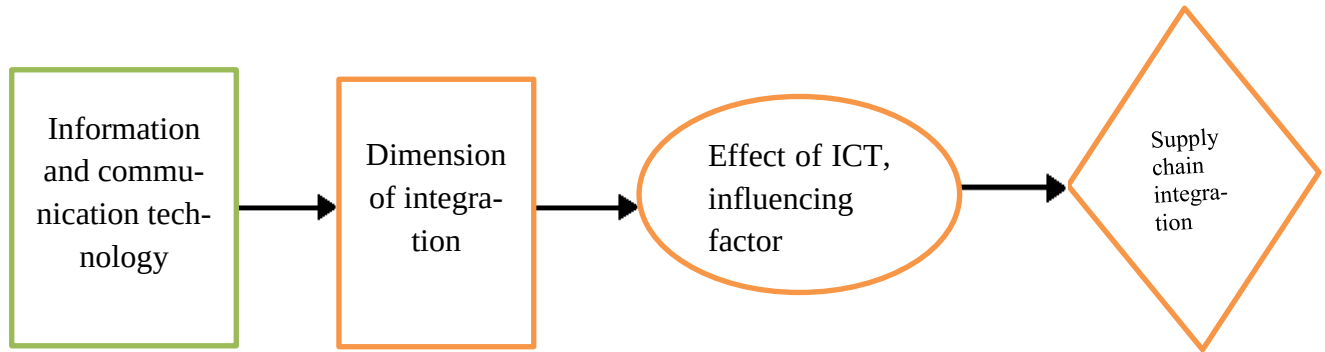


Figure 2. 4. Supply chain control structure

The effect of procurement on the integration of the supply chain that construction industry [45]. Management of the supply chain area how to make benefits and other methods successful, how to select and appoint suppliers to manage the integrated supply chain and to build trust.

The leader control the whole process and fined the solution by approving the question on the case company, understand the whole process of construction by each trader. However, early involvement of suppliers and subcontractors effective management and leadership for integrated supply chain effective communication and feedback on performance are the main point of supply chain construction.

Integration of developing countries in global supply chains, include through add value to their exports [46] how to segment or integrate developing countries into global supply chain production network system in qualitative method by interview the industry manager about supply chain interaction, business supporting assistance is available to demonstrate the integration of supply chain development for the countries.

To the extents manufacturing firms integrate with their supply chain members, improve their performance, and their external and internal drivers of supply chain members [47] empirical studies by develop the theory and framework of supply chain integration demand uncertainty and technology uncertainty induce internal integration performance.

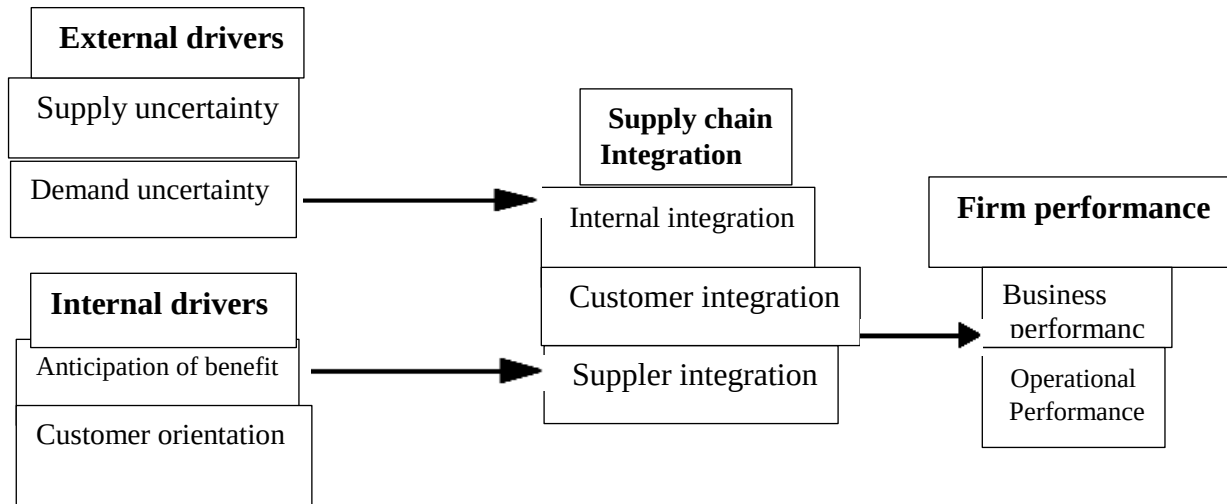


Figure 2. 5 Supply chain driver's elements [48].

The behavior of firm work culture or strategy is one driver of supply chain integration on the firm development. The challenges of supply chain integration on manufacturing company [48], the literature review and explication of the aged difference between supply chain integration relate to any kind of challenges to any business domain; study many cases from different industries working behavior and conclude the same administration result.

Supply chain integration as the competency of IT and firm's market performance and through mediate role of supply chain agility [49]. Information systems in supply chain integration and management [50], the information system affects the supply chain integration and management. Some studies compacted by literature survey, reviewed by primary, secondary and framework citation are the main working tools of the study.

Infrastructure for information technology in SCM consists of Internet connectivity, hardware and software including application systems integration time and power interchangeability. Companies are attempt to find ways to improve their flexibility and responsiveness and in turn on competitiveness by changing their operations strategy, methods and technologies that include the implementation of SCM paradigm and information technology the development of information technology for effective SCM information systems in supply chain integration and management practice.

In the firm development one issue the strategic importance of planning, controlling and designing a supply chain as whole [51]. The synthesis past supply chain model effort and identifies key challenges and opportunity associated with supply chain mode. One of the most critical drivers of supply chain enhancing visibility through information sharing mechanism and linkage supply chain collaborates [52].

In an increasing competitive environment there are many uncertain or random elements in the supply chain such as customer demand, lead time and production fluctuation, to correct up this uncertainty and random element take account stochastic modeling [53] supply chain integration challenges and solution compensate the sickness of supply chain integration [54].

Supply Chain Integration to Enhance the Performance of Ethiopian manufacturing Industry [55]. The major problems contributing for the poor performance of manufacturing industry are mismanagement of the flows of material, information and financial flows of a supply chain and lack of integration the internal, supplier, customer and integration positive and strongly correlated with performance company product quality and competitiveness. Supply chain integration compromise effective communication system with suppliers about production capacity, production schedule and product development. sharing information about the inventory status and lack of long-term relationships, internal lack of internal communication about plan, collaboration on company development program, human resource problems to analyze this trajectory of the use of collaborative platforms to integrate supply chains based on two cases depicting different aspects of implementing supply chain collaboration practices [56].

To investigate the aspects of using collaborative platforms for the integration of supply chains, a qualitative research approach adopt and developed through two case studies in companies from the manufacturing industry.

Table 2. 5. Integration summary

Problem	Method	Finding	Framework	author
How to explore complexity of ICT on the control of supply chain integration.	literature review and empirical studies used to develop model	Making up or composition of a whole by adding together or combining the separate parts or elements in effects, influence factors.	Information technology. Supply chain integration, dimension of integration, effect of integration,	Ntnu S.P. Andersen, 1989
Effect of procurement on the integration of the supply chain within the construction industry,	By qualitative method	Effective communication and feedback on performance are the main effect of supply chain in construction.	Need, procure, develop and implement are the framework division of effect of construction integration in supply chain.	Malik M.A. Khalfan, Peter McDermott, Ruben Vrijhoef, Salman Asad,2002
Integration of developing countries in global supply chains in and value adding	Hypothetical analysis by statistical tool	Business supporting assistance is available to demonstrate the integration of supply chain development for the countries capacity.	Sales, manufacturing, product specification, post sales distribution and market analysis.	UNCTAD secretariat,2011
The driver of supply chain	Empirical study approach	Demand uncertainty and technology uncertainty induce internal integration	External (supply,demand,technology) and internal driver anticipation of business, customer orientation ,lead to supply chain integration to firm potential	Erlinda yunus , 2013
The challenges of supply chain integration on manufacturing industry	Litterateur review and expletory description about aged practice of supply integration	Supply chain challenge affects business probation.	List the factors and level each factor in percentage and integrate them	Hussain A.H Awad, Mohammad Othman Nassar, 2010
Information systems in supply chain integration and management	by litterateur survey, review using primary, secondary and framework citation	Company integrate every component in strategically system	Implementation about supply chain information system combined by divert integration system	Gunasekaran , E.W.T. Ngai, 2003

The main issue that strategic importance of planning, controlling and designing supply chain direction	Synthesis model related strategic plan	supply chain such as customer demand, lead time and production fluctuation, to correct up uncertainty and random variability	Specify the correct variables and compensate the individual potential	Hokey Min, Gengui Zhou, 2002
The major problems contributing for the poor performance of manufacturing industry are mismanagement	Qualitative analysis	Internal, supplier, customer and integration are positively and strongly correlated with performance company product quality and competitiveness	Supplier integration, company manufacturing and customer agent, consumer, firm performance and customer integration	Tsion Ale-mayehu, 2017

2.4 Preliminary Literature Review

Supply chain integration is an offshoot of supply chain management. Scholars has viewed supply chain management as all the activities involved from upstream suppliers to downstream distributors and retailers to fulfill customer request [57].

Supply chain has always been about companies working together to achieve a purpose, these relationships have always involves some degree of collaboration to solve bottlenecks in the supply chain network and overcome bumps in demand and supply. An integrated supply chain requires continuous information flows that in turn assist to achieve the best product flows [57].

Supply chain integration as the level or intensity of information sharing and collaboration among internal functions and between value chain partners including customers and suppliers. SCI in three levels including integration with suppliers, integration with customers and Intra-organizational integration, allows firms to achieve increased company goal. Integration involves collaboration work together between buyers and suppliers, joint product development, common systems and share truth information [58].

The integration of supply chain management has been the subject of significant debate and discussion. As organizations seek to develop partnerships and more information that is effective links with trading partners, internal processes become interlinked and span the traditional boundaries of

firms. Physical logistics become more dependent on information technologies, and these technologies can become enablers of further cooperative arrangements. Firms are extended enterprise as a network of processes, relationships and technologies creating an inter-dependence and shared destiny. The truly strategic nature of supply chain management thus becomes apparent for participating companies, with successful implementation becoming a source of competitive advantage.

The transformation of production system both major domestic and export agricultural commodities requires the existence of efficient marketing system that can transfer the produced agricultural commodities from the point of production to the required market for both domestic consumption and export the required quantity and quality at the required time at the least possible cost. Thus, scientific investigation to identify the marketing constraints and opportunities for the sector as whole and by sector and commodity in particular is important to tackle the constraints and to utilize the opportunities [59].

Supply Chain Management is primarily concerned with coordination of the flow of the business process output of one actor to the input of another actor's processes. The main flows among supply chain business processes are products, order demand and supply information [60].

Agro-industry constitutes all the post-harvest activities involved in the transformation, preservation and preparation of agricultural products for the consumption of food and non-food products. Agro-processing is the "combination of manufacturing available products that processes raw materials and bi products developed from the agricultural supported sector. This includes products organized from agriculture suppliers, manufacturers, forestry founders and mixed investors. Captured within agro-industry are diverse ranges of primary and secondary post-harvest activities, and involves varying levels of scale, complexity, labor cost, and technology intensity [61].

Under the Ethiopian context, the type of production scale, location of production, and the nature of the product determine manufacturing capacity of agricultural commodities. Accordingly, the agricultural production and livestock sector has different systems. Among the crops, one can distinguish cereal, oil crops, pulses, vegetable, and fruits processing systems. Supply chain is a complex process which requires the best practices to achieve the desired organizational goal which is basically the optimization of profits. Supply chain management practices contribute 50% to the profitability and performance of any organization [62].

A break of two or better three, years between oilseed rape crops within the rotation is recommended to avoid the increase in pests and diseases that may be caused by short oilseed rape rotations [63]

One can also further distinguish within the different groups of agriculture crops different marketing systems. Among oil crops, there is a distinct supply system for nudge, sesame and groundnuts. Oilseed crops are the focus of this study, has unique supply chain integration system because the production system of industry.

The past study of supply chain is different research review that the general chain of an organization and its integration. The integration in vertical, horizontal and inter organization. Value chain analysis, agricultural and food value chain supply chain management those review the supply chain drivers and chain barriers. In the case of barriers, more work this limited study needs than the past study for each individual chain system.

The integration of supply chain considers for individual capacity to the overall accordant demand can be level there is missing of industry performance. Supply value chain spans input companies, farmers, traders, food companies and retailers, all of whom must ultimately satisfy the varying demands of the consumer in a sustainable manner and returned back to got the manufacturer to furnish the system flow. What is the missed from the past studies was traditional, cultural; awareness creation and food process are lost. Farming system and cultivation in integrated supply chain of oilseed product and manufacturing industry. Most study triangulates the line of the market deduction but not their supply chain from individual supplier; work habit and distribution system, rather than export and import item.

2.4.1 Supply Chain Cooperation

The peasant associations increase their dairy system in supply chain cooperation short time delivery [64]. Sample control view implication and lab data interpretation on the product processing time natural lactic formation the specific gravity of each stage difference lead unwinds to in one flow line of producer, consumer and cooperative delimitation. The dairy processes of the region fully incorporated in individual study for farmer want acceptance by consider natural processing and technological support. Map flow about guideline in the market pro aviation work adaptation. The cooperating actors share their total profit in shear alliances [65]. The coalitions expected to be formed cooperation. The analyses the performance of companies characterized by varying approaches to formal and informal cooperation within the supply chain [66]. The study depending

on the sample company identified and compared the market performance of three groups of companies: cooperation with external entities only formally, cooperating only informally and cooperating both formally and informal. Formal cooperation can be based on formal contracts between suppliers and purchasers or formed by entities sharing common interests [67]

Formal cooperation

- ✓ Easy to identify by surrounding and cooperating entities.
- ✓ Contractual (development of cooperation progresses quickly).
- ✓ Cooperation does not always have a partnership nature; inter organizational trust may be at low level.
- ✓ Initiated by senior management, usually not engaged in a direct exchange.

Informal cooperation

- ✓ Difficulty to characterizing as well as identifying links.
- ✓ Initiated via interaction (its development requires more time).
- ✓ Cooperation based upon trust.
- ✓ Developed by entities directly engaged in cooperation line employees [68].

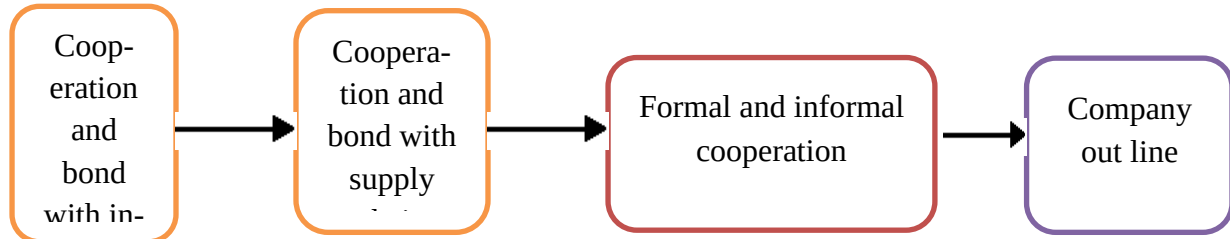


Figure 2. 6. Formal and informal cooperation within supply chains and company performance [69]

SMEs in supply chain network and computation [70] cooperation in supply chains [71] how to share the savings of the decreased bullwhip effect in the cooperative model. In the mathematical solving language, range tool answered by transferable utility cooperative game theory tool both firms minimize their relevant costs, and two cases are examine: the supplier and the manufacturer minimize their relevant costs in a decentralized and in a centralized cooperative way.

2.4.2 Supply Chain Participation

To benefit in manufacturing company to sure competent [72], qualitative analysis guided on framework grade the paper reveals that the comparative advantage of low-cost labor is not sustainable. Thus, for sustain growth and prosperity, Vietnamese footwear manufacturers should find

other advantages in manufacturing. Reducing challenges and increasing opportunities based mainly on national comparative advantages. Method of approach on the field comparative discovered on the part of variability.

The factors of significance in determining participation are land under cultivation, total income, price of output, ownership of productive assets and vehicular transport; while the remaining variables were statistically insignificant in determining supply chain participation. Ways of flow about the study leave some point of view about participation actor in supply chain [73], semi-structured interviews with firm representatives and original survey data to study the factors influence farmers' participation in modern supply chains in the Ecuadorian blackberry sector. Different probity model specifications, find that individual farmers' social networks are important determinants for participation in modern supply chains in an environment characterized by a homogenous farm sector. Further research to explore the specific pathways which social networks exert their influence. The stage of value chain added participation developed [74]. Farmers' participation and supply chain issues [75] the market on the platform for farmers to earn better income, hence enabling growth in their business ventures, sample reviewed traveling to come up the level of farmer participation on the market was largely participated by seller's who mark farms produce bought from the farmers and wholesalers.

The global value chain study assess that determine factors and economic effects of global value chain participation across developing countries in five sub-regions in Asia, Africa and the Middle East [76]. To contribute the ongoing debate about the extent and desirability of integration into regional and global value chains, to identify the benefits associated with wider participation. Global value chains (GVC) have become a dominant feature of world trade and investment, encompassing developing, emerging, and developed economies [77].

The empirical analysis presented in the report provides a starting point for policymakers in the regions to assess their countries' GVC engagement, and to consider policy options. The buyer and the seller activities in value chains can bring about economic benefits, highlighting the importance of understanding what determines participation and identifying the scope that governments may have in shaping it. In particular, low import tariffs, both at home and faced in export markets, and engagement in regional trading agreements can facilitate backward and forward GVC engagement.

Inward openness to foreign direct investment also has a significant association with backward integration. Trade facilitation and, logistics performance, intellectual property protection, and the quality of infrastructure and institutions all estimated to have impacts on GVC integration.

According, to Humphrey and Schmitz (2002) distinguish between the types of upgrading:

- ❖ Process upgrading: where firms seen to gain in terms of efficiency in producing a given type of output.
- ❖ Product upgrading: where firms engage in the production of more sophisticated products.
- ❖ Functional upgrading: where firms acquire new functions within a given value chain.
- ❖ Chain upgrading: where firms move into different value chains.

Supply Chain Connectivity Enhancing Participation in the Global Supply Chain [78],

Supply chain management, describes the barriers to enhancing participation in global supply chain, analyzes the various measures of supply chain performance the study suggests steps for the development to fully reap the benefits of the global value chain. The World Economic Forum (WEF) report classifies supply chain barriers [79],

- (1) Market access,
- (2) Border administration,
- (3) Telecomm and transport infrastructure
- (4) Business environment

2.4.3 Supply Chain Collaboration

Collaboration in the UK can be traced back to the 1980s, when manufacturers began to realize that complex bespoke supply [80] chains and even product development processes had become too costly, and they could share resources with rivals without compromising product integrity. Since the early 1990s, collaboration has been a prevalent theme in supply chain management.

