

# Factors of Sesame Supply Chain Management Practice in Ethiopia

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**Abstract** This is a study with an objective of assessing the Factors of Sesame Supply chain Management practice in Ethiopia. As sesame is an oil seed that is generating the lion share of foreign currency for Ethiopia, the study will have bigger significance in evaluating and identifying the significant factors of the sesame flow from origin/farm to exporting firms in the country. The study has targeted the whole chain participants which are large scale registered farmers, traders who collect sesame from the farmers, Ethiopian Commodity Exchange an authority controlling the overall flow of export items in the country and finally the exporters. Using primary data mainly questionnaires collected from 336 respondents, the research objectives have been achieved and found that the logistics system, chain members integration and operational capacity of each chain element participants are significant factors facilitating the flow of sesame from the farm to its export point.

**Keywords** Logistics system, Chain members' integration, Operational capacity

## 1. Introduction

### 1.1. Background of the Study

Sesame is believed to be the native oil seed to the African savanna, however, its domestic production was recorded in the Middle East and India since 4000 years ago (Ayana, 2015). Globally, the top largest producers of sesame are Myanmar, India, China, Sudan, Uganda and Ethiopia (Girmay, 2018). Evidences also indicated that Ethiopia ranked third in Africa in terms of sesame production (Hagose, 2017; Wijnands, Biersteker, & van Loo, 2009).

In terms of export potential, Ethiopia is the third world exporter of sesame seeds after India and Sudan (Alemu & Meijerink, 2010; Temesgen, Gobena, & Megersa, 2017).

Sesame is the second largest export item in Ethiopia next to coffee from which the country gains large share of foreign currency. (Ministry of Trade, 2018/19) Being cultivated in the western and North western part of Ethiopia, Sesame flows through different chains to be exported out the country. These chains elements are the large scale farmers, the traders, ECX and the exporters on which this study has highly relied on.

Sesame supply chain management has been studied in depth even though the factors associated to its performance

have been ignored by many researchers. Supply chain management of such products has been evaluated from the point of many factors from which the dominant ones are the production capacity of the origin/farmers in our case/, the logistics system which comes from the transportation, warehousing and information sharing aspect, the chain environment through which the items flow related to the climatic conditions, social and political situations and finally the integration among the chain members of the item under consideration which is sesame in our case.

Ethiopian sesame supply chain is regulated by the government body, ECX, with a role of promoting sesame trade and regulating the overall supply chain that sesame passes through. ECX is authorized body playing the role of assuring quality of the sesame traded, facilitating quality warehouse, smooth process flow/system and protecting the participants having forecasted market and environmental conditions in the country. (ECX, 2019)

### 1.2. Statement of the Problem

Unlike that of Coffee which is largest export commodity in Ethiopia, Sesame supply chain has been found to be too slow and unfitted with the expectations of the government in the country. In terms of export potential, Ethiopia is the third world exporter of sesame seeds after India and Sudan (Temesgen, 2017). Sesame is the second major export cash crop in Ethiopia, next to coffee (Abebe, 2016). According to Food and Agriculture Organizations (FAO) (2015), Sesame is an important cash crop and plays a vital role in the livelihood of many people in Ethiopia. However, a number of challenges hamper the development of the sesame sector

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along with the supply chain (Berhe, 2019) Therefore, this study is meant to evaluate the Factors of Sesame Supply chain Management practice in Ethiopia.

### 1.3. Hypothesis

In order to address the problem specified, the following null hypothesis has been developed.

- ✓ Production/operational capacity participants has significant effect on the Sesame Supply Chain Management practice in Ethiopia
- ✓ Logistics system has significant effect on the of Sesame Supply Chain Management practice in Ethiopia
- ✓ Chain member integration has significant effect on Sesame Supply Chain Management practice in Ethiopia
- ✓ Chain Environment has significant effect on Sesame Supply Chain Management practice in Ethiopia

### 1.4. Objectives of the Study

The main objective of this study is to evaluate the Factors of Sesame Supply chain Management practice in Ethiopia specifically being target to evaluate the roles of logistics system, operational capacity, chain members' integration and chain environment on the sesame supply chain management practice in Ethiopia.

