Factors Affecting the Implemented Coffee Traceability Marketing System in Ethiopia Commodity Exchange, Jimma Branch

Research Thesis Submitted to Jimma University College of Business and
Economics Department of Management in Partial Fulfillment of the
Requirements for award of Master's degree of Business Administration (MBA)

BY:

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JIMMA UNIVERSITY COLLEGE of BUSINESS and ECONOMICS MBA PROGRAM

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BY:

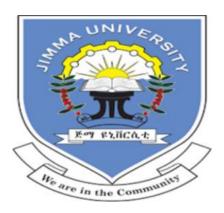
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MBA PROGRAM

DECLARATION

I hereby declare that this thesis entitled "Factors Affecting the Implemented Coffee Traceability Marketing System in Ethiopia Commodity Exchange, the case of Jimma Branch" has been carried out by me under the guidance and supervision of Mr. Wubishet Mengesha and Ms. Tsigereda Aboye.

The thesis is original and has not been submitted for the award of degree in any other University or Institution.

Researcher		
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Signature:	 _	
Date		

CERTIFICATE

This is to certify that the thesis entitled "Factors Affecting the Implemented Coffee Traceability Marketing System in Ethiopia Commodity Exchange, the case of Jimma Branch" Submitted to Jimma University for the award of the Degree of Master of Business Administration (MBA) and is a record of Valuable research work carried out by Mr. Mohammed Soma, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree of diploma.

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Co - Adviser's Name	Date	signature

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By: MOHAMMED SOMA HASAN

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Abstract

This study has been done to examine factors that affected the implemented coffee traceability marketing system in Ethiopia Commodity Exchange, Jimma branch. Hence, descriptive and explanatory research designs with qualitative and quantitative approaches have been used for the study. The target populations were 323, and the Stratified Random sampling method was used to draw 130 samples from the heterogeneous groups. For gathering primary data, questionnaires, interviews, and focus group discussion have been used and the secondary data were compiled from different sources. Four independent variables (awareness creation/ development, supply chain intricacy, legislation, and controlling system) were used to measure the traceability performance so as to analyze the current coffee traceability system in ECX Jimma branch and thereby to take respective measurements after the analysis. Descriptive and inferential statistics have been applied for the analysis. Hence, the results from the regression model summary & analysis of variance indicated that the goodness fit of the model and the estimated independent variables could explain 88.5 percent variation in the current coffee traceability performance, and this situation can be taken as a warning alarm for the ECX and the concerned bodies to take the right remedial action to sustain the traceability system. Beside to the findings, feasible recommendations with perspectives of the concerned organizations have been forwarded by the study so as to abet the sustainability of coffee traceability marketing system particularly in ECX Jimma branch, and generally at Ethiopia Commodity Exchange. Finally areas of future research direction have been suggested by the study.

Key words: traceability, awareness creation, legislation, supply chain intricacy, controlling system

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Table of contents

CHAPTER ONE:	1
1. INTRODUCTION	1
1.1. Background of the research	1
1.2. Background of the Study area/Organization.	2
1.3. Statements of the problem.	4
1.4. Objectives	6
1.4.1. General Objective	6
1.4.2. Specific Objectives	6
1.5. Scope of the Study	7
1.6. Significance of the Study	7
1.7. Limitation of the Study	7
1.8. Organization of the Paper	8
CHAPTER TWO	9
2. Review of Related Literatures	9
2.1 Theoretical Literatures	9
2.1.1 Traceability Concepts and Definitions	9
2.1.2 Objectives of Traceability	12
2.1.3 Importance of Traceability	13
2.1.4 Effectiveness of Traceability Systems	
2.1.5 Traceability Model	14
2.1.6 Supply Chain Traceability	16
2.1.7 Goal of Effective Traceability	
2.1.8 Standardization of Information	17
2.1.9 Traceability through Information Exchange	18
2.1.10 The Risk Factors Impact on Food Traceability	19
2.1.11 Traceability and Legislation	19
2.2 Empirical Literatures	20
2.2.1 Traceability in Green Coffee Supply Chain	
2.2.2 The Traceability Requirements	24
2.2.3 The Importance of Traceability	
2.3 CONCEPTUAL FRAMEWORK	25
CHAPTER THREE	
3. Research Design and Methodology	
3.1 Research Design.	
3.2 Sources of Data.	
3.3 Target Population & Sampling Methods	
3.4 Method of data collection	28
3.4.1 Primary data	28
3.4.2 Secondary data	
3.5 Reliability and Validity of the Instrument	
3.6 Data Processing and Analysis.	
3.7 Ethical consideration.	34