The concept of collaboration grounded in the widely accepted belief that companies generate greater benefits and reduce risks by sharing information and working together. The current economic climate impacted by many forces such as international financial downgrades, debt crises, and socio-economic and political unrest [80].

Supply chain collaboration for organization and enterprises work together to come up common future development. It departure from the anchor point of discreteness that underlies spot market transactions to a relational exchange, as the roles of supplier and buyer no longer narrowly defined in terms of the simple transfer of ownership of products [81].

Collaboration appears as enterprises recognize cases where working and operating [82] Measurement for supply chain collaboration and supply chain performance of manufacturing companies integrated on the resource value chain system [83] Supply chain management (SCM) has changed from a strategically decoupled to strategically coupled area of research, as such partners have to improve relationships with one another. The study is to model and measure the relationship between the trust-intertwined Supply chain collaborative process and supply chain performance of manufacturing companies.

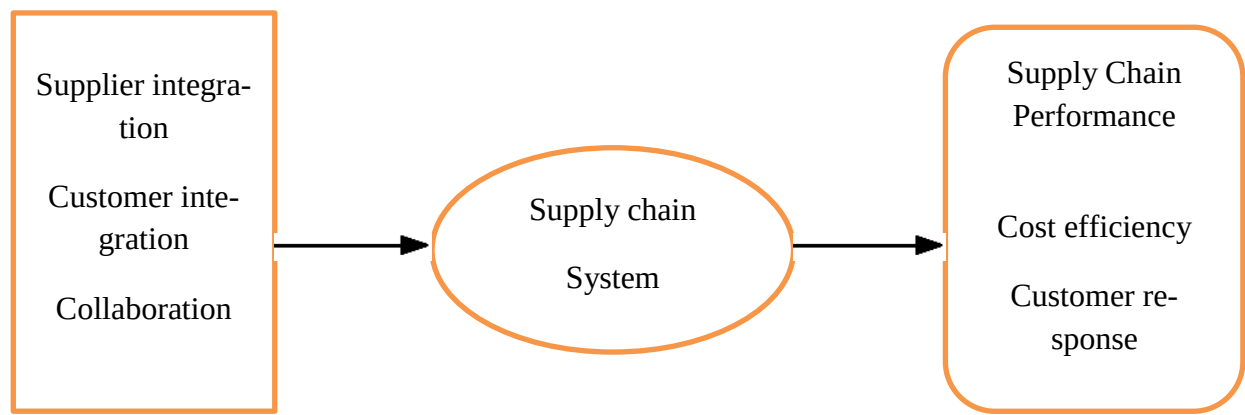


Figure 2. 7 Supply Chain Collaboration systems

To examine different aspects of collaboration in supply chain [84] objective of developing theory for supply chain collaboration major findings shows that supply chain collaboration can be applied into different areas like process, planning, forecasting, transportation distribution and the prime motivating factors behind the manufacturing companies entering into collaboration are trust, leadership, commitment, interdependence, organizational compatibility and infrastructure technology [85].

2.4.4 Supply Chain Coordination

According to (Bowersox, 2003) Supply chain coordination emerging two or more firms voluntarily agree to integrate human, financial, technical resource to create a new, more efficient, effective and to develop relevant business. According to (Crum and Palmatier, 2004) coordination is cooperative behavior or a joint available decision-making between mutual companies to represent willingness of organization effort. Both (Finley and Srikanth, 2005) work together by share useful process, adapted technology and increase the value of customers. From Kahant about supply chain coordination states that, process based on trust, mutual respect, information share, joint together ownership of decision and collective responsibility for value outcomes. Manufacturing industries share together each useful start from two or more work centers [87].

According to Anthony, (2000) Sharing the responsibility of exchanging common planning, management, execution, and performance measurement information. Sanders and Premus says, (2005) an effective mutually shared process where from two or more firms work together have mutual understanding to common entities. According to, Simatupang and Sridharan, (2002) two or more companies working together to create a competitive advantage and profit by acting alone, Stank et al. (2003) A process of decision making among interdependent parties, involving the joint ownership of decisions and collective interaction.

2.4.5 Deriver of Supply Chain Collaboration System

Derivers of supply chain collaboration (Lewis, 1900) states increase in the market shear, asset utilization enhancement in customer service, improve quality of product, skill enhancement and economic scale development. According to (Pastier, 2000) supply chain collaboration decreases the risk of failure of product development. When (Holton, 2001) reduced inventory and rapid rate of product development and obsolescence. According (Golicic, 2002) gaining rapid access to market, (Horvath, 2001) Shearing and reduction in the cost of product development and reduce time product development.

Supply chain process collaboration and internet utilization to an international perspective of business relationships [86] the findings of an international study which primary objective was to investigate the relationships between internet utilization in business-to business relationships, collaborative efforts and their impact over supplier and customer oriented processes performance.

The analysis with the use of descriptive statistics, reliability evaluation of the research model's internal scales, path analysis and structural equation modeling to evaluate supply chain processes collaboration up- and down-stream level integration. Information technology and supply chain collaboration mediate the effects of challenge factors [87]. The study acquire that, the effect of information technology not predetermined by its technological capabilities. Rather, its effect on inter organizational collaboration is the emergent properties of the interplay between information technology and existing relationships between partners. Four dimensions of supplier-retailer relationship (trust, interdependence, long-term orientation, and information sharing) to investigate the mediating effect of existing relationships on the efficacy of information technology. Information technology reinforces and stabilizes existing inters organizational structures and arrangements, cooperative formative contexts between partners should precede the information technology based inter organizational linkage effort.

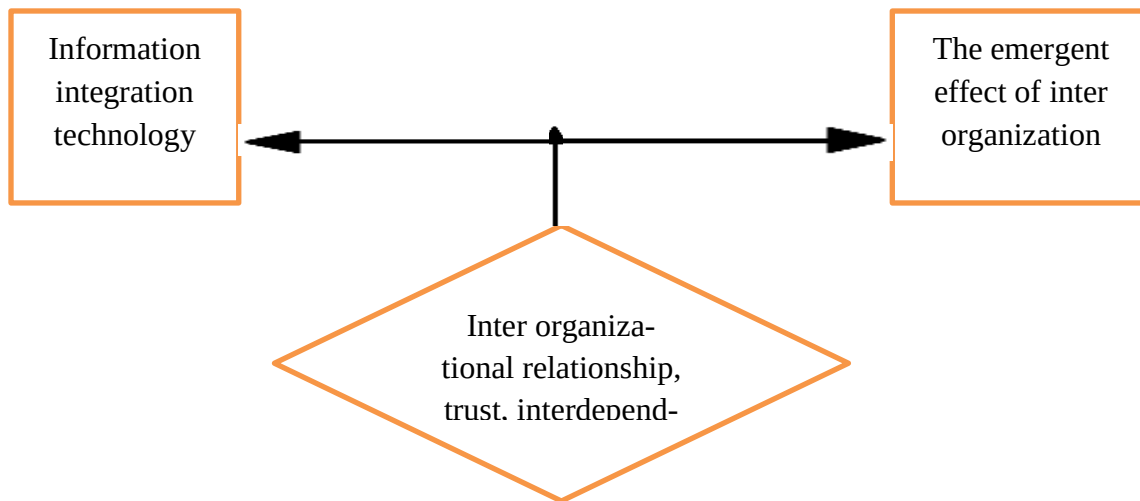


Figure 2. 8. Supply chain collaboration model IT Effect on Inter organizational Collaboration

Company strategy behavior and culture of individual company reduce the collaboration of each point company development in the integration of information viability. Organizational culture, supply chain management practices and build organization's decision level [88] . Organizational culture affects ERP decisions through influencing supply chain management practices .In order to develop measurement constructs for the survey instrument, company visits and interviews conducted, hypothesis on organizational supply chain management and framework design. In addition, there is a lack of measuring certain cultural dimension and examining its impact on information technology behavior.

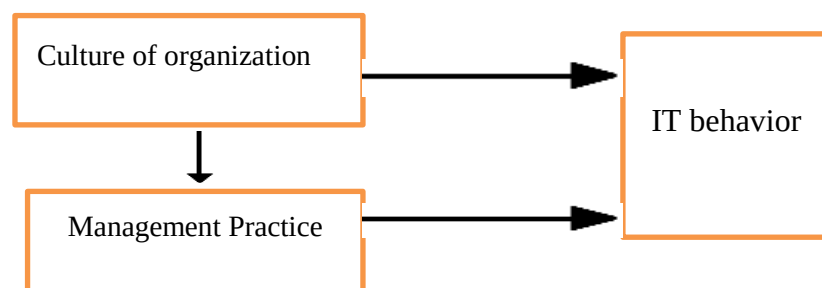


Figure 2. 9. Supply chain management frameworks [89]

The influence of collaboration in procurement relationships [90] , when coordinated actions benefit the group more than uncoordinated efforts of individual firms, despite the commonly reported benefits that can be gained in close relationships, recent research has indicated that collaboration

attempts between purchasing firms and their suppliers have not been as widespread as anticipated. How the purchasing function utilizes collaboration in its supply chain relationships. Using a survey of procurement professionals, investigates how the purchasing function utilizes collaboration in its supply chain relationships. Practice of supply chain management has not yet achieved its full potential in the procurement field. Firms seem to be maintaining a silo mentality that puts an emphasis on individual firm success rather than supply chain success.

Collaborations developed on the branch of the action points this are information shearing, decision synchronization, trust, incentive alignment, and collaboration communication those are acted together perform company performance effectively. Supply chain collaboration influence on collaboration in procurement relationships [91], supply chain segmentation approach, based on customer buying behavior and service needs, is the most appropriate context for collaboration [92]. The relationship of supply chain collaboration (SCC) and trust, two constructs that are important in the study of supply chain management [93], the transaction costs and stakeholder theories used as frameworks in analyzing the SCC and trust constructs. These constructs developed through literature review and consultation with industry experts.

The study contributes to the supply chain management by providing comprehensive and pragmatic definitions of supply chain collaboration and trust. It also provides practitioners with a listing of SCM strategies that they can employ to achieve better collaboration. Supply Chain Collaboration Making Sense of the Strategy [94] Show that the slow progress to date may be due to a lack of common understanding of these concepts, and the difficulty of integrating external collaboration with internal production and inventory control. The effectiveness of supply chain collaboration relies upon two factors: the level to which it integrates internal and external operations, and the level to which the efforts aligned to the supply chain settings in terms of the geographical dispersion, the demand pattern, and the product characteristics.

Measurement and determinant of supply chain collaboration [95], underlying the factor of collaboration level and its variation in the industry. To assess the role practice of information technology on the adoption of collaborative practice depending on the objective of the paper the researcher lead to touch the core point of the study by compromise different questioner paper and data analysis from company swept.

The low level of collaboration in traditional furniture first order measurement model followed by the second order confirmatory factor analysis that suggests that collaboration in the forest product

industry defined by four indicator shard by both customer and supplier side and two indicators specific side.

Drivers of close supply chain collaboration one size fits to all [96], the purpose investigate the antecedents of close supply chain collaboration and to develop a multi-variable conceptual model of factors that drive the need for close supply chain collaboration.

A multi-variable conceptual model developed based on literature and on a series of dyadic mini-cases in the electronics, fashion and consumer packaged goods industry.

Supply chain collaboration influenced by altitude factors. It reveals a need to integrate findings from analytical and empirical disciplines that study supply chain collaboration. The results suggest that collaborative initiatives predominantly initiated with suppliers and not with customers, and that close supply chain collaboration may lead to inertia in business relations. This study based on dynamic case studies in three different make-to-stock industries; future research may include a large-scale survey in more industries, including both make-to-order and make-to-stock environments. Based on the findings, firms can make better choices in their collaborative initiatives; based on the conceptual model, firms can identify potential areas of close supply chain collaboration. Findings from analytical and empirical literature are combined and such are combined perspective is deployed for the first time into a conceptual model of drivers of close supply chain collaboration are market and product partner.

Finally, the empirical evidence from an exploratory case study in the agro food industry, at the grow processor interface, and information regard to the way concept actually applied in small medium size enterprises (SMEs) available. Supply chain collaboration concept significant importance for the manufacturing industry; however, some constraints arise due to the nature of industry's products capacity, and the specific structure of the sector. Subsequently, collaboration in the supply chain is often limited to operational issues and to logistics related activities. Research is limited to a single case study and further qualitative testing of the conceptual model needed in order to adjust the model before large-scale testing and overall supply chain collaboration [98].

2.4.6 Effect of Supply Chain Integration Technology

Effect of Supply Chain technology, Supply Chain Collaboration and Innovation Capability on Supply Chain Performance [99], to examine the mediate effect of innovation capability on the relationships between supply chain technologies, supply chain performance, supply chain collaboration and supply chain performance. The cross-sectional survey of sample manufacturing companies model in result of mediation analysis revealed that innovation capability is a full mediator on the relationship between supply chain technology and supply chain performance as well as on supply chain collaboration and supply chain performance.

The Collaborative Supply Chain [100] managerial inertia manifested in local perspective and opportunistic behavior of chain members contribute to mismatch between supply and demand. Collaboration in the short term refers primarily to the cooperation among different chain members aimed at meeting the needs of both usual and unusual demands for product service. Identifying the managerial inertia of various chain members that prevents them from gaining mutual benefits and studying the underlying reasons for self-interested behavior are very important research issues.

A collaborative supply chain proposed to, simultaneously consider information sharing incentive alignment in consonant with appropriate performance measures and integrated policies as initiatives to mitigate the detrimental effects of managerial inertia on chain performance. Improve supply chain efficiency through convergence, collaboration, and visibility, organic supply chain collaboration [101] food industry and food chain challenge, to contributing a better understanding of the linkage between supply chain performance and possible performance improvement with respect to food quality and safety standard. To addresses, the question whether the level of collaborative planning and close supply chain relationships could help improves quality and safety of organic supply chains. Conducted as a part of the multi-disciplinary EU-wide survey of organic supply chains, in chain structural investigate the structures, performance and relationships within the Supply chains, low level of collaboration among various actors especially on cost and benefit sharing highly integrated supply chains show higher collaboration especially in the domain of decision synchronization.

Trust and collaboration appear to related with increased performance, while, the higher the perceived risk for quality and safety is, the higher the probability of supply chain collaboration. Collaborative performances of supply chain are supply chain design and government, information shearing, and establishment and maintenance of relationship are the component of financial performance and non-financial performance. Framework about Organic supply chain collaboration [102].

Supply chain collaboration and open innovation toward a new framework for network dynamic innovation capabilities [103]. Organizational models and main criticalities in implementing a collaboration strategy in order to improve the productivity of the innovation process of a company, leveraging on external sources of competences and aligning its supply chain in order to sustain its innovativeness rate required in highly competitive environment.

Collaborative demand and supply planning between partners [104], best practices for effective planning ,how to share these practices and lessons so that executives, managers and planning professionals have a standard, or a basis for consideration, as they contemplate how to improve their company's supply chain planning processes and collaborative relationships. To insights for those who want to enhance their collaborative planning and relationships, confirms existing practices

and concepts of those who are already collaborating successfully. Qualitatively studies by comparing the demand and supply fluctuation between the accelerated time duration balancing.

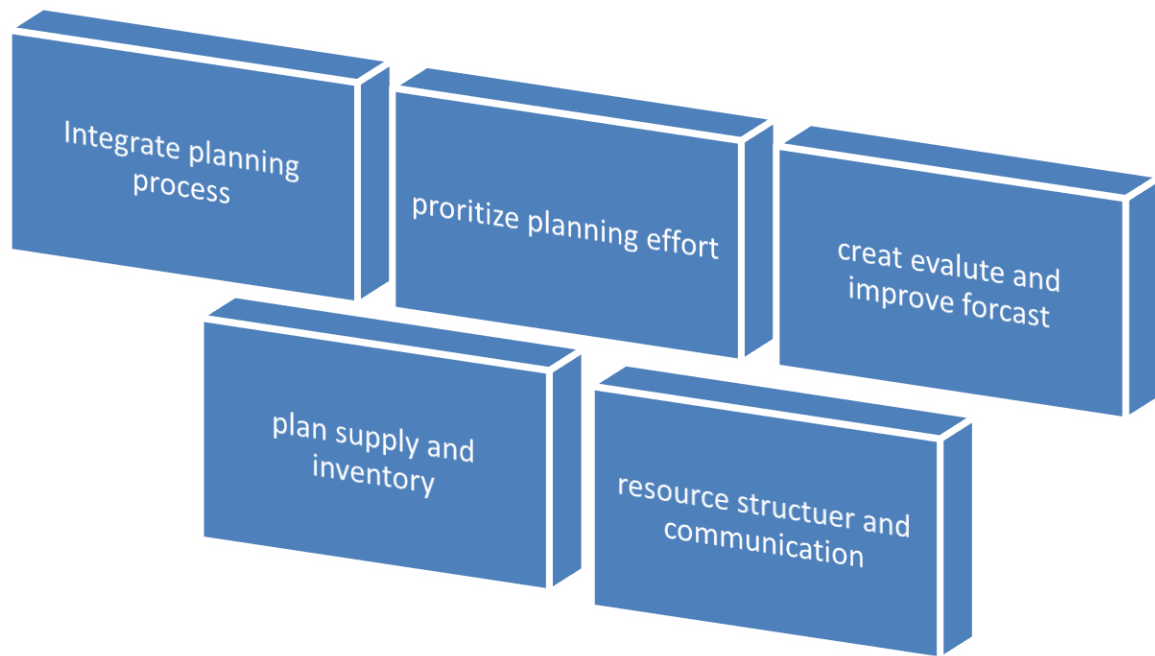


Figure 2. 10. Collaborative Planning Practices [105]

Collaborative relationships range from transaction focused to strategic partnerships. Depending on the level of collaboration between partners, the information and resource inputs may vary significantly. Subsequently, the quality of outputs or results expected from the process will be different. Collaborative relationships become more sophisticated with advanced levels of collaboration.

2.4.5.1 Level of Collaboration

The level of collaboration compressed in three parts. This are limited collaboration, partial collaboration and full collaboration.

- ❖ Limited collaboration (transaction relationship): Separate planning; little management involvement, transaction focused, common data standards, exchange data via internet.
- ❖ Partial collaboration (preferred partnership): Joint process planning, management engagement, focused on quality service, supplier and relationship managements.
- ❖ Full collaboration (strategic partnership): Integrate planning and joint decision-making, executive engagement, shard briefing, supply chain innovation, focused on advanced knowledge and aligned supply chain matrices.