### 1.5. Scope of the Study

This study is mainly targeted at sesame supply chain management factors in Ethiopia specifically on the north and western part of the country from where the main sesame production starts. Additionally, the study has incorporated the traders and exporters in Addis Ababa who are the chain elements dwelling in the capital while working with the farmers and ECX in the north and western Ethiopia.

## 2. Review of Literature

### 2.1. Definition and Concepts of Supply Chain Management Performance

Supply chain management has been defined by scholars of who have common means with Martin Christopher, 2011 who has stated supply chain management as the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole. Supply chain management is applied by companies across the globe due to its demonstrated results such as delivery time reduction, improved financial performance, greater customer satisfaction, building trust among suppliers, and others.

Supply chain management performance is defined as the operational excellence to deliver leading customer experience (Simchi-Levi *et al.*, 2003). This shows the supply chain is assumed to be performing better whenever the customers are being delivered with the product under consideration without major interruption and flexibly with

changes in the demand level of the product that the customers demand.

### 2.2. Factors Affecting Supply Chain Management Performance

Even though the factors affecting supply chain management performance vary from product to product, the most commonly referred ones are manufacturing capacity, logistics system, and integration among the chain participants, environmental factors in which the participants reside in.

#### 2.2.1. Manufacturing Capacity

Manufacturers create value by producing and marketing product/service bundles to either end customers or intermediate members of the supply chain (Bowersox *et al.* 2007). According to Benetto and *et al.*, 2009, manufacturing which is the first supply chain point, next to the raw material sourcing, is expected to be one providing quality and being flexible in providing what and how much the customers are in need of.

#### 2.2.2. Logistics System

Businesses in all types of industries are placing far greater emphasis on the design and management of logistics processes and the integration of those processes upstream and downstream with those of suppliers and customers, Donalde waters, 2010. Logistics system is then defined well by most writers from whom the common definition by Bowersox *et al.* 2007 states that logistics is a flow of material between two points including the storage and geographical movement to be underlined in any logistical systems.

#### 2.2.3. Integration among Chain Participants

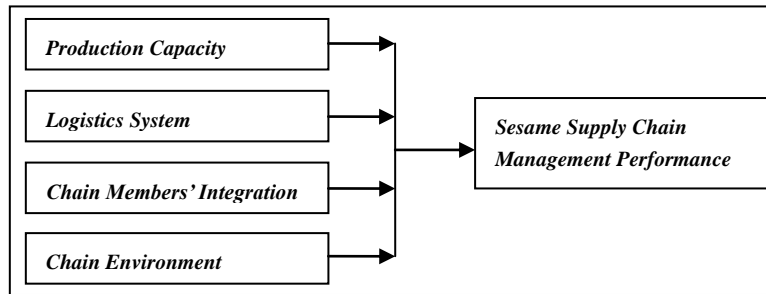
Supply chain integration as defined by DrDawei Lu, 2011, is a cross organizational interaction and exchange between participating members of a supply chain. This integration is stated to be the key for performing the overall delivery of a product from the point of its origin to the point of the end consumption, consumers.

#### 2.2.4. Chain Environment

Companies need to implement new strategies that allow them to deal with environmental uncertainties in the supply chain (Wu, 2006) in order to perform in a proficient manner. The environment includes the natural environment the participants reside in and the government support and regulations.

### 2.3. Conceptual Frame Work of the Study

For the purpose of addressing the objectives of this study, after reviewing certain literature on the supply chain management performance, here the researcher has developed proper conceptual framework on the factors in the sesame supply chain management practice in Ethiopia.



Source: developed for this study

### 3. Material and Methods

#### 3.1. Population and Sampling

The target of this study are the sesame supply chain participants in Ethiopia who are the farmers, traders, ECX and the exporters whose number has been given as the following along with the proportional samples derived from the total population using Yamane Taro's formula displayed where  $n$  stands for the sample desired,  $N$  for the total population at hand and  $e$  stands for the error margin.

**Table 1.** Population and Sampling

Target Population	Total number	Samples	$n = \frac{N}{1 + Ne^2}$ $n = \frac{1702}{1 + 1702 \times 0.05^2}$ $= 324$
Farmers	1033	195	
Traders	426	81	
ECX	243	46	
Exporters	19	19 **	
Total		343	

\*\* taken all as the number of target is manageable

Source: ESA, 2019

#### 3.2. Data Types, Collection Procedures Analysis Methods

Primary data mainly questionnaire has been distribute to the total of 343 target. The questionnaires were distributed randomly to the respondents to avoid bias and 336 questionnaires were full returned having desired responses.