CHAPTER FOUR	35
4. DATA PRESENTATION, INTEPRETATION and ANALYSIS	35
4.1. Demographic profiles (Background) of the Respondents	36
4.2. Current status of factors affecting the implemented coffee traceability	37
4.2.1. Awareness development	38
4.2.2. Supply chain intricacy	41
4.2.3. Legislation	44
4.2.4. Controlling System	45
4.2.5. The Current Coffee Traceability Marketing practice at ECX	48
4.3. The analysis of Pearson's Product Moment Correlation Coefficient	51
4.3.1 Results of Pearson's Product Moment Correlation Coefficient	53
4.4. Assumptions of Multiple Linear Regressions.	55
4.4.1 Multi co linearity	55
4.4.2 Normality	56
4.4.3 Linearity	56
4.5 Regression Analysis tests.	57
4.5.1 ANOVA Analysis (testing Significance of the model)	57
4.5.2 Model Summary (F-test)	58
4.5.3 The co linearity test:	60
4.5.4 The coefficients test	61
4.6 Summary of Qualitative data analysis	62
4.7 The Summary of Major Findings	66
Chapter Five	70
5. CONCLUSION AND RECOMMENDATIONS	
5.1.Conclusion.	70
5.2. Recommendations.	71
5.3. Future Research Direction.	74
References	75

List of Figures and tables

Figure 1. Motivational forces for traceability	12
Figure 2.Supply Chain Traceability Types	14
Figure 3: Histogram	56
Figure 4 Normal p-plot	57
Table 3.1: Summary of the Reliability Test on Scaled items	31
Table 4.1: Demographic profiles of the respondents	36
Table 4.2: Descriptive analysis of Awareness creation/development	39
Table 4.3: Descriptive analysis of Supply chain intricacy	41
Table 4.4: Descriptive analysis of Legislation	44
Table 4.5: Descriptive analysis of Controlling System	46
Table 4.6: Descriptive analysis of the Current Coffee	
Traceability Marketing at ECX	49
Table 4.7: Pearson Correlations	52
Table 4.9: ANOVA	58
Table 4.10: Model Summary	59
Table 4.11: Co linearity statistics	60
Table 4.12: Coefficients	61

Acronyms / Abbreviations

ACDI/VOCA: Agricultural Cooperatives Development International/Volunteers in Oversees

Cooperative Assistance

AGP: Agricultural Growth Program

ASI: Agribusiness Systems International

CFIA: Canadian Food Inspection Authority

CLU: Coffee Liquoring Unit

ECTDMAJZO: Ethiopian coffee and tea development and marketing authority Jimma zone office

eATTs: Electronic Assets Track and Traceability Systems

ECTDMA: Ethiopian Coffee and Tea Development and Marketing Authority

ECX: Ethiopia Commodity Exchange

ECEA: Ethiopian Commodity Exchange Authority

FAO: Food and Agricultural Organization

GIN: Goods Issue Note

GMO: Genetically modified organism

GPS: Global Positioning System

GRN: Goods Received Note

IP: Identity Preservation

ISO: International Standards Organization

MOU: Memorandum of Understanding

PUN: pick up note

MoT: Ministry of Trade

UNDP: United Nations Development Program

USAID: United States Agency for International Development

WH: warehouse

WHO: World health organization

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Research

Despite its debatable comprehensive and ecologically friend growth, it is generally accepted truth that the agricultural sector has been undergoing considerable changes in the past three decades. New farming practices as well as new handling and processing techniques have been developed to meet the increasing consumer demand for reliable and consistently safe supply of various agricultural commodities. Furthermore, consumers are giving emphasis to safety, high quality and sustainability of food products. Hence consumer experiences with food safety and health issues combined with an increasing demand for high quality food and feed products have resulted in an increasing interest in developing systems to aid the food traceability efforts. Consequently, traceability in the food supply chains has gained considerable importance in the past few years (Carriquiry and Babcock, 2007; Folinas, et al., 2006; Jansen-Vullers, et al. 2003; Madec, et al. 2001; McKean J.D., 2001).

In a dynamic, competitive and highly fragmented business environment, firms need to consider opportunities for tailoring their products to reach specific consumers. Fortunately, traceability provides one such opportunity and defined as: the ability to trace the history, application or location of those products which are under consideration (Dyer, at el. 2008).