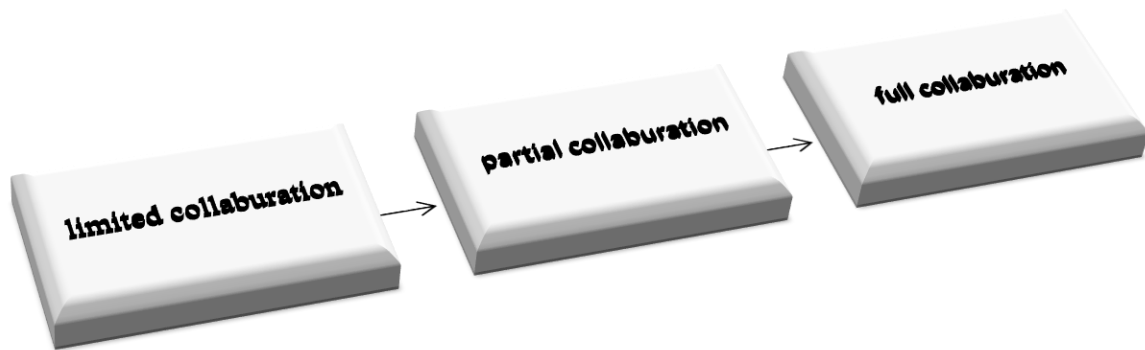


Figure 2.11. Level of collaboration low to high and value benefit, Collaboration Relationship [105]

End-to-end supply chain metrics include:

- Total supply chain response time
- Total supply chain cost to serve the customer
- Total current asset utilization and working capital
- Total fixed asset utilization
- Total supply chain inventory
- Total revenues and profits
- Total lost revenues or missed sales opportunities

The importance of strategic alignment and resource commitment for collaborative planning effort truly succeed [106]. Investing in advanced planning technology and sharing information is only the beginning of developing effective collaborative planning and building collaborative relationships. Performance and relationship management help collaborative partners build trust to adequately share risks and achieve substantial operational and financial benefits.

2.5 Collaboration of Supply Chain

Collaborative Partnership Procurement and Supplier [107] , collaboration is not developed in a short time. It takes time for trust to build into relationships. Trust tested all the time before an organization believes the other entity can called a trusted partner. The blog shows the various stages of the development of the collaborative relationship between purchaser and supplier. In every relationship, supply chain members need to prepare for variation resolution. Every entity should strive to reach a settlement amicably without resorting to mitigation.

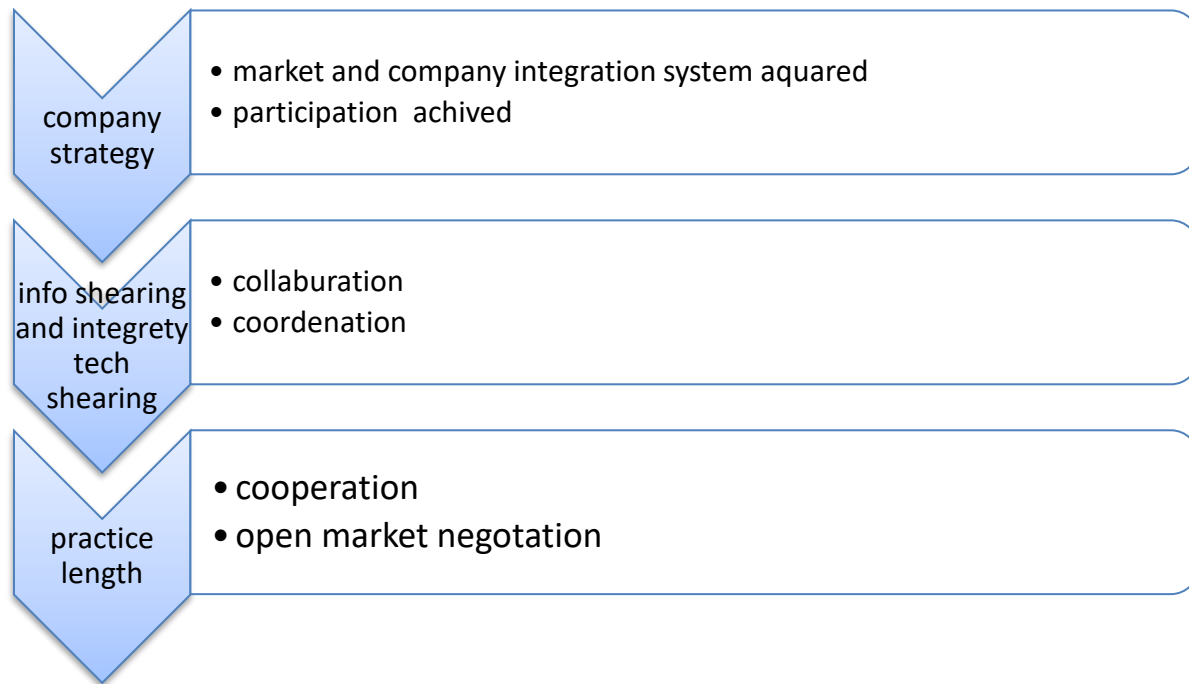


Figure 2. 12. Development of Collaborative Model integration on researcher Strategic Alliance Model [108]

2.5.1 Views of Collaboration in Different Scholars

According to (Skjoett-Larsen), collaboration two or more parties in the supply chain jointly planning a number of promotional activities and working out synchronized forecasts, on the basis of which the production and replenishment processes are determined. Planned activity are mutually information flow in correct, relation of inter organization adopted in trust full.

Collaboration refers according to Lewis, increase in market share, asset utilization, enhancement in customer service, improvement in quality of product, skill enhancement and economy scale in production and capacity. Simatupang and Sridharan states that the close cooperation among autonomous business partners or units engaging in joint efforts to effectively meet end customer needs with lower costs, incentive alignment, risk shearing and create interdependence develop the collaboration of supply chain level.

2.6 Framework of Supply Chain Control

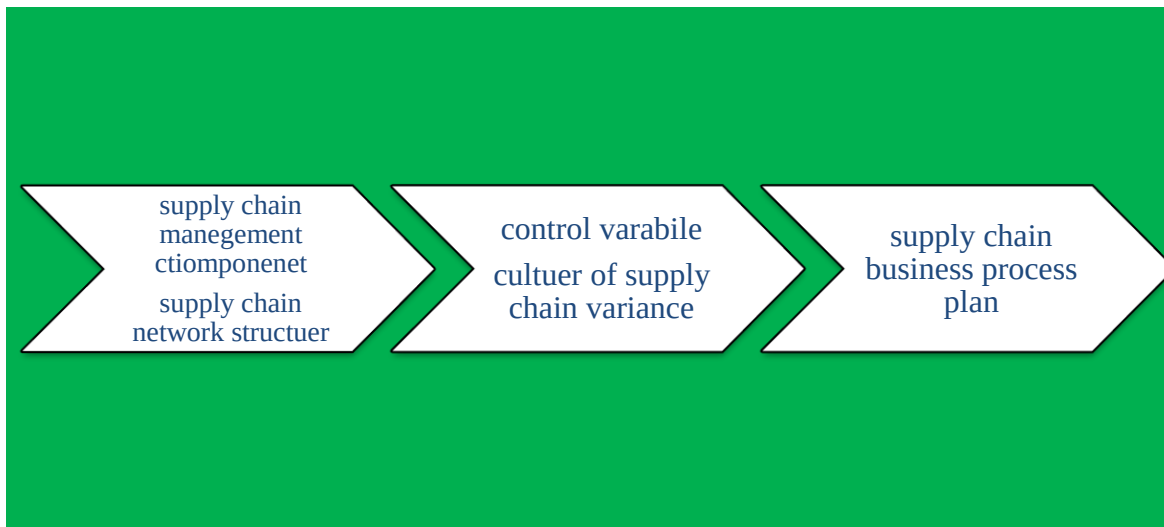


Figure 2. 13. Lambert & Cooper guide labeled of supply chain collaboration

To demonstrate the problem fitting factors in short tabulation the structure adopted and developed by the researcher. Supply chain network structure, supply chain control variables are market sensitive (chirostpher, 2000 and Agrawal shaniker 2002) ,in corporate meeting to customer want is one issue delivery speed(Jarama,chirosopher,2001) process integration availability of the target product and working together to meet specification.

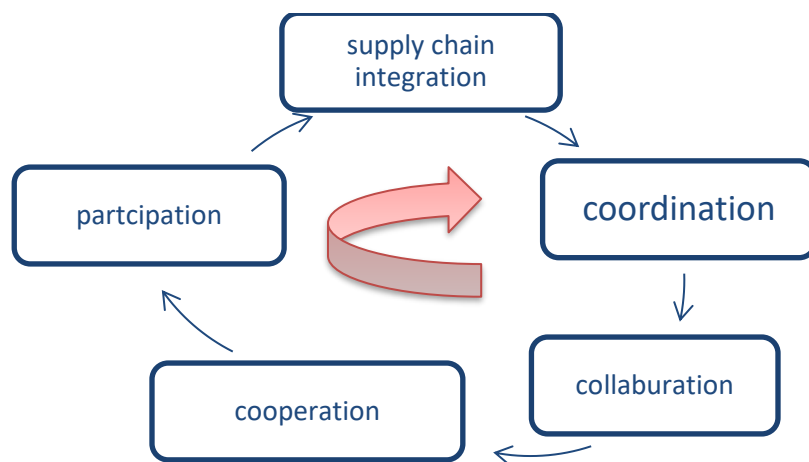


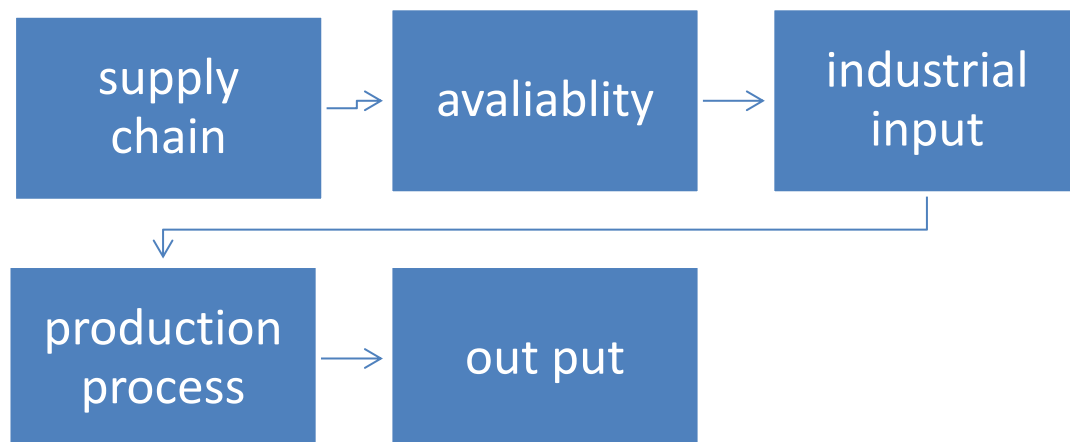
Figure 2. 14. Supply chain integration flow chart

Table 2. 6 Supply chain control variables and obstacles

Involvement Practice	Supply Chain integration Control
Supply chain equilibrium	Incentive obstacles
Customer relation	Information processing obstacles
Cost effective	Operation obstacles
Call service center	Price obstacles
Operation process	Strategic obstacle
Level of information shearing financial	
Quality of information transfer	

The extant on supply chain integration factors divided into three main streams. The first stream focuses on environmental effects such as environmental uncertainty technological uncertainty and demand uncertainty [109] . The second stream focuses on the effects that inter-organizational factors such as trust, power and commitment have on the relationships that firms have with their suppliers or customers [110]. The third stream focuses on firm-level factors such as strategy (Rodrigues et al., 2004) or information technology [111].

2.7 Supply Chain Integration Involvement Practice

**Figure 2. 15. Integration chain flow**

The management of upstream and downstream integration between customer and supplier the exchange cost minimum on the supply chain value [109]. Integrated supply chain is about going from the external customer and then managing all the processes needed to provide the customer with value in a horizontal success [110].

CHAPTER 3: RESEARCH DESIGN AND METHDOLOGY

This section includes two main parts (research methodology and research design) with the planned Procedure and the tools used to process the thesis. In order to achieve the stated objectives of the research methodology tool was carryout to supply chain integration of oilseed product and manufacturing industry in west Gojjam

3.1 Research Design

The objective of this research is supply chain integration of oilseed product and manufacturing industry in west Gojjam. For in this case a theoretical holistic model, an optimization collection center and distribution center is proposed. This study carried out by considering the different literature gaps of the researchers and the existing problems of the investors and manufacturing industry by using the data collecting techniques. A quantitative is address to solve the collection center and factor analysis process carried out to identify the impact of drivers and barriers of supply chain integration. For this study, the following procedures or phase of the research design addressed to come up with the final output. The procedures used in this research design are:

- ❖ First, the existing statue of supply chain integration of oilseed product and manufacturing industry is studied. The different barriers and drivers of supply chain integration identified and ranked using excel.
- ❖ Secondly, the relationship among the barriers and drivers is analyzed using factor analysis
- ❖ thirdly, based on the analyses a supply chain integration theoretical holistic model, distribution and collection center models are developed.
- ❖ fourthly, for the quantitative model of collection centers and distribution their optimality checked using MICMAC and LP.
- ❖ finally, based on the results of the output conclusion, recommendation, and future research direction addressed.

3.2 RESEARCH METHDOLOGY

Methodology is a procedure, which helps to choose the techniques used to gather the required data, design process and the way of data presentation and data analysis using a helpful approach. The primary data collected through questionnaire and interview.

Specifically, questions designed and distributed to selected members of the investors, wholesalers and manufacturers. Interview also held to top management official of the manufacturing company

and to selected staffs. The secondary sources of data used from different relevant published books, journals, articles, senior thesis work, manuals and available documents. The variable data collected from W/Gojjam wonberma worda agricultural seed development. SPSS factor analyses tool addressed to know the impact and relationship of the variables in supply chain integration. To develop the collection centers of supply chain integration of oilseed product the constraints solved using MICMAC solver. The collected data also analyzed to avoid the uncertainty parameters using Microsoft excel SPSS and MICMAC software's solver. Generally, this research design and methodology of study was followed the following steps to achieve the study as shown in figure 3.1 below.

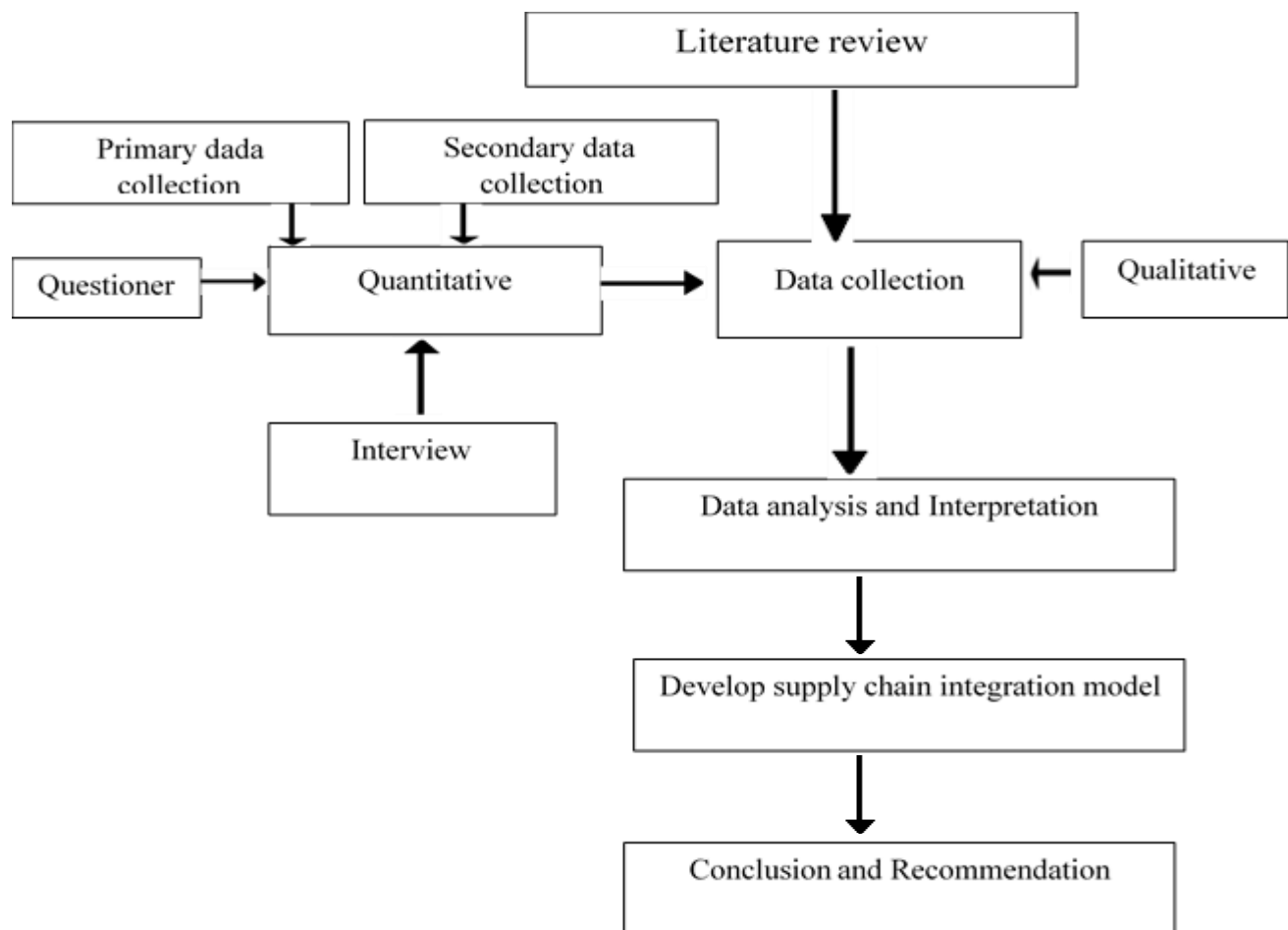


Figure 3. 1 Research work methodology

3.2.1 Review Literature

The literature review conducted relative to the concepts of supply chain system and integration of manufacturing processes. This method is blueprint stage for the research which helps to summarize the previous finding in order to develop best way of supply chain integration system by identifying the gaps of different authors. The reviewing approach done by referring different relevant published books, journals, articles, senior thesis work, manuals and available documents. The literature reviewing of this thesis focuses on the concepts of supply chain integration, drivers and barriers of oilseed manufacturer, components of supply chain system challenges and basic activities of supply chain integration.

3.2.2 Primary Data

For better understanding of the problem area a direct data collection from the Ethiopia oilseed sector. In W/Gojjam, the action performed using observation, questionnaires, informal communication with farmers and managers of the company. This technique helps to provide a relevant data information for the analyses purpose to achieve and to propose a better solution. Using this method, the amount of oilseed product per year, the number of oilseed investors, number of collection center and wholesaler stated.

3.2.3 Secondary Data

In this research the Secondary data specifies the way how to, from whom the data is gathered. In this research secondary data collection method was addressed including different published articles, books, journals, websites and a recorded data from the W/Gojjam seed development sector and Ethiopia oilseed seller sector to strength the research.