The collected data have been coded and fed on SPSS 20 version form which descriptive and inferential analysis has been obtained. The descriptive analysis was made in terms of standard deviation, min and max response rate to evaluate the respondents' evaluation of the chain as a whole from the point of pre-stated factors and chain performance. Inferential analysis mainly multiple linear regression has been used to measure the effect of the independent variable/factors of

sesame supply chain/ on the dependent/sesame supply chain performance in Ethiopia.

The mathematical model for the multiple linear regression of this study has been presented here, where SSCP represents sesame supply chain performance in Ethiopia, LS stands for logistics system, CMI stands for chain members' integration, CE for chain environment and PC is to mean production capacity of the farmers/operational capacity of the other chain elements.  $\beta_0 - \beta_4$  stand for the coefficient of the variables in having contribution to the sesame supply chain performance in Ethiopia while  $\varepsilon$  stands for the expected tolerable error margin of the model under consideration.

$$SSCP = \beta_0 + \beta_1 PC + \beta_2 LS + \beta_3 CMI + \beta_4 CE + \varepsilon$$

### 4. Results and Discussion

From the sample of 346 respondents 336 ones have returned well written responses which are used to evaluate the major and specific objectives of the sesame supply chain performance factors in Ethiopia. All the respondents were from the highly concerned staff about the flow of sesame throughout the chain and they are the ones chosen based on their experience which is a minimum of a year stay in their current unit.

#### 4.1. Descriptive Analysis

Sesame supply chain management practice has been investigated from the influencing factors indicated as Operational capacity of the chain members, Flow Facilitating Logistics system, the chain members' integration and their environment in which the chain operates. Each of these factors and the sesame supply chain performance has been evaluated through detailed sub variables and the overall average view has been shown with the SPSS output below.

**Table 2.** Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Overall Operational Capacity of chain members	336	1.00	5.00	3.4250	.59095
General Logistics System in the chain	336	1.00	5.00	3.8229	.70597
overall chain Members integration	336	1.00	5.00	3.3028	.70842
Chain Environment	336	1.00	5.00	3.3988	.69517
Sesame Supply chain performance	336	1.00	5.00	2.7833	.61520
Valid N (listwise)	336				

As it can be seen from the summarized evaluation of the responses sesame supply chain performance has been rated below average performance expected with a mean of 2.7833 showing that the sesame supply chain management in general has lesser performance in meeting the required level. As such the sesame supply chain performance which has been evaluated from the point of supply reliability, flexibility, speed and consistency is indicated to be lesser performer.

As the supply chain performance is lesser, the factors of the chain performance have also shown to have lesser capability. Except the Logistics system which has been proved to be better performing all the other factors of sesame supply chain are rounded to only the average showing relatively lesser capability in the chain. Therefore, the chain performance has been weakened with the poor operational capacity of the chain participants, with the poor integration they have among and the less performing chain environment they pass through.

#### 4.2. Regression Analysis

As the sesame supply chain in Ethiopia has been rated to perform lesser this study has tried to answers what the role of the factors is in affecting the chain performance. Therefore multiple linear regression has been run through SPSS and the

following out comes have been drawn.

**Table 3.** Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.86 <sup>a</sup>	.670	.662	.23578

a. Predictors: (Constant), Chain Environment, Overall Operational Capacity of chain members, General Logistics System in the chain, overall chain Members integration

As it can be seen from the model summary output above, the factors of sesame supply chain have stronger degree of association .864 as indicated by R. this shows that the overall factors of the chain improvement is also expected to raise the supply chain performance. The adjusted R square also shows that the sum total effect of the sesame supply chain performance factors is significant accounting for 66.2%. This is an indicator that the improvement in these chain factors can result in this percentage increase in the sesame supply chain performance of the country.

The specific factors effect on the sesame supply chain performance has further been indicated through the coefficients table below.