3.2.4 Direct Observation

This method helps the researcher how to collect the required data and information from the chain integration process of oilseed product in w/Gojjam. In this research, direct observation technique is used to analyses the annual reports, collection capacity, recorded qualitative and quantitative data's using visual judgment.

3.2.5 Interview

The interview used to strength the ideas collected through questionnaires and observations. The Interview was made with the supply chain integration, number of product, collection, distribution, marketing and respondents who are directly involved with the subject matter.

3.2.6 Questionnaire

In order to gate information questionnaire was develop to determine the existing supply chain system. The target of using questionnaire is to understand the existing supply chain integration of oilseed and manufacturing industry in w/Gojjam. This questionnaire contains 42 questions with nominal scale, choice, and open ended and close-ended formatting system. This questionnaire distributed to 49 numbers of investor, manufacturer and wholesaler and only 46 papers filled.

3.2.7 Validity and Reliability of the Data

Reliability of the research tested by using the SPSS software tool analysis through Cronbach's alpha value. During the analysis, process a value of 0.892 obtained in factors of supply chain integration and 0.754 in barriers of supply chain integration. This result shows that, Cronbach's Alpha based on Standardized Items is in acceptable range to proceed with the study according the Cronbach's standard because it is greater than 0.70 [109]. Generally, all the collected data are checked their validity using the tool of SPSS software. The MICMAC and LP optimization tool also used to check whether the model optimality is valid or not, as result an optimal solution found.

3.1 Selection of study commodities and study sites selection criteria

Selection criterions are-

- ❖ Geographical proximity
- ❖ Sectorial concentration
- ❖ Market system
- ❖ Support service
- ❖ Resource capacity
- ❖ Labor force
- ❖ Transportation /development strategy
- ❖ Work culture
- ❖ Network system

Oilseed agricultural product are the main export items, those are sesame, groundnut, Gomen sunflower. Every agricultural product depend on environmental condition, in west Gojjam favorable to maize, sorghum, teff. , macho, chili, barley, and oilseed product. Specifically the study concern about oilseeds product capacity and integration of industrial manufacturing input process system [109] .

- ✓ Type of Oilseed product
- ✓ Capacity concentration
- ✓ Supply chain on the customer position
- ✓ Variability of product
- ✓ Level of supply chain

3.2 The Existing Supply chain Practice in W/Gojjam

The general over all crop oilseed product supply chain system

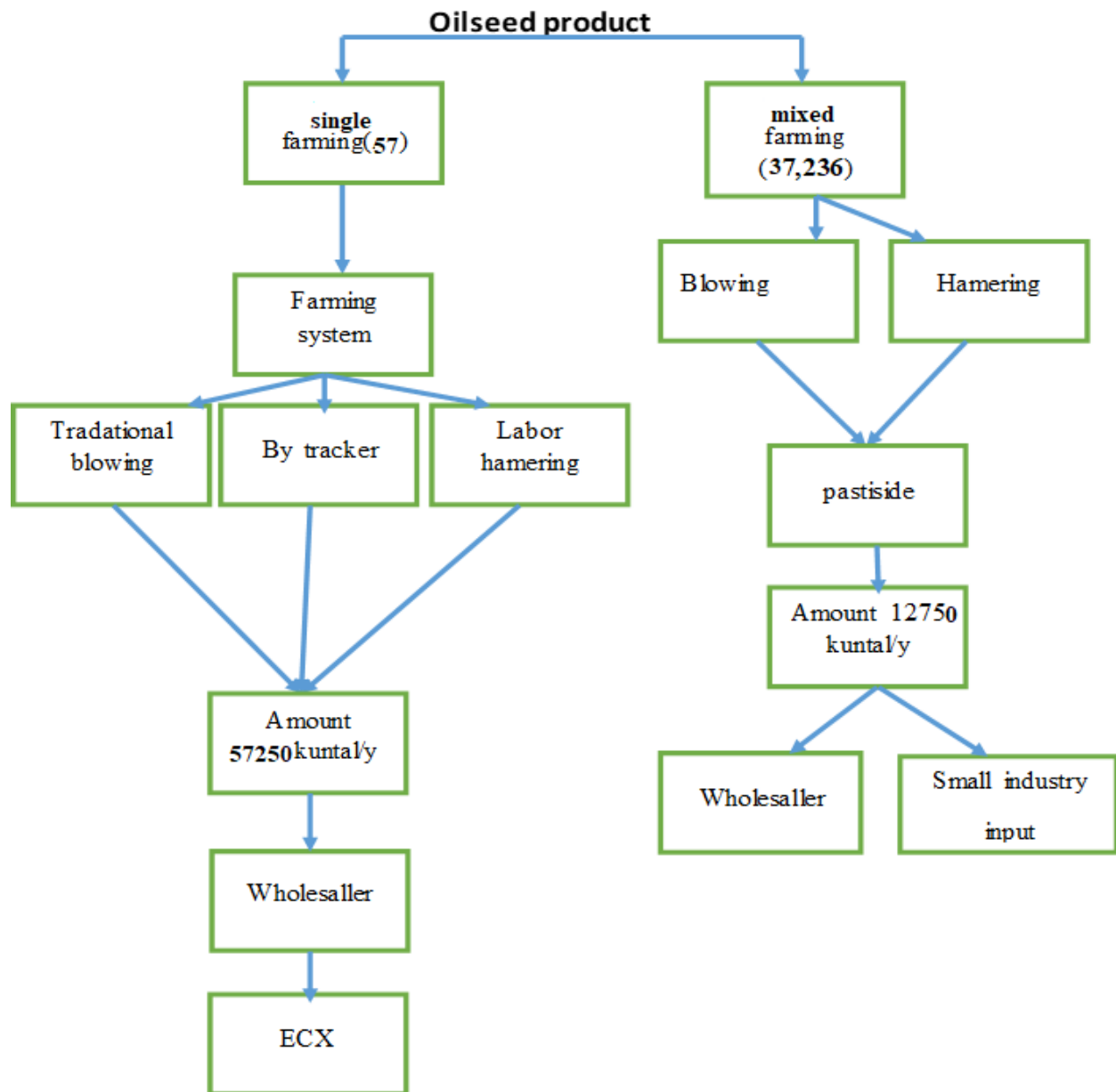


Figure 3. 2 Oilseed product series flow system

From figure 3.2 the existing supply chain oilseed farms classified into two. Those are single crop farming process and mixed crop farming system. Single crop farm is the processes of farm those are produce only a single oilseed product in one place at one time. A single agricultural practice

of produce or grow a single crop, plant, or livestock species, variety, or breed in a field at one a time in a single place. Mixed farming is the type of farming which involves both growing and the rising of livestock. The cultivation of crops alongside the rearing of animals for meat or milk defines mixed farming. For example, a mixed farm may grow cereal crops such as wheat or rye and keep cattle, sheep or poultry. Mixed farming is the process where crops and animals are grown and kept on the same piece of land at the same time. On the other hand, mixed crop, is where different crops grown at the same time in the same piece of land grown together.

3.3 Criteria to Select Location

Table 3. 1 selection criteria

No	Criteria	Sub-criteria
1	Geography proximity	Proximity about development line infrastructure, adaptable to human,
2	Sectorial concentration	The executive jiggled nearest special point about the place
3	Market potential	The production output easy to deliver into customer
4	Support service	Sister to one deficiency on the other product type
5	Resource potential	Resource concentration scape up one project benefit
6	Labor requirement	The amount of worker always comparable to work strength
7	Technology	The place comfortable to develop technological input
8	Work culture	The working time and working tool are easy to use and to buy in chip
9	Network line	The place are on the line of networked and every technology input easy to transport and deliver use product.

Most scholars and business experts agree that on the selection of business foundry area they consider geography proximity, government support, market potential, raw material capacity, labor force, technology availability or development, work culture of the community and network line between the supplier and customer integration.

3.4 By Geography

Table 3. 2 location special characteristic

No	Name of location	Place propose	Characteristic
1	West Gojjam	Center to distribution and industry, high amount of oilseed product like macho, gunmen, groundnut, sesame maize, teff, wheat and sorghum. comfort to farm and there is large amount of investment place around Nile in the west direction river	Comfortable environment not hot, geographical level flat, high natural water concentration, population, less industry, more place covered in crop, more exchangeable resource and center to distribute to the regional city. However, the infrastructure like road and distribution center are not fulfil.
2	East Gojjam	Near to capital city and low in oilseed product The type of oilseed in this area sunflower, groundnut and macho are available.	Small amount of sesame product than the three place but the distance and infrastructure like road and telecommunications and electric power are available
3	Wolega	Minimum amount of sesame product but macho and gunmen are available	Environmental hot, far in location from the other, less in interchangeable product or crop
4	South Gondar	High amount of sesame product. the only area that cultivate maximum amount of sesame in Ethiopia	Hot environment, far from the capital city, less amount of population, less in worker, less in ground water.

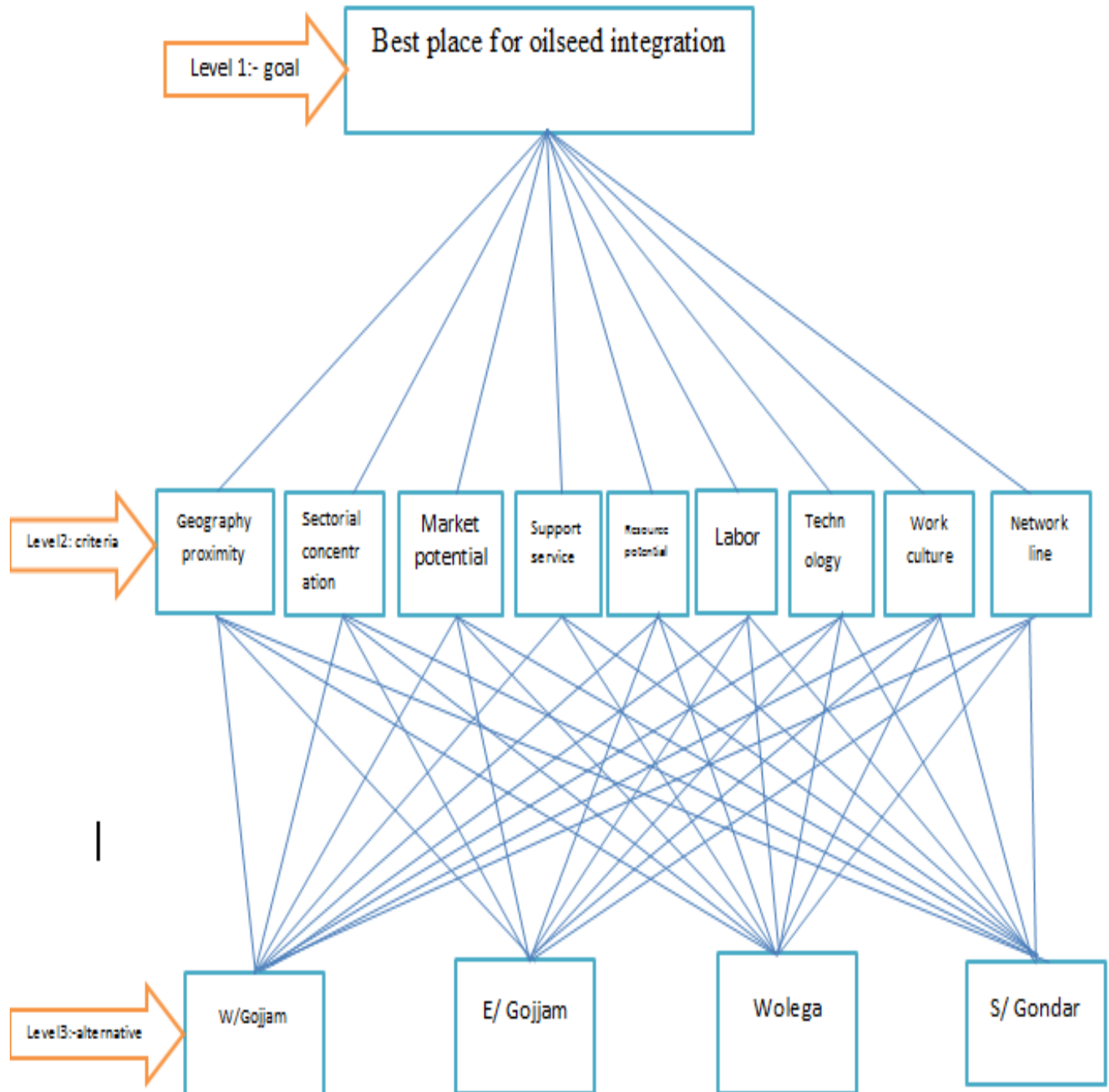


Figure 3. 3 Study sit selection

From Figure 3. 3 weight balance spider structure, have three levels. Each level integrated into three those are alternative, criteria and goal. Level three denoted by alternatives this known as the initial building block of the research area. The second level is criteria that used to select the first building

block or study area. The interpretations calculated by the mathematical weight balance ratio and pair compression method.

Likert scale: - A Likert Scale is a type of rating scale used to measure attitudes or opinions. With this scale, respondents asked to rate items on a level of agreement.

Table 3. 3. The standard preference scale for comparison value using Likert scale

Preference level	Numerical value
Equally preferred	1
Equally to moderately preferred	2
Moderately preferred	3
Moderately to strongly preferred	4
Strongly preferred	5
Strongly to very strongly preferred	6
Very strongly preferred	7
Very strongly to extremely preferred	8
Extremely preferred	9

The comparison matrices are level preferences in the nine selection criteria of the location to get the overall goal of the analytical hierarchy process.

Table 3. 4 Criteria for location

criteria	Geog- raphy prox- imity	Sec- tor based	Market system	Sup- port ser- vice	Re- source poten- tial	Labor force	technol- ogy	Work culture	net- work
Geography proximity	1	6	8	5	9	4	3	2	7
Sector based	1/6	1	4	6	8	2	7	5	9
Market system	1/8	1/4	1	5	4	7	8	3	9

Support service	1/5	1/6	1/5	1	6	5	9	8	7
Resource potential	1/9	1/8	1/4	1/6	1	9	7	8	6
Labor force	¼	1/2	1/7	1/5	1/9	1	5	9	8
technology	1/3	1/7	1/8	1/9	1/7	1/5	1	8	9
Work culture	½	1/5	1/3	1/8	1/8	1/9	1/8	1	8
network	1/7	1/9	1/9	1/7	1/6	1/8	1/9	1/8	1
sum	2.81	8.48	14.15	17.73	28.53	28.43	40.23	44.12	64

From table 3.4, there are nine columns and nine rows to get the large value of sample. Area divide in each number by similar equal value the minimum 2.81 and maximum 44.12 is work culture of the study area.

Table 3. 5 Dived individual value in the column sum value

criteria	Geography	Sector concenter	Market system	Resource potential	Support service	labor	technology	Work culture	network
Geography proximity	0.35	0.70	0.56	0.315	0.28	0.14	0.07	0.045	0.109
Sector concenter	0.05	0.11	0.35	0.28	0.33	0.07	0.17	0.12	0.125
Market system	0.04	0.02	0.07	0.14	0.28	0.24	0.19	0.007	0.14
Support service	0.07	0.01	0.01	0.21	0.056	0.175	0.22	0.199	0.109
Resource potential	0.03	0.01	0.017	0.035	0.009	0.316	0.17	0.199	0.093
labor	0.08	0.05	0.009	0.0038	0.011	0.035	0.12	0.22	0.125

technology	0.11	0.01	0.008	0.0049	0.006	0.007	0.02	0.0226	0.14
Work culture	0.17	0.02	0.023	0.0042	0.0067	0.003	0.002	0.022	0.125
network	0.04	0.01	0.0077	0.005	0.0078	0.0042	0.0027	0.0027	0.015

Table 3. 6 Pair with comparison matrixes for preferences location

location	W/Gojjam	E/ Gojjam	Wolega	S/Gondar
w/Gojjam	1	8	4	6
E/ Gojjam	1/8	1	6	5
Wolega	1/4	1/6	1	4
S/Gondar	1/6	1/5	1/4	1
sum	1.53	9.36	15.25	16

4. Divide the sum of pair with individual to the column to get total sum value

Table 3. 7 Pair with ratio number

location	W/Gojjam	E/ Gojjam	Wolega	S/Gondar	Average weight
w/Gojjam	0.65	0.854	0.262	0.375	0.535
E/ Gojjam	0.078	0.106	0.393	0.312	0.222
Wolega	0.163	0.017	0.06	0.25	0.1225
S/Gondar	0.104	0.021	0.016	0.062	0.0507

From **Error! Reference source not found.**, the pair ratio select the maximum average weight ratios 0.535 and then divide by equal number after that the maximum number is the research area. This value coordinate with west Gojjam now the study around her.

CHAPTER 4: DATA ANALYSIS AND DEVELOP SUPPLY CHAIN INTEGRATION MODEL

4.1 Data Analysis

This chapter present about data analysis result from questionnaires, interview and direct observation from the available primary data. These are design to collect the available data that answer the research question. The researcher presents the data in the form of tables, graph and charts.

The chapter organized as follows; first, the background information of the respondents then presents the response rate. Second questionnaires regarding supply chain integration and interview presents, third questionnaires and interviews that are related with supply chain integration well be presented. The design data in four sections of supply chain, supply system, manufacturing and distribution systems. The customer inquired to respond if they are aware the supply chain integration system. Supply chain cost, inventory analysis, supply selection factors and outbound logistics value are the extent of the system to measure the inbound and outbound transportation, distribution channel, each channels market share and factors to consider for the proper decision of the inbound and outbound transport.

4. 1.1 Demographic profile of the respondent

According the area of the study respondents are, wholesalers and manufacturers corporate both female and male. The age group 40-55 is the most productive labor comparing to relative the other age groups but comparing to the age group 25-40 as shown in table 5, it is very less. Most of the wholesalers and manufacturers are elementary, certificate and bachelor degree holder the do every activity through experience.

Table 4. 1 demographic profile of respondent

variables		Respondents %		
		farmers and Investors	wholesalers	manufacturers
sex	Male	81.76	10.9	92.5
	female	18.24	89.1	7.5
age	25-40	38.24	26.77	34.3
	40-55	43.16	47.77	36.15
	>55	18.63	26.23	26.62
Education level	Non grad level	0	0	0
	Elementary school	33.46	34.61	22.42
	High school	11.50	28.12	41.53
	Certificate	37.20	15.8	10.51

	Diploma	17.84	17.57.8	24.02
	Bachelor degree	0	3.9	1.52
	MSC	0	0	0
	PhD	0	0	0
Work ex- perience	1-5 years	0	2.19	4.9
	2-10 years	8.55	14.75	38.56
	10-15 years	23.15	38.14	46.49
	15-20 years	22.46	39.08	8.4
	20-30 years	32.75	5.84	1.65
	30-40 years	11.89	0	0
	>40 years	1.2	0	0

From the above table it concluded that most of the targeted groups have work experience of greater than 5 years for investment (8.55%), for wholesalers (39.08 %) and for manufacturing (46.49%). Similarly, Work experiences of the investors who have between 20 to 30 years are for minimum (30 to 40%).

Respondent	Number of re- spondent	question respond	question not an- swered	Total sum	Respondents in %
1.small farmer	22	46	3	71	36.2244898
2.Investors	8	25	1	34	17.34693878
3.Retailer	3	34	0	37	18.87755102
4.Wholesaler	4	34	0	38	19.3877551
5.Agriculture sector	3	9	2	14	7.142857143
6.Manufacturer	3	45	0	48	24.48979592
Total respondent	43	147	6	196	100
Percentage	21.93877551	75	3.06122449	100	

From table1 4.2 demographic profile of the respondent classified into six those are small farmers, investors, wholesaler, agricultural sector, and manufacturers. This research study deals on supply chain integration of oilseed product and manufacturing industry in W/G. The questionnaires distributed for 43 participants based on supply chain system, amount of year production, type of farm system, and their customers. The questionnaires filled by 43 respondents; however, six questions are not filled by the respondent. Total number of question answered 147 and 6 questions are not

respond from the quaternary. The total amounts of question answered in percent 97.95% and the total question not respond in percent 2.04% then the study correct.

The questionnaires have four main sections. The first section deals on more about the general information of their background and supply chain system. The second section of the questions their customer focuses on supply and demand interaction. The third section part of the study deals on the technology of farmers they develop and training practice. The fourth section of the questionnaires includes issues related to supply chain system and scarcity of product and the production potential of industries. The last section of the questionnaires focuses on questions that need a detail explanation concerning to W/Gojjam oilseed product and manufacturing industry. The interview also performed using the questions that were included in the last section for farmers, investors and managers.

4.2 Existing Supply Chain System in W/G oilseed product and manufacturing industry

In W/Gojjam, half percent of land from the total area can cultivate oilseed agricultural product. The capacity to supply into market an average of 820,000 quintal per year. They sale their oilseed product to individual users, wholesalers and industries but they have no common distribution center. More than 85 % of farmers are oilseed cultivator but they use only products as additional input, to keep other crop from animals or boundary delegation. For this reason, there is scarcity of oil product and low supply chain integration practice comparing to other oilseed product manufacturer.

4.2.1 Factors of supply chain oilseed product

- Transportation
- Market system
- Information system
- Environmental issue
- Availability of involvement such as labor work, technological product, etc.
- Inventory
- Distribution and collection center
- Farming technology

Table 4. 2. Value of supply chain factor in the respondent

Factors	Existence factors						Factors in %
	very low	low	medium	high	very high	sum	
transportation	3	0	9	6	8	52	14.40
inventory system	2	6	10	2	9	66	18.282
market	1	4	2	0	6	26	7.20
environment	2	9	3	5	0	29	8.03
Availability of technology	6	4	6	6	2	48	13.29
information	12	0	4	4	0	40	11.080
Awareness	7	2	1	5	2	34	9.41
distribution center	7	11	4	2	9	66	18.28
Total	41	36	39	30	36	361	100

From table 4.2 the value in each composition four factors inventory system, distribution center, transportation, and information are similar values to the cross ponding degree. This leads that the factor of one action changes the other value capacity. Distribution center and inventory system overlap to the other composition. The network of inventory system increase the distribution center value to touch information and market analysis correct position happened.

According to (Cooke's 1997), defines supply chain management as the successful coordination and integration of all the practice raw material goods to finished product through end users. for sustainable competitive advantage. Market shear innovated in information tabulation, when the information in squeezed way the inventory and distribution center tangent in opposition direction. Environment issue reduces the technology adaptation to integrate the process of farming actor. According to (Deloitte 2017), states block chain the system of exchange information game between the manufacturers and investor to get mutual benefit. Farmer actor stimulated in the support of manufacturers and trainers to scored technology capability.

Table 4. 3. Total value of respondent on factor point percentage

Factors	Rank							percentage
	1	2	3	4	5	single	total score	
transportation	0	0	0	0	8	8	40	15.625
inventory system	0	0	0	2	9	11	53	20.703
Farming technology	6	0	2	0	0	8	12	4.5112
market	0	0	2	0	6	8	36	13.5338
environment	0	0	3	5	0	8	29	10.9022
information	0	0	4	7	0	11	40	15.625
distribution center	0	0	1	2	9	12	56	21.052
						66		
total	7	2	15	18	32	72		
Total							266	100.01

From ,the total value of respondent on factor point percentage value hundred percent this tile, as those factors are the hider of supply chain integration on oilseed agricultural product and manufacturing industry.

4.2.2 Factors of Supply Chain Value

- lack of awareness
- Market deficiency
- Information variability
- Environmental issue
- Geography character
- Lack of availability working actor
- lack of proper Inventory
- lack of Distribution center
- Lack of Farming technology

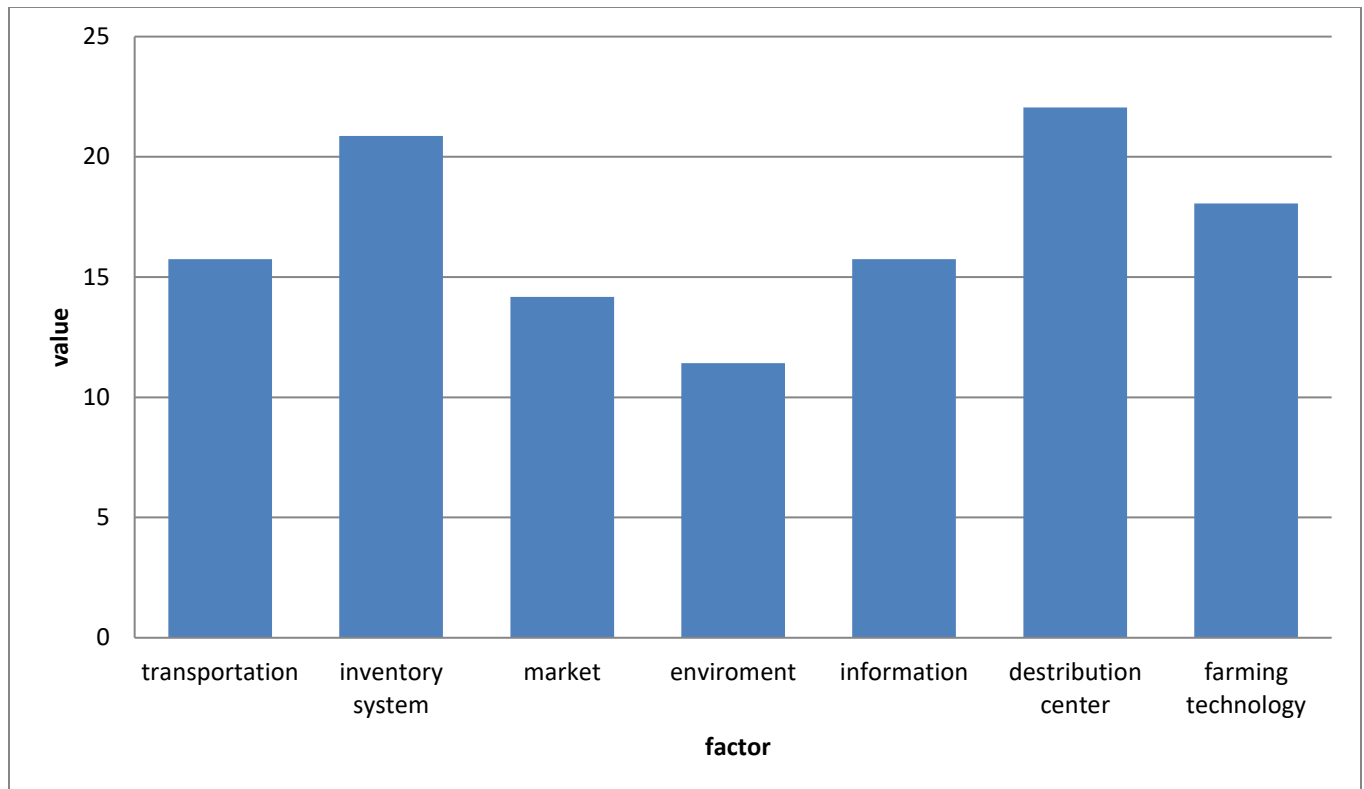


Figure 4.1. Value of respondent in percent

The factor of supply chain under respondent situation in value pie chart the amount of distribution center decrease then the hinder types are increase due to consecutive challenges. When information system tangent to the distribution center then, market shear rank decrease amplitude and the enviroment, inventory system slop to farming technology value.

The degree of interdependency strongly linked with the one to the other cross-pond value. In supply chain, integration system one variable traced the value of internal integrity of the other factor potential. According to hoover, 2001 Supplier- factory - distribution - retailer - end customer make loop channel.

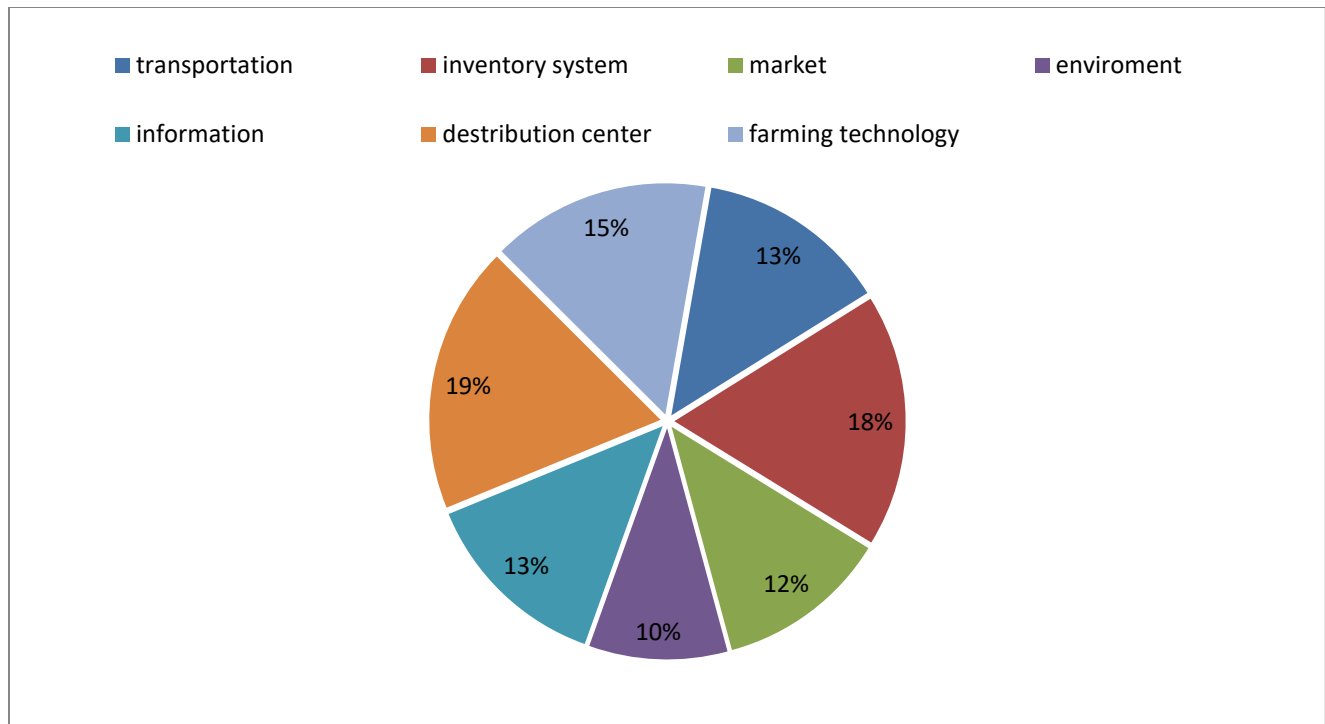


Figure 4. 2chart factor percentage value

From Figure 4. 2, chart factor percentage value distribution center high dominate value to interfere supply chain integration system.

4.3 Transportation

In the rural area the level of transportation is main issue, materials are transported from farming area to some extent storage they use animal transporting. In the summer, season the amount of rain decrease agricultural oilseed product output, also decrease.

- ❖ Farmers use to transport their product by animals to the market
- ❖ Farmers transport their material to the farm area by animal

4.4 Distribution System

The investors and farmers sale their product by search market because of common collection and distribution center. However, her is another message about Ethiopia during in this type of production and supply chain integration problem still the first oilseed exporter from Africa. Ethiopia export sesame in the world's 3rd to 5th percent sesame exporter.

- Accounts up to 18% of global export share
- But 95% of export of the product raw sesame

- Only 5% is hulled

Table 4. 4.The integrated agro processing Industry Park input raw material

Commodity	Total net market surplus (in tons)
Maize	198787.4
Barley	32323.1
Sorghum	19119.2
Haricon bean	38707.5
Fava bean	26731.6
Chickpea	8676.4
Sesame	28007.7
Red pepper	9729.5
potato	149925.1
meat/ton	52183.55
Milk/ton	218386.6
Egg/million	24.02817
Honey/ton	3790289

Source: - Bure Integrated Agro Industry program

4.4.1 Preliminary Existing Inventory system

At present, there are efforts to establish inventory control system of the company that would minimize the overall cost of inventory holding and stock out costs. However, based on modern inventory control and management techniques. Prior to analyze the situation, ABC analysis of the inventory materials carried out in order to direct the area of focus for the inventory control system.



Figure 4. 3. West Gojjam in wonberma worda agricultural crop inventory, 2009

The storage in the investment area collected in fragmented way according to inventory strategy arrangement is so difficult to control and inspect the quality of the product. By nature oilseed product like Sesame, groundnut, and macho are water sanative. The farming systems develop in this area into two ways.

This are:-

- ❖ Single crop farmer: - this type of crop cultivation one type crop at one place at one time.
- ❖ Mixed crop farming: - this type of cultivation those are cultivate crop product more than two variety crop at one cultivation land at one time. Sometimes those are used this crop for control animals and pestles.



Figure 4. 4. Mixed crop system



Figure 4. 5. Single crop farming system



Figure 4. 6. Ground nut

According to censuses in (2007), areas of Ethiopia sesame oilseed crop place are Est Gojjam, Wolega, W/Gojjam, Gondor, north Shewa, Binishangule Gomez are the dominant place.

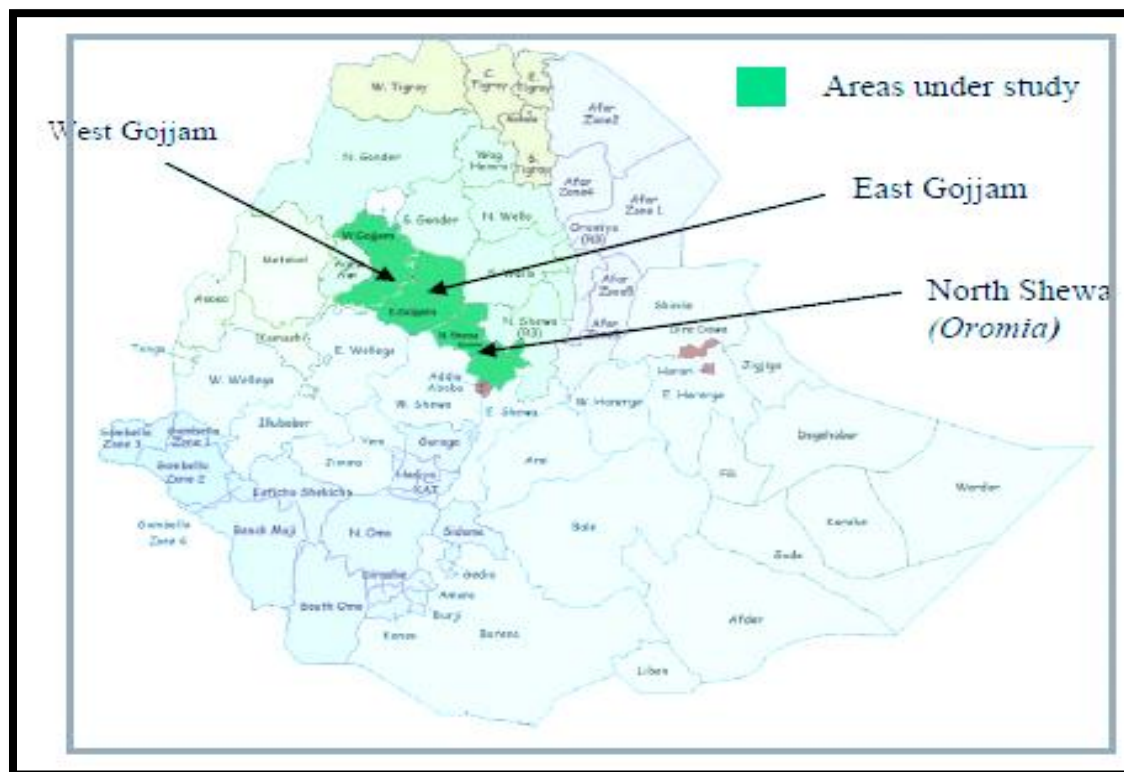


Figure 4. 7. Location of Oilseed product in Ethiopia (Sources Censuses in, 2007)



Figure 4.8. Small oil processing Group plc in Bure.

Small group manufacturer are produce oil by their on potential in traditional way. Due to this amount of finished oilseed product are not address the customer demand and there is high amount of loss.

4.5 Variable Determinant

The variables are components to actuate the problem lead to solution direction.

Table 4. 5. Factor variable determination and code alignment

Variable name	Variable code	description
transportation	tra	transportation decrease the product time distribution to the required place and destination
environment	env	environment is factor to couch each parameter
market system	mar	market consideration derive the concerned farmer value chain
inventory system	inv	inventor affects the product and the farmer morality when the inventory far much increase the waste money
information valuation	info	information affect the product concentration or farming gap because the manufacturing industry and farmer are not level in horizontal
distribution system	dis	the distribution system affect the product reliability and consistency

farming technology	far	the farming technology decrease the product quality and quantity due to the technology factor reliability than competitiveness
Awareness of actor	awa	The small farmers and investor are the total productivity of manufacturing industry profit.

The variables are link in quarter according to the column and line value. The values compressed from the questioner data that collected in the form of interviewed and quotation answered in free written document. The lines written in the form of quotation and column that tagged in interview question answered. In the division of lines and column integrated in four-quarter variable segmentation. The division of line and column leads into four the influences and dependence component.

Table 4. 6. Column and line value relationship

VARIABLE	VARIABLE CODE	TOTAL VALUE IN LINE	TOTAL VALUE COLUMNAS
transportation system	tra	4	2
market system	mark	3	3
distribution system	dist	2	4
inventory system	inve	2	2
environment system	envi	2	2
availability of technology	avai	4	6
information system	info	6	6

4.5 The Relation of Direct, Indirect and Influence Dependency Integration

The relation between direct, indirect, dependence and influence are the component of factor analysis delimitation. The segmentation of variable are grouped in four positions. In Micmac software factor analysis system variable put in each quarter. Quarter one, quarter two, quarter three and quarter four this helps to manage the character of each individual to a similar componential behavior.