**Table 4.** Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.572	.239		6.587	.000
	Overall Operational Capacity of chain members	.017	.058	.016	.292	.038
	General Logistics System in the chain	.271	.057	.311	4.744	.000
	overall chain Members integration	.082	.058	.095	1.420	.006
	Chain Environment	-.046	.054	-.052	-.857	.059

a. Dependent Variable: Sesame Supply chain performance

The highest effect on the sesame supply chain comes from the logistics system that prevails in the chain connecting each of the chain participants in the flow of sesame from farmers to the last exporters in the country which accounts to 31.1%. This shows that the improvement in the logistics system like the transportation facility, warehousing and inventory management can result in 31.1% increase in the sesame supply chain.

The second significant factor here is chain members' integration accounting to 9.5% effect on the sesame supply chain performance indicating that if the chain member can plan and act together on the chain issues they have the possibility of raising the performance of the chain to this level.

The last significant effect on sesame supply chain performance comes from operational capacity of the chain participants having around 1.6% on the chain performance while the chain environment has almost insignificant effect of the sesame supply chain performance in Ethiopia.

Therefore the hypothesis drawn were accepted except chain environment has been rejected to have significant effect on the sesame supply chain practice in Ethiopia as its significance level fails above the minimum error margin as shown in the table above.

## 5. Conclusions

Being based on the data analysis made in relation with the objectives of the study the following major conclusions have been reached.

Logistics system has been proving to have the highest effect on the performance of sesame supply chain in Ethiopia. Logistics system which is the sum total factor of material flow, information sharing, transportation and warehouse management is bigger factor determining whether the performance of sesame is better or not in general. Therefore the stronger the information sharing, material flow, transportation and warehouse management is made to be, the

better the performance of sesame supply chain can be concluded in this sense.

The second significant factor proved is, chain Members integration which is expressed in terms of chain members joint planning culture, communication, feedback taking, evaluation and information reliability among has been found to have significant contribution to the performance of sesame supply chain in the country.

The third significant contributor to the performance of sesame supply chain management is operational capacity of sesame supply chain participants in Ethiopia seen from the perspectives of meeting quantity and quality requirement so the other chain elements, flexibility to raise or lower their supply and consistency of deliver to their respective customers in the chain.

Finally, chain environment was found to be insignificant factor contributing lesser to the performance of sesame supply chain performance in the country.

In conclusion, as these contributors have significant role in the sesame supply chain performance of Ethiopia, must be given emphasis by the sector leaders in improving their practice to help the oilseeds export in the country as it is the base for foreign exchange generation.

## 6. Recommendations

Logistics System an organized way used to plan, organize, coordinate, and implement the bridging of the dimensions of time and space within a supply chain system. Logistics is thus one of the most important functions of the economy. These ranges from the procurement of raw materials to their processing and to the delivery of the goods to the end-user or throughout the chain of a product flow (Harald Gleissner and J. Christian Femerling, 2013). This shows how much we must emphasize on the logistics system as key for the better performance of the whole chain in which the logistics system exists.

Therefore the government as a primary beneficiary of the sesame export must control and facilitate the transportation availability and safety, warehousing infrastructures at specific nodes area and develop information exchange infrastructures thought the areas of sesame supply flow.

Chain members' integration is the other important contributor to the performance of sesame supply chain performance. Integration is the best tool of facilitating stronger supply chain flow in supporting joint planning, action as well as commonly agreed evaluation of operations among the chain elements (Tagay F. and Lamesgin D, 2019). As such the sesame supply chain elements shall be advised to jointly plan their respective demands, supply abilities, feedback giving and taking procedures and the like to let succeed in this operation.

The other contributor of better supply chain performance is production/operation capacity of chain elements in meeting the demands of the respective elements they serve. According to Kenta Tomura, 2015 many supply chain

elements failed to plan and raise their production capacity in a way it meets the requirements/demand of the other demanding chain element and the final output of the supply chain fails lately as a result of the poor production capacity of such firms. Therefore our sesame supply chain members must be motivated to plan and make their production/operation capacity competitive to each other in a way it supports the final goal of the sesame supply chain.

## 7. Future Research Directions

This study has final concluded that the major significant factors influencing the sesame supply chain management practice are logistics system, operational capacity and chain members' integration whose effect accounts to 66.2% on the practice indicating that the remaining 33.8% are factors whose effect has not been predicted yet and we recommend other researchers to address untouched factors here in this study.

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