The system values organized from the question of individual weight that compensate in order to relation. One factor has a chance to test into four times depending on the degree of closeness get the value in a quadrant length from center to outer boundary. Factors integrated in four quarter the value differences between each other are smooth or rough length of deference between the center and upper boundary are cheek. In such a way that if the individual character limit the incremental

of the other closeness factor. If the transportation factor links into direction of influence, the second dependence component reduced or increased into the line component of first or third quarter.

Direct dependence and direct influence place in one variable or quadrant, but indirect influence and indirect dependence are place in alternative quadrant position. When all quadrants are controlled in factor variable the influence and dependence are indirect affected on the length of factor and distance into the station point, but two or one of the quadrants are free from factor variable the system are direct dependence and direct influences appear in that area.

Table 4. 7. Dependence and influence variable analysis

variable	Influence direct	Direct variable	Dependence direct	variable	Influence indirect	variable	Dependence indirect
tran	4	tran	2	tran	2	tran	4
mark	3	mark	3	mark	3	mark	3
dist	2	dist	4	dist	4	dist	2
inve	2	inve	2	inve	2	inve	2
envi	2	envi	2	envi	2	envi	2
avai	4	avai	6	avai	6	avai	4
info	6	info	6	info	6	info	6
awar	2	awar	3	awar	3	awar	2

From table 4.7, dependence and influence variable transport affects the supply chain system influence directly into four times and influence indirectly two times from other eight factor variables. Market influence directly the supply chain system three times and influence indirectly three times from other eight factor variables.

Distribution center influence directs the supply chain system two times and influence indirectly four times from other eight factor variables.

Inventory system influence direct the supply chain system two times and influence indirectly two times from other eight factor variables.

Environment system influence directly the supply chain system into two times and influence indirectly the chain two times from other eight factor variables.

Availability of resource influences directly the supply chain two times and influences the chain indirectly six times from other eight factor variables. This factor indirectly influence greater than direct value means that there is excess amount of resource.

Information influence directly the supply chain system six times and influence indirectly the chain six times from other eight factor variables. Supply chain integration system equal proportion information and transportation value.

Awareness influence directly the supply chain system two times and influence indirectly three times from other eight factor variables, this lead to as the creation of farmer includes into information value.

4.6 Direct dependence and indirect dependence

Transportation affects direct dependence the supply chain two times and indirectly dependence four times from other eight-dependence type.

Market system affects direct dependence three times the supply chain and indirect dependence three times, this talk as the value of market system are equal to satisfy the customer.

Distribution system affects the supply chain direct dependence four times and indirect dependence two times from other factor value.

Inventory system affects the supply chain direct dependence two times and indirect dependence also two times.

Environment affects the supply chain system direct dependence two times and indirect dependence two times, this is equal value in two cases.

Availability of resource affects the supply chain system direct dependence six times and indirect dependence four times this tells as the resource concentration good.

Information system affects the supply chain direct dependence six times and indirect dependence also six times this recommend as the information between supplier and customer clearly justified.

Awareness affects the supply chain system two times direct dependence and indirect dependence three times from other eight factor variables.

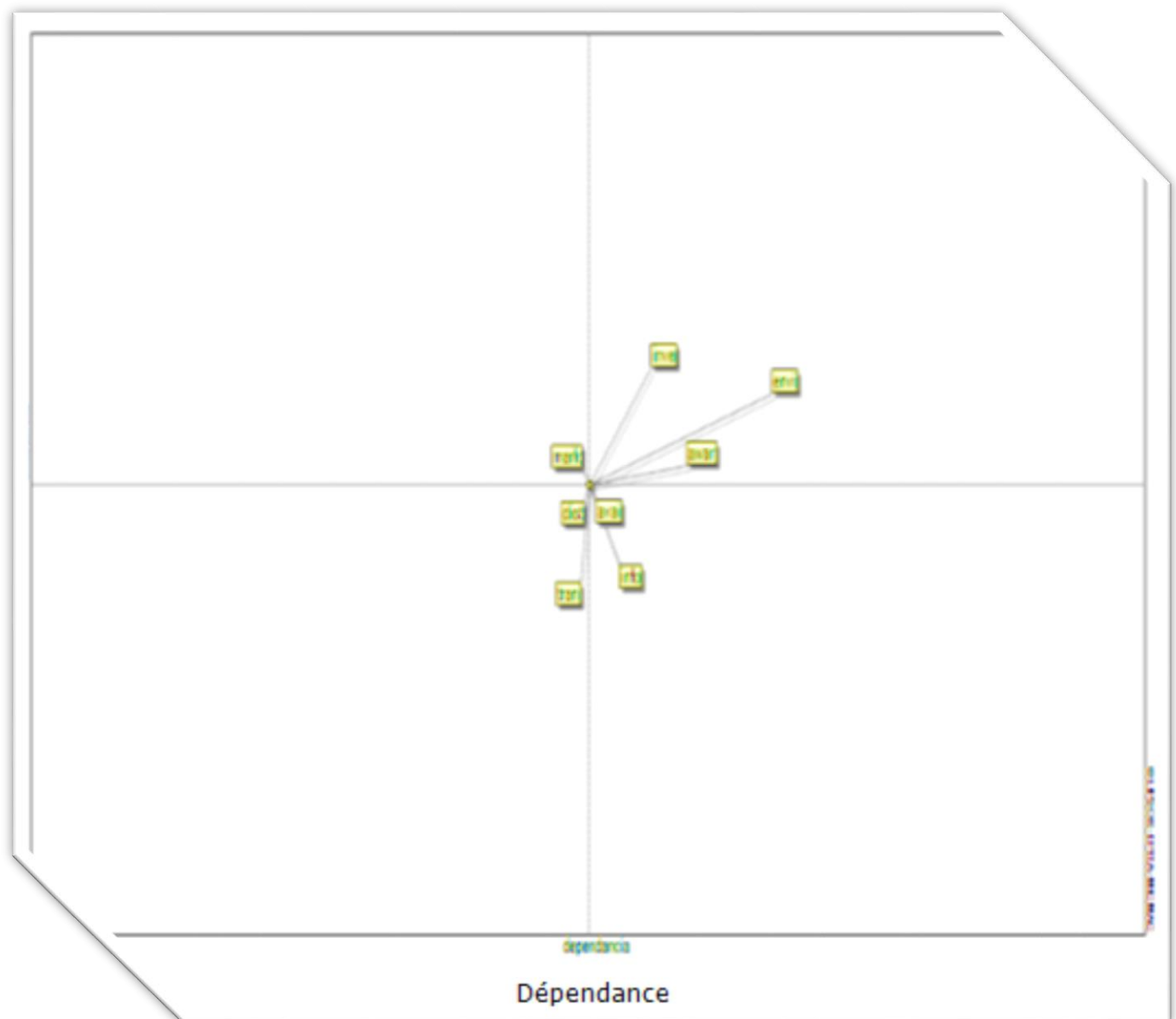


Figure 4. 9. Dependency and influence factor

From Figure 4.8 graph the factor variable distributed in four quadrants. In the first quadrant, number of variables are three and the length of factor high from other three quadrants. When the separation radius increase the dependence of other variable actor also increase. Quadrant two-dependence value is very low compare to other three quadrant factors. When the separation radius shorts, the factor dependencies also decrease. In quadrant three there are two-factor dependency these are not equal factor one small despite and the second high despite compare to the other quadrant value.

From quadrant four factor are similar to into quadrant three this indict that the dependence are equal to supply chain system.

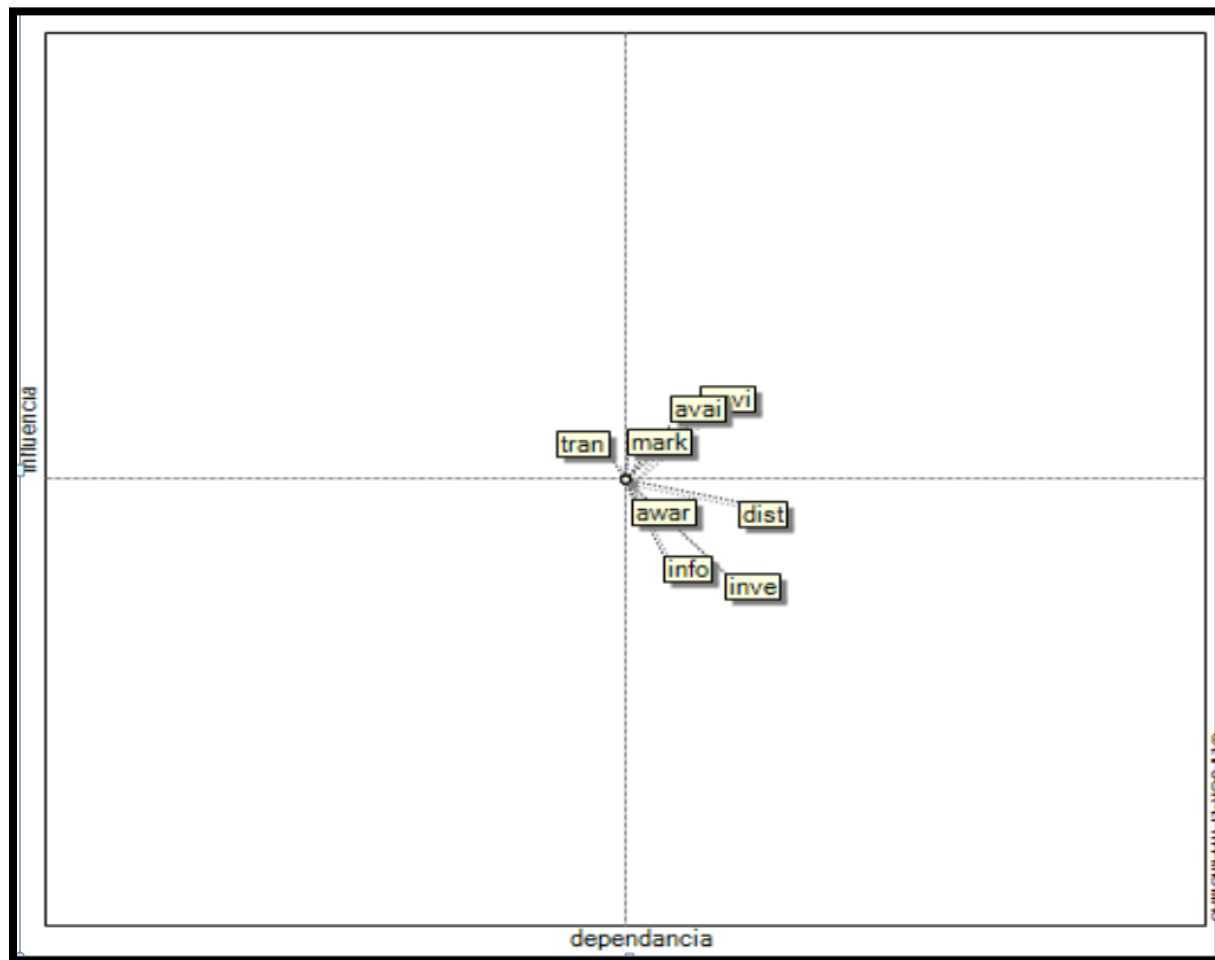


Figure 4. 10. Direct influence and dependence factor graph

From Figure 4. 10, the variable stepped down into in three quadrants. In the first quadrant, three factor variables aligned together overlap and increase the separation radius. These are market shear, and availability of resource and technology and environmental issue are the group of positive delimitation between the dependence and influence factor. Where, as transportation is the negative factor in influence and dependence relation. In quadrant, three both influence and dependence are positive and there is no factor line. Awareness, distribution center, information and inventory system are the four basic factor of dependency rather than influence value.

When the length of variable radius increase the relation between the variable are rough this claimed that factors are grouped into nearest point. If the quadrant covered in a single variable the relation of dependence are high. When the radius of variable connectivity is short the integration

between each variable factors are highly strong. One variable assign into one quadrant the relation between each individual factor variable week and other leading point introduced to the neighbors variable rather than dependency indirectly affect the line of passing direction. The null of quadrant defines in that area the total relation of variable component closed rather than integrated, according to different scholars supply chain is the relation of each individual point passes through high manufacturing industry benefits. One point of passing line was break total flow of supply chain polished difficulty way ,if the point reduced in other transection the total activity sloped down quickly rather than aligned.

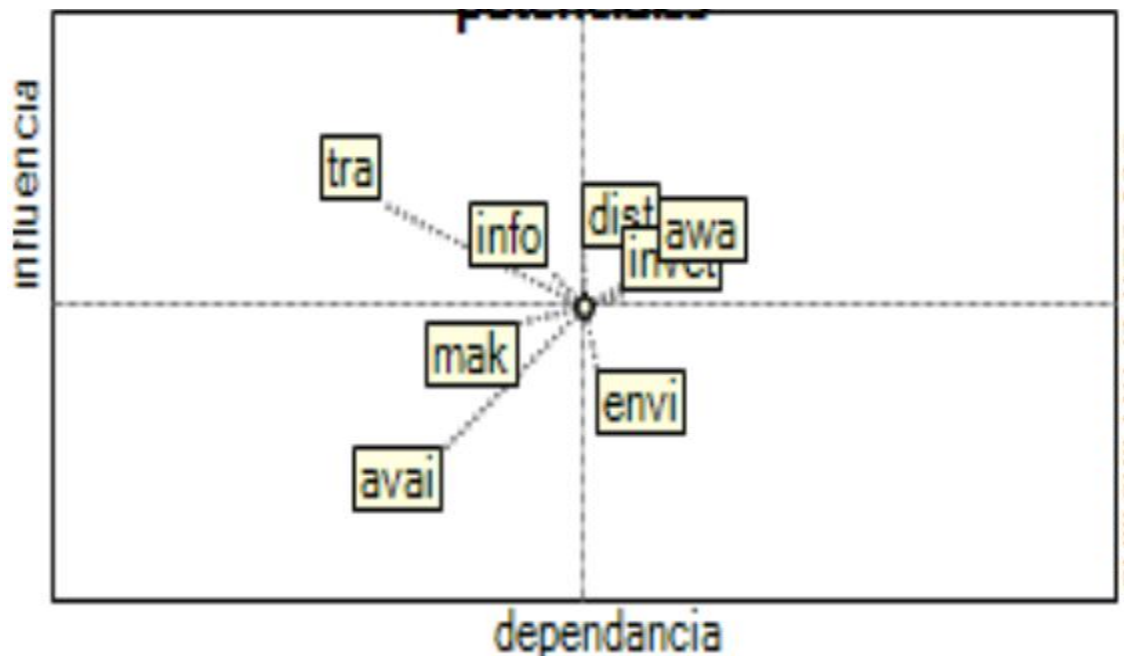


Figure 4. 11. Indirect factor influence and dependence relation Micmac graph

From Figure 4. 11, indirect influence and dependence graph shows that both quadrants covered in different variables and in different separation length or radius into separation point. In the direct influence and direct dependence graph variables are separate rather than in quadrant one in three which mean that the factor are addressed into quadrant one. The difference between direct and indirect influence factor are the closeness of factor between separation lengths.

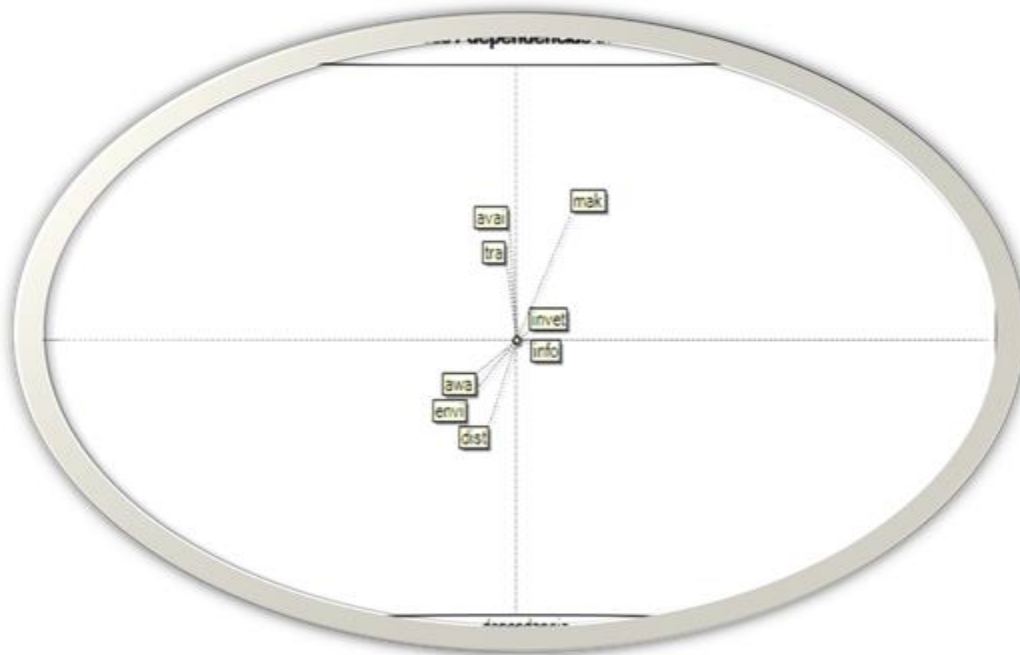


Figure 4. 12. Influence inventory system

From Figure 4. 12, the market system affect the supply chain system in quadrant one and inventory dominated by market. In quadrant three, three factor values hinder supply chain integration system and their challenge greater than in quadrant two variable factors. Quadrant 4 subjected only in one variable factors and this factor value is very small compared to other quadrant separation distance.

Table 4. 8. Influence matrix

Variable	Direct in- fluence	Direct de- pendence	Indirect in- fluence	Indirect de- pendence	total	Percentage
Tran	2	4	4	2	12	11.32075472
mar	3	3	3	3	12	11.32075472
Dist	4	2	2	4	12	11.32075472
inv	2	2	2	2	8	7.547169811
envi	2	2	2	2	8	7.547169811
avai	6	2	4	6	18	16.98113208
info	6	6	6	6	24	22.64150943
Awe	3	4	2	3	12	11.32075472
Total	28	25	25	28	106	100

From table 4.8 the supply chain integration affected by direct influence in 28%, direct dependence 25%, indirect influence 25% and indirect dependence is 28 %, but the maximum factor is direct influence and indirect dependence barriers affect supply chain integration system. The number of dependency and influence total number of factor dependence greater than number of influence. Total interaction dependence 25 and total factor of variable influence 23; the maximum dependence is distribution center and the minimum dependence market system.

The maximum influence value from the factor variable four, this is awareness creation and minimum and market system. Total influence of distribution system in the supply chain 10 and the inventory affects the chain by seven ,information system affect the integration by six value and equal challenge.

Table 4. 9. Influence and Dependence percentage variable

Interaction of variables	Influence in percent	Dependence in percent
Transportation system	45%	76%
Market strategy	67%	78%
Farming technology	87%	56%
Inventory system	90%	45%
Environment	87%	60%
Awareness creation	94%	80%
Information system	23%	56%
Distribution and collection	45%	89%

Form table 4.10 the influence and dependence percentage value the maximum factor percentage value 94% this happened by scarcity of awareness creation .and the minimum factor value is 23 %

in the influence. The other factor value in the dependency 89% that is distribution and collection center problem.

Table 4. 10. Influence of variable in percent and matrix order

Factor	value
Total matrix	7
Numerical interaction	2
Numerical center factor	46
Single point factor	3
Numerical disorder factor	2
Division factor	4
Number of counts factor	6
Total	73
Total in percent	7.3%

4.7 Supply Chain Management System Correlation

Supply chain management thought of as the group of activities that bring about the coordinated flow of material from the source to the end customer, and ultimately build customer value. Those activities are:

- Integrated behavior (i.e. incorporating customers and suppliers)
- together shear information
- together shear risk
- cooperation value
- focus on customer service
- integration process
- collaborate build and maintain

The consequences of integrating processes and implementing supply chain management are lower costs, improved customers value, satisfaction, and achievement of competitive advantage

The drivers and barriers of supply chain integration are (lack of transportation (D1), lack of correct information (D2), lack of technology (D3), lack of availability (D4), lack of inventory (D5), lack of geographical stability (D6), lack of market (D7), lack of awareness (D8), lack of competitive (D9), lack of quality assurance (D10) and lack of distribution center (D11)). The External barriers are lack of management, lack of responsible, lack of policy, market assessment, lack of inspection, lack of product development are the main barriers in the supply chain integration.

Table 4. 11. Correlation table of factor variable value

Drivers		D1	D2	D3	D4	D5	D6	D7	D8
D1	PC	1	-.021	-.433	.333	.378	.345	.333	.496
	S	.367	.969	.391	.519	.461	.504	.519	.511
D2	PC	-.021	1	-.492	-	.553	.192	-.354	.389
	S	.969		.321	.491	.256	.716	.491	.512
D3	PC	-.433	-.492	1	-	-.500	-.934*	-.432	.424
	S	.391	.321		.392	.313	.006	.392	.358
D4	PC	.333	-.354	-.432	1	.224*	.653	.333	.651
	S	.519	.491	.392		.670	.160	.461	.542
D5	PC	.378	.553	-.500	.224	1	.338*	.224*	.553
	S	.461	.256	.313	.670	*	.512	.670	.231
D6	PC	.345	.192	-	.653	.338*	1	.653	.576
	S	.504	.716	.006	.160	.512		.160	.240
D7	PC	.240	.338*	-.656	.239	-.165	.609	1	.670
	S	.646	.513	.157	.649	.755	.199	.649	.391
D8	PC	.576	.188	-.353	.079	-.186	.234	.079*	1
	S	.231	.721	.493	.882	.725	.655	.882	.504

* Correlation significant 0.05 level (2. tailed)

* Correlation significant 0.01 level (2. tailed)

From the result of SPSS multilayer perceptron the driver variables of the input layer (D1, D4, D5, D7 and D8), and the hidden layer (D2, D3, D6, D9, D10 and D11) the synaptic weight minimize the error of target group. The positive value of correlation indict that interaction between factor variable are high on the star. Transportation and inventory system, market center and environmental factor are positive relation. Awareness and market center create positive relation to technology with environment issue. Availability of Service has maximum decreasing value from other factor variable correlation.

4.8 Strength and Weaknesses of Current Supply Chain Management

The strengths and weaknesses of the current supply chain. Concerning that, there are also key improvement areas that outlined and evaluated at different levels such as strategic orientation, process, support management, organization, cooperation, and measurements system.

4.8.1 Strategic Orientation

According to (Cohen,2004), the supply chain strategy designs an unique supply chain configuration that drives strategic objectives. There are five major components such as, manufacture strategy, distribution or outsource strategy, channel strategy customer and supplier strategy and available network infrastructure. Manufacturing strategy define and it used as recommended the optimization strategies of lead-time are not well-defined channel strategy.

Channel strategy used for customized products and indirect distribution channel for standard products. Markets instead on being orientated on global markets where future growth is expected.

Outsourcing strategy depends on volume and suppliers' competences. Outsourcing strategy for other processes and activities is not well-defined [110].

Customer service level defined as specific service for key accounts customer service strategy is not well defined. Service levels according to customer importance are not well organized.

Asset network strategy not established in production equipment from the evaluation of strengths and weaknesses, results that despite many strengths related to different key parts of supply chain strategy, there are also some weaknesses. The most important work on, is the long term depending on customer requirements, type of demand, as well as the cost base [111].

4.8.2 The strategic frame of supply chain integration on oilseed product

The strategic action of supply chain integration approach on according to (Bauer 2001, Pagell 2004), both the relation of intra and intercompany integration across chain in work order.

External (with supplier and customer) and internal integration, process integration, information, data and material flow integration.

Supply chain management according to (Lummus and Vokurka 1991) coordinate and integrate into seamless process of all activates in flow position. (Cooper and Lambert 2000) management integration of supply chain the key business process from end user to supplier.

Depending from different scholars and the analysis of the research the researcher assigns a supply chain integration of oilseed product and manufacturing industry integration.

4.8.3 New Supply Chain Model

From the MICMAC tool analysis the distribution center and inventory system are the dominant factor in supply chain integration of oilseed product and manufacturing industry in west Gojjam, due to this the supply chain system can be organize by their distance from Addis Ababa to each town. The criteria to select the distribution centers are the potential of oilseed production capacity. Those are Bahir Dar, Dangla, Adite, Bure, Shindy, finotselam, soma and Gomer Donde are the area center to customers.

Table 4. 12. Supply chain distribution center

No	Distribution center	Addis Ababa in km	Bahir Dar Km	Dangla km	Adet km	Burie km	Shind km	Gomer Dond	Finotselam km	Soma km
1	Bahir Dar	492	0	76.2	44.3	152	169	215	162	335
2	Dangla	483	76.2	0	120.5	75.8	92.8	138.8	85.8	258.8
3	Adet	446	44.3	120.5	0	196.3	213.3	259.3	206.3	379.3
4	Burie	411	152	75.8	196.3	0	17	63	10	183
5	Shindi	428	169	92.8	213.3	17	0	46	27	166
6	Gomer Dond	474	215	138.8	259.3	63	46	0	73	120
7	Finotselam	418	162	85.8	206.3	10	27	73	0	193
8	Soma	594	335	258.8	379.3	63	46	120	193	0

From the table 4.13 the distribution and collection center allocated in their distance from Addis Ababa to regional state. Define distribution and collection center as in supply chain integration term the process by which materials are collected from the producer and store in inventory. In supply chain integration collecting the required product, the advantage is inspect the quality standard and transport into the customer and manufacturing industries. There are two common types of collection system; central collect to central and decentral collect central [112]. In the design of supply chain integration collection center, when cost efficiency is the objective then the central system is determined, but is time and resource capacity is recommended the decentralize system is valuable to minimize delay time and scarcity in supply chain integration process [113]. In this study, the central to center used to control the product quickly and efficiently. The production of oilseed product capacity increase the collection center also increase with respect to inventory type and transportation system. According to the interviews, centralized collection center is preferable to control the management system and customers to get information. In the analysis of chart value the more preferable center places are bure, shindig, soma, dangla, gomer donned, adite, finotselam, Bahir Dar and soma are palace to reduce transportation problem.

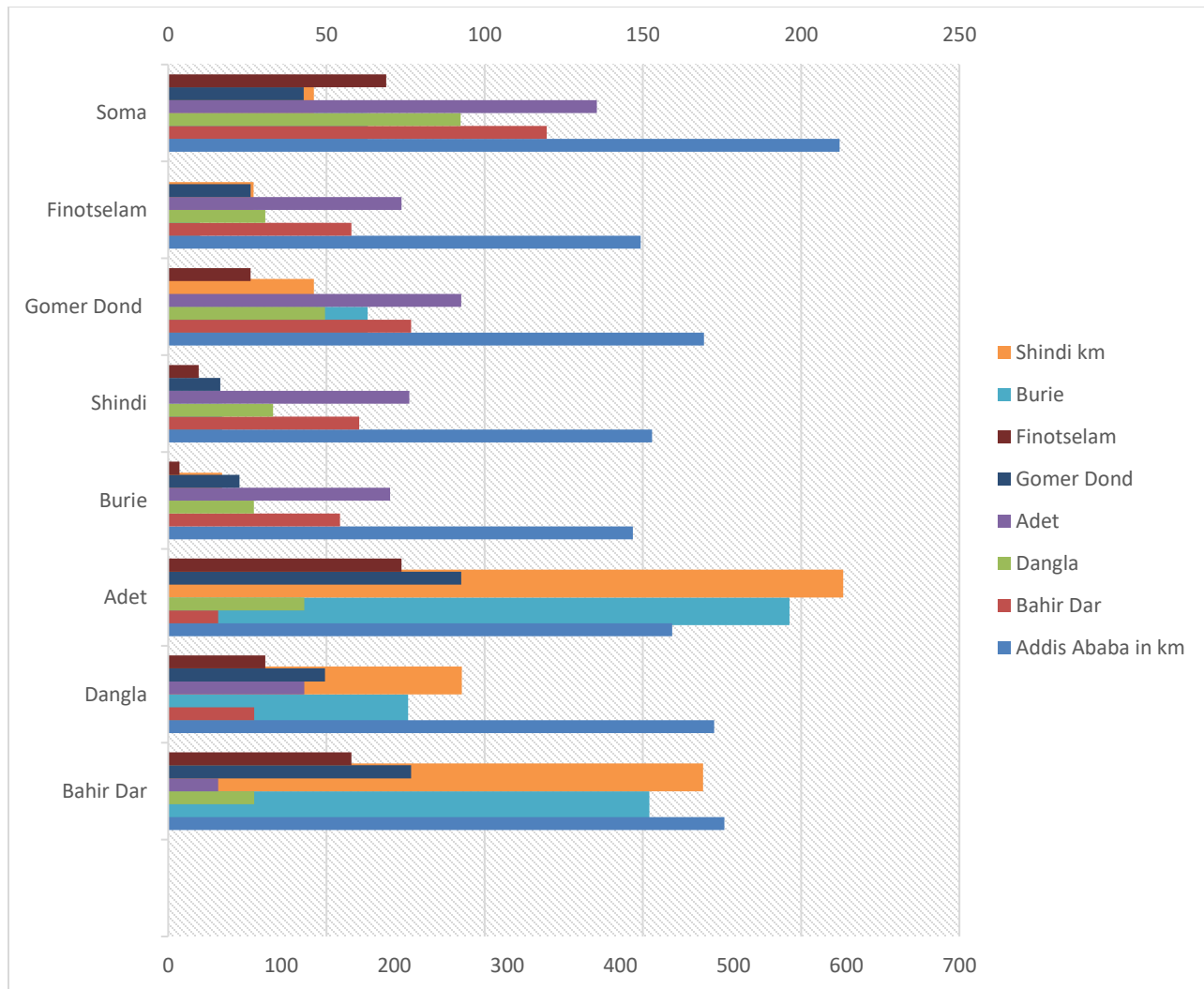


Figure 4. 13. Distribution centers of Supply Chain Integration

From figure, 4.12 the distribution center is an effective management of supply chain integration can help to reduce the transportation cost and reduce the scarcity of resources.

Based on 84.5% of the respondent's transportation, distribution center, collection center and awareness are affect the supply chain activates in W/Gojjam.

Because of the region loss incomes from oilseed product more than 45% of other crop type.

Therefore, develop a proper collection center can help to solve the transportation and scarcity problem in order to maximize the awareness of producers and customers.

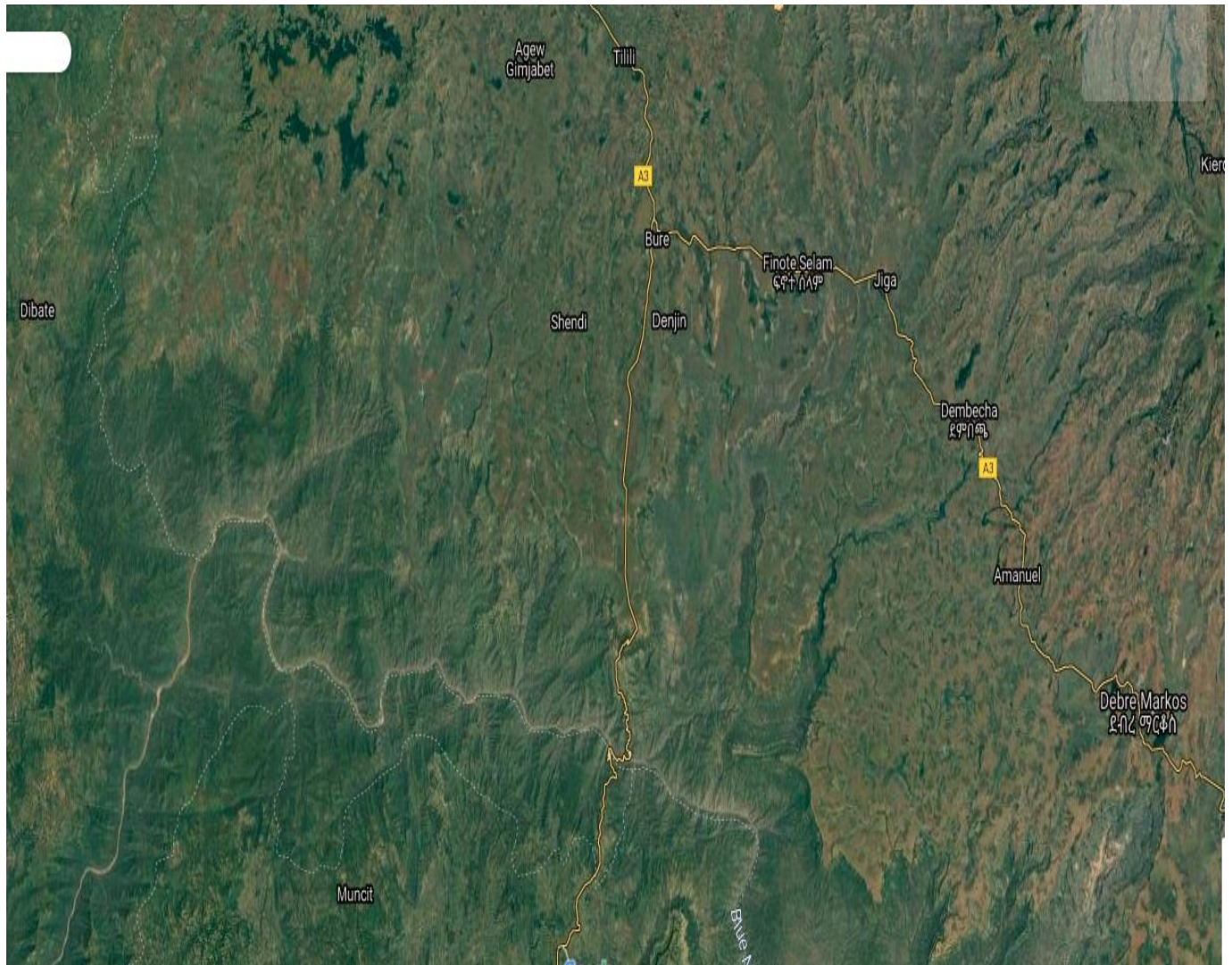


Figure 4. 14. Location Collection Centers

Supply chain integration take time to follow recaps the system. Once up on the system run every branches and main actor in the system are inter mediate participatory into the standard direction. The standard system of oilseed and manufacturing industry revolves initial standing from base-ment of farmer farming area controlling. Where the farming area is account into different way every developmental systems installed. Most of the time oilseed farming area is hot and mountain covered this leads to reduce developing development infrastructure. The chain system divide into five group this cover all the line of supply chain actor in technical assistant working the initial action tested back to again the system truly known if it is accurate or tentatively allow it.

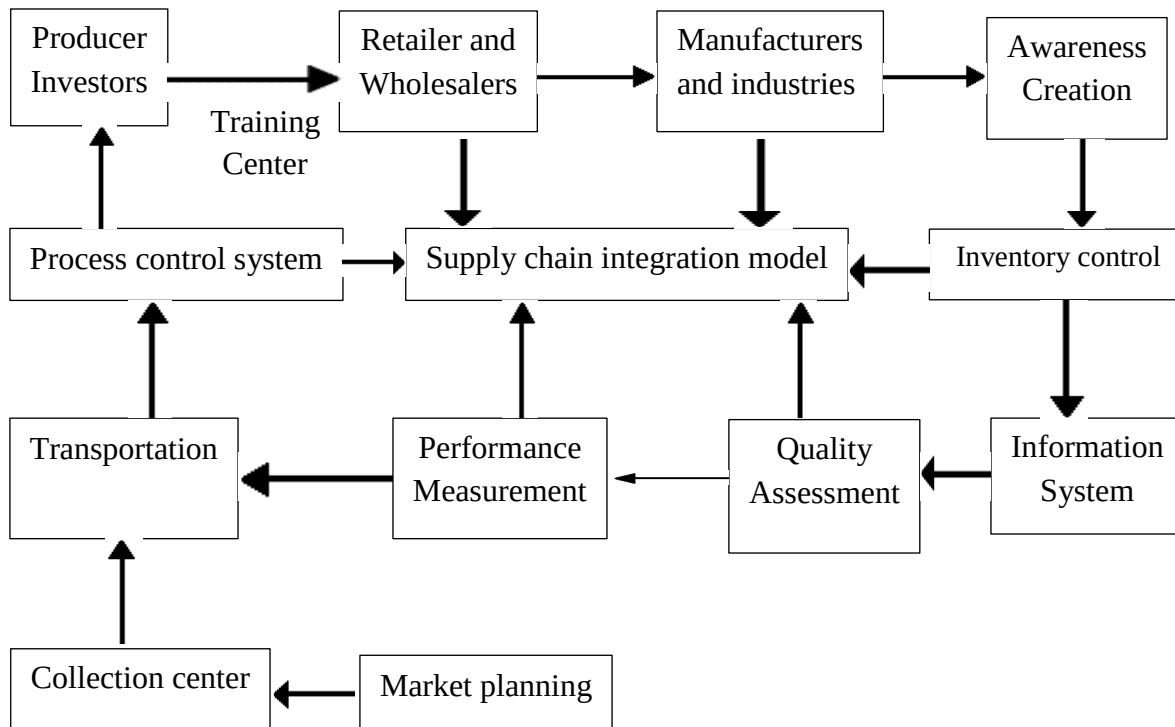


Figure 4. 15. New supply chain integration holistic model

Generally, to summarize the existing statues of west Gojjam oilseed product and manufacturing industry supply chain integration system according to the above data analysis and interpretation comparing to the proposed model ;

- ❖ There is a deficiency of a collection center around investment area because of this, there is scarcity of oilseed product and manufacturers are subject to import in high cost.
- ❖ In west Gojjam, there is the problem of transportation such as, from bure to shindi, the road is peseta and the road is below the standard.
- ❖ From shindi to gomer dond the road below standard and Gomer to Soma there is no road and transportation system but her is there are above than 23 oilseed product investors. They transport their product by animals and labors due to this we loss 15000 to 200000 quintal per year.

- ❖ The most factors that affect the supply chain integration in west Gojjam collection center, transportation and market strategy. Due to this problem, the farmers use oilseed product for boundary declamation with neighbor farm area and protection from animals. This area there is also lack of information, training about the type of product proper to the environment due to this the output is low.

Therefore, it is important to propose a collection center, transportation system and awareness creation center to reduce the scarcity of oilseed product and expense for manufacturing industries. According to the MICMAC result, assign a proper collection center to minimize supply chain integration scarcity problem in oilseed product.

4.8.4 supply chain model

Supply chain integration model proposed to control the gaps in the integration process of oilseed product and manufacturing industry collection center. The main target of model to increase the number of collection centers.

Assumption:

Develop supply chain integration model, the following consideration are proposed:

- ❖ The volume of products with respect to distance should have proportional in transportation costs.
- ❖ Transportation and labor cost defined.
- ❖ Demands of location sites are known
- ❖ Initial collection points will be the generating.
- ❖ The final destination of oilseed product Burie and to other Ethiopia town

$$\text{Minimize Total Transport Cost} = \sum_{i=1}^8 CC_i ANP_i + \sum_{i=1}^8 Tc_i ANP_i \quad (1)$$

Subjected to:

$$\sum_{i=1}^8 ANP_i \geq dc_i \quad (2)$$

$$\sum_{i=1}^8 ANP_i \leq CaC_1, \forall I \in I \quad (3)$$

$$\text{ARP, CC, TC} \geq 0 \quad (4)$$

Notice:

ANPi1 - number of oilseed products transport from customer centers l to collection centers i.

CaCi - capacity of collection center i

CCi - collection cost of oilseed products at collection centers i

dci - the distance cost between customer center l and collection i

I - set of collection center, 1, 2, 3, 4,.....8

L - Fixed set of points for investor centers, 1, 2, 3, 4, ...12

TC1 - transportation cost of oilseed product from customer 1

The above objective function indicates the way to optimize the collection center of the selected area related to the transportation cost in order to collect oilseed product to Bure. The objective function of this model is normally a minimization of transportation cost and develop collection center. The variables show that the quantities of oilseed types to be collect into the collection centers to deliver the final destination.

Now it is possible to decide from the output which variable (site) is best to assign nearest to the other variable (collection center). The goal of this model is to find the values of the model's that gives a best solution for the objective function, which subjected to the restrictions. This model contains 64 variables and 8 constraints. The constraint indicates, the limits on the variables, which expressed the objective value iterate in minimum time.

4.8.5 Major Finding of the Research

Discussed in the literature and data analysis (correlation, Micmac analysis and LP) the drivers and barriers influence the supply chain integration of West Gojjam oilseed product in internal and external. These factors hinder the manufacturers to get raw materials in due date. Therefore, the supply chain integration cannot addressed in very well. The other finding is if the oilseed product reach in market the inspection quality problem occurred due to rain and trans-

portation. However, when a proper collection center assign transportation cost can be minimize. Assign a proper collection center not only minimize scarcity but also increase the initiative of investors and farmers.

4.8.6 Test and Validate Model

Validate the developed supply chain model is an important in order to implement the model perfectly. Check the model will help to provide a better decision make for control the plane and target supply chain integration system. Transportation model tested by LP tool and an optimal solution found compare the existing system of oilseed product. The result of the relative error 0.050 and sum-tailed error is 0.01. The tasted and training values are 42 percent and 58 percent of respectively validation.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Supply chain integration important concept that can help to integrate supplier and manufacturing industry. This study conducts the existing status of W/Gojjam oilseed product supply and distribution integration system that affect the region. After study the status, identify the problem and a literature review was conducted. However, Ethiopia exports different agricultural and skin products this is not the major development method because we sell in cheap and in port very expensive cost. It means that oilseed agricultural product integrated to manufacturing industry want. Most of the time, previous study concern about oilseed product export and how to increase earn implicitly. This is not the way of development but how to integrate the supply chain integration of oilseed agricultural product and manufacturing industry. The study area in W/Gojjam more oilseed product is cultivated in single and mixed crop farming system.

To solve the above problem the compatibility of industry integration with agricultural product would first studied. This study introduces supply chain integration of oilseed product and manufacturing industry of on around the basement of product area.

To achieve the above objective the research conducted related literature review in supply chain, supply chain integration, supply chain management and agricultural product of oilseed product capacity in each concerned area. The research collected primary and secondary data from local area, small oilseed manufacturer and issue government sector. By using, the data collected and observation MICMAC factor analysis used to discuss and explains the result. Finally, frameworks show the supply chain integration of agricultural product and manufacturing industry strength.

The finding of the research show that the problem of industry integration starts from small frame area up to high investors and to manufacturing industry. In the integration of agricultural and manufacturing industry relation the main actor are awareness of farmer's oilseed product how they plow and use to as input of manufacturing industry. In most rural area agricultural oilseed product are uses as additional input or use as control of other crop from animal attack and flood. The researcher concludes about awareness of the actors, line the development infrastructure like transportation system, distribution center, and market system shear or equilibrium market through the year. These studies solve the past study and limitation the assigned framework includes all channels of factors and duty actors. In general, it concluded that supply chain integration framework is

new for west Gojjam, oilseed product distribution center, transportation and awareness will help to manage the suppliers and manufacturers of industry alignment.

5.2 Recommendation

Based on the major finding of the research the following are recommended to the agricultural and industry development integration of west Gojjam administration and all the concerned.

- ❖ Create awareness program for farmers
- ❖ Establish development infrastructures
- ❖ Control the market deficiency in the summer and half autumn season
- ❖ Arrange the meeting line of oilseed agricultural products and manufacturing industry
- ❖ Create industry standards quality and manufacturing level

5.3 Future Research

Supply chain integration the advanced field plays a great role for continuous development and a smooth flow of products to manufacturing industries and customers. These many techniques and method that used to control a supply chain integration. However, the research look like a general guideline, which is an advantage to other researches. To researchers to develop areal control system consider all the different supply chain barriers, drivers and security are an important issue. Therefore, it recommended to researchers to study the development of supply chain integration, advantage of integrating oilseed product and manufacturing industries, market strategy and control the factors of supply chain integration.

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ADDIS ABABA UNIVERSITY INSTITUTE OF TECHNOLOGY
SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDUSTRIAL STREAM



TITLE: SUPPLY CHAIN INTEGRATION OF OIL SEED PRODUCT AND
MANUFACTURING INDUSTRY IN WEST GOJJAM

By: Zelalem Girmaw zgirmaw19@gmail.com

Advisor Dr. Gulelat Gatew

Co. Advisors Mr. Shmelis (PhD)

Acknowledgement to the respondent

Hereby, I would like to express my gratitude for your dedicate cooperation. Your smooth supports help me to do perfectly this project. This questionnaire is conduct for the purpose of fundamental scientific research. Therefore, we assure you that the information obtained from this questionnaire, put in correct place and not transferred to other any other. You may feel free to verify these statements from us personally. For other questions pertaining to this research, please contact Mechanical Department, head of the department.

Yours Sincerely,

Thank you for your assistance

ENGLISH QUESTIONNAIRE FOR FARMERS

The purpose of this questionnaire is to gather relevant information regarding the supply chains of oil seed agricultural product and manufacturing industry relation. The information that you provide is strictly confidential and be used for this study purpose.

Thank you for your cooperation!

1.0 General information

2.0 Sex of respondent: ☐ Female ☐ Male

Your age in years: _____

What is your profession? _____

3.0 What is your position in this company? _____

4.0 What was the highest level of education you completed? Mark only one.

5.0 ☐ Elementary school ☐ High school

6.0 ☐ Certificate ☐ Diploma

7.0 ☐ Bachelor degree ☐ Master's Degree

8.0 ☐ PhD

9.0 other _____

1. The type of Farming system you use.

☐ Part time job

☐ Fulltime job

2. How much land cultivate in a hector? -----

3. The crop types and variety that you produce please label in the given information (very low=1, low =2, medium =3, high =4, very high=5) use this sign (√).

No		Degree				
	Type of crop cultivate in your farming	1	2	3	4	5
1	Sesame					

2	ground nut					
3	Sun flower					
4	Gomen					
Depending on production amount /yield/ in each crop per year		1	2	3	4	5
1	Sesame					
2	Ground nut					
3	Sun flower					
4	Gomen					
Crop production selected criteria in your farming case		1	2	3	4	5
	Based on market demand criteria					
	Based on material supply					
	Based on environment					
	Based on export currency					
	Based on agriculture manager push mentee					
Crop variability amount		1	2	3	4	5
	Do you know how to increase your products quantity					
	Do you know how to increase your products quality					
	Do you perform pre condition about crop growth rate					
	Use of URA for crop growth					
	Use of DAP per year					
Depending growth rate in month		1	2	3	4	5
	Sesame					
	Ground nut					
	Sunflower					
	Gomen					

Type of farming tool /use technology/	1	2	3	4	5
Plowing Tractor					
Traditional system by ox					
Hand hammer/labor/					
Harvesting /collecting/ tool	1	2	3	4	5
Combiner tractor machine					
Manual deriver combiner					
Labor					
Depending crop quality grade	1	2	3	4	5
crops graded system					
Sesame					
Sunflower					
Ground nut					
Gomen					
Depending inventory	1	2	3	4	5
Did you think that Inventory system strength supply chain					
Did you thank that mass use inventory system is reduce product quality					
Inventory position					
Cognitive working /work culture/system	1	2	3	4	5
Is their team work					
Individual working condition					
The place compatible for investment					
Related on storage	1	2	3	4	5
use safety store your products after collecting					
the crops packed system when stored					

	Long type crop are stored with acceptable quality					
	Are storage easy to control system					
	Are the storage comfortable for distribution center					
	the storage decline the supply chain system of your product					
QUESTIONS RELATED TO SELLS		1	2	3	4	5
	The method to got price of crop product in market					
	Exchanging system of crop product in market					
	Do you know how to determine crop sells price					
	Did you think that the relation system of customer smooth					

4. 3. To whom you sell your products? Put this sign if you agree (√)

No	Actor	Buyer				Amount		Selling price
		whole-saler	retailer	factory	Single customer	Kg	%	
	Sesame							
	Sun flower							
	Ground nut							
	Gomen							
	other							

4.4. Do you have an agreement to sell to particular agency?

☐ yes

☐ No

If yes: Every how many years do you renew the contract?-----

4.5. Do you find the buyers or do they find you?-----

4.6. Do you have surplus to sell? When you have surplus, who do you supply? -----

4.6.1 What causes the surplus? -----

5. QUESTIONS RELATED TO TRANSPORTATION

5.1. Do you transport the Products? If yes

Product type	Mode of transport	Quantity	Distance	Hired/owned transport	Transport cost /quantity	Loading cost	Unloading cost
Sun-flower							
Ground nut							
Gomen							
Sesame							

5.3. Are there any losses during transport?-----

5.3.1 How much in kg/kuntal? -----

5.3.2 What causes the loss? -----

6. GENERAL QUESTIONS

6.1. Are there any cooperatives or other organizations for you?-----

6.1.1 If yes, are you part of any cooperative or organization?-----

6.1.2 If so; what supports do you obtain? -----

6.2. Have you ever attended any training related to market system?-----

6.3. In your experience, what things could be done to maximize crop product and supply chain?-----

6.3. What do you think about supply chain? -----

6.4. Do you think that production of oilseed product in west Gojjam high? -----

2. QUESTIONNAIRE (WHOLSALERS AND RETAILERS)

The purpose of this questionnaire is to gather relevant information regarding the supply chains of oilseed product and manufacturing industry. The information that you provide is strictly confidential and will be used for this study purpose.

Thank you for your cooperation!

1. General information

1.1. Job category put this sign in the box (√)

☐ Wholesaler

☐ Retailer

1.2. Education status

☐ No Education

☐ Primary

☐ Secondary

☐ Higher education.

1.3. Work experience?

☐ 1-5

☐ 5-10

☐ Greater than 10

2. QUESTIONS RELATED TO BUYING/Market Shear/ 2.1. Do you find the sellers or do they find you?

2.2. Do you make agreements with the sellers? For how long?

No	Buy from			Place of production	How much buy per time	Buying frequency days/hour
		Retailer	wholesaler			
Sunflower						
Ground nut						
Sesame						
Gomen						
Farmer						

2.3. Are the crops sorted and graded before sell? If so by whom?

2.4.1. What kind of standards is in practice to grade and sort the products?

☐ Variety

☐ Size

☐ quality

☐ all of them

2.4. 2 Do you measure the product quality before you purchase? -----

2.5.1. Are there any quality standards which you use?

2.5.2. Do you pay different prices for different classes/quality of products?

- 2.5.3 How are the crops packaged when you buy it?
- 2.6. At what price do you buy the crops per kg/kuntal? What affects the price? -
- 2.7. Do you have any way to find out about the prices in advance? -----
- 2.8. What quantity of crops is low cost during the buying process? -----
- 2.9 What type of crop is high cost? -----
- 2.9.1 What type of crop is low distribution in market? -----
- 2.9.2 What type of measure you take when low crop distributions appear?-----

3. QUESTIONS RELATED TO TRANSPORTATION

3.1. Do you transport your products? If yes

Mode of transport	Quantity/type/				Distance	Hired/owned transport	Transport cost /quantity	Loading cost	Unloading cost
	ses-ame	Groun d nut	Sun flower	Gomen					
Trucker									
Isuzu									
Donkey									

- 3.2. Do you use safety during transport? How?
- 3.3. Are there any losses during transport?.....

4. QUESTIONS RELATED TO STORAGE

- 4.1. In what kind of facility do you store your products until sell? -----
- 4.2. During storage, do you sort the products according to their types, grades and quality?-----

4.3. How are the crops packaged when stored? And for how long will it be stored?

.....

4.4. Do you use safety grade while storing? What type of safety are uses?

.....

4.5. How do you treat your crops during storage?

No	Type of packing/treating	packaging		
		quantity	cost	
			material	labor

4.6. Are there any difficulty during storage?.....

5. QUESTIONS RELATED TO SELLING AND DISTRIBUTION

5.1. To whom do you sell your products?

No	Actor	Amount		Selling price/kg
		kg	%	
	Wholesalers			
	Retailers			
	Directly to consumers			
	other			

5.2. Do you have an agreement to sell to particular agency?

☐ yes

☐ No

If yes: Every how many years do you renew the contract?.....

5.3. Do you find the buyers or do they find you?

5.4. How do you pack your crops during sells? -----

6. GENERAL QUESTIONS

6.1. Are there any cooperatives or other organizations for you? -----

If yes, are you member of any cooperative or organization?-----

If so; what supports do you obtain.....

6.2. Have you ever attended any training related to market system?-----

6.3. In your opinion, what things could be done to maximize crop quantity distribution system in the supply chain?

6.3. What do you think are the greatest problems in the supply chain around their?

6.4 What do you think should be done to solve the problems?

Manufacturing industry

To manager

Introduction

1. What is your company product?-----

2. Who is your supplier?-----

3. Who is your customer?-----

4. In what interval the company buy raw material?-----

5. How much you buy in one time?-----

6. Are the customer fulfill all items in one duration?-----

7. By what technology travel the material?-----

8. What type of packaging system you use?-----

9. What type of market system use?-----

☐. Pull up

☐. push up

10.If you use pull up what advantage you got ?-----

11.If you use push up also what advantage you got?-----

12. Do you think that the cost is appropriate for raw material?-----
13. If yes, what are customers assumption to your company?-----
14. If they are not satisfied what are the factors affected?-----
15. What type of customer attraction use?-----
16. When the market full?-----
17. Is their crop cost variability /market valuation /appear? -----
18. At what month the market instable /increase/?-----
19. When transportation is difficult?-----
20. What are the other difficulty to full run up the integration between your customer?-----
21. How do you know about supply chain development system?-----
22. What factors reduce the relation of customer?-----
23. Do accompany have a legal system how to develop customer attraction? or a study center?-----
24. If there is a past study about customer attraction or relation? By what system studied?-----
25. For whom deliver the company product?-----
25. How deliver the product to your customer?-----
26. By what system delivered to the customer?-----
27. Are everyone known your product -----
28. What type of measure use when shortage appear?-----
29. Is there any agency give to training about supply chain, customer and supplier relation?---
2. Please rate the following based on your privacies opinion about supply chain integration oilseed product in west Gojjam. Strong disagree=1, disagree=2, neutral=3, agree=4, strongly agree=5.

No	Factors	Code				
		1	2	3	4	5
1	Do you think that raw material distribution interval affect raw material on company integration					
	the customer fulfill all items in one duration					
	travel technology system for material					
	The type of packaging system you use					
	The type of market system use					
	Use of pull up market system					
	Use of push up market system					
	the cost raw material is appropriate					
	The customers assumption to your company					
	The type of customer attraction use					

For Farmer interview

Introduction

1. What type of crop you produce?-----
2. How many hectares do you have-----
3. How much kuntal do you got in one farming year?-----
4. What type of technology do you use for farming? -----

☐ tractor
☐ by ox
☐ hand craft
☐ other---
5. What type of chemical do you use for farming? -----
6. How many month take to reach one farming year crop?-----
7. What are the main factors affects you?-----
8. What kind of harvesting crop system do you use?

☐ Combiner ☐ labor ☐ other

9. Is there any mechanism to harvest the crop on time?-----

10. What are the major factors affect your farming and distribution system?-----

11. Who is your customer?-----

12. Are the price appropriate?-----

13. If No, what measure you take?-----

14. When you sell?

☐ Summer ☐ winter ☐ spring

15. How they buy?

☐ From house ☐ From market ☐ From storage ☐ other

16. How much time you sell?

☐ Once ☐ In month ☐ In two month interval ☐ other

17. Are there any agreement in your customer? -----

18. By what interval it approved?-----

19. How many customer do you have?-----

20. What major factors are existing in your farming process?-----

21. Transportation system you use? -----

22. Did you see the market in media? Yes or No

If yes

☐. when-----

☐. At what time-----

1. From where do you buy the raw material? Make X in the required box.

☐ From Ethiopia

☐ out of country

☐ Other place

2. Do you have constant customer? -----

3. What are the major factor that influences your supply system? Cheek all if the following factors exists and please rate the degree of existence using (very low = 0, low = 1, medium =3, high = 5 and very high =7)

Factors of supply chain		Degree of existence				
		0	1	3	5	7
1.	Transportation					
2.	Marketing					
3.	Competitor's					
4.	Inventory					
5.	Information					
6.	For manufacturing industry market shear					
7.						
8.						

Thank you!