According to Opara (2003), traceability from consumer's perspective helps to build trust, provides peace of mind, and increases confidence in the consumable products. Likewise for the growers, traceability is part of an overall cost-effective and quality management system that can assist in continuous improvement and minimization of the impact of safety hazards. It also facilitates the rapid and effective recall of products, and the determination and settlement of liabilities.

In recent years, traceability system in products' safety management in the developed countries and some districts has shown a rapid development. The EU proposed product traceability system for cattle and beef product as early as 2000, which was the first time to put forward the

traceability for food products to be taken into the legal system. Since then the scope of traceability has been extended to the entire food/any consumable product, apparel industries, and even banned the import of products with no traceability and the agricultural products' traceability system has been accepted by the consumers. Accordingly, in addition to the EU, the U.S, Japan, Canada, New Zealand, Australia, Netherlands & other agricultural production powers has set up products supply chain traceability system, (Wang at el, 2007).

Likewise, China started to explore agricultural products quality safety traceability system in 2002. According to Peres Loiseau and Montet (2007), the quality and safety problem of agricultural products has always been the focus of all paces of life and it imposes impacts on health and life of residents. Hence with the occurrence of current frequent food safety problems, consumers need to know, whether agricultural products they are buying and using are guarantying them wellbeing. In addition to that, trust affects consumers' purchases intentions and guarantee has a strong effect on their purchase decisions, with consumers' increasing queries about where their consumable product came from, who produced it, and what chemicals were sprayed on it, traceability or identity preservation became a buzzword that is now reaching other industries, (Bhaduri, 2011).

Therefore, as the international trade system is constantly changing so as to meet the evolving consumers' preferences and needs, it is inevitable for the mediators who are engaged to fulfill such requirements to update themselves by stepping along with such preferences simultaneously. Thus, ECX as the country's pioneer modern market platform for buyers and sellers, it is mandatory to it to do its best to ensure its sustainability in the industry effectively, by sufficing the needs arising from the major international coffee buyers, quality and safety product, i.e. the traceability issue, to trace the purchased coffee to their actual farms, where and how they have been growing, and by whom they are produced.

1.2Background of the study area/organization

The Ethiopia Commodity Exchange (ECX) was started its operation in April, 2008, with a vision 'to transform the Ethiopian economy by becoming a global commodity market of choice.' ECX is a marketplace, where buyers and sellers come together to trade on the spot, assured of quality, delivery & payments.

ECX has been offering integrated warehouse system services in 23 branches located in different 23 cities of the country. Currently, at the warehouses services of sampling, cupping, grading, weighing, certification and delivery are given at least for six types of commodities (Coffee, Sesame seed, Soya bean, Haricot bean, Mung-bean, and Chickpea) using state-of-the-art technologies. The estimated grand total accommodating capacity of the current ECX warehouses is 4,380,000 quintals (438,000 metric tons) of different agricultural commodities at a time.

In doing so, ECX, since the last three years, has been practicing coffee traceability marketing system in four selected sites of its branches, including the Jimma branch. Currently, ECX is progressing to ensure the online trading (e-Trade) system by connecting six e-trading centers built in the country (including the Jimma site) with the Head quarter. This is expected to play a vital role in enhancing the traceability system in many hands, too.

The ECX Jimma branch, the main focus of my study is located 350 kms from the capital city Addis Ababa, where the ECX Head Quarter is based. The Jimma branch currently has a total of 201 workers and renders all ECX services to its clients that include 200 permanent coffee suppliers, hundreds of individual farmers, Private limited companies, investors, cooperative unions and exporters. It has 2 warehouses that have a capacity of accommodating 150,000 quintals / 15,000 metric tons of coffee beans at a time.

Generally, the Jimma branch in the past three years of its traceability marketing services, it has undergone a transaction of 45,000 metric tons of traceable coffee beans. However, when this is compared with the actual production capacity of the Jimma zone, it is estimated only 1/4th of the total product. Why? (source: www.ecx.com.et; an interview held with ECX Jimma branch manager, 2020; ECX's annual report, 2019).

Therefore, my research under the title of "factors affecting the implemented coffee traceability marketing system in ECX Jimma branch" has tried to investigate the real situation in the branch using four estimated factors (i.e. awareness creation/development, supply chain intricacy, legislation, and controlling system) by analyzing their impact on the performance of the traceability system.

1.3 Statement of the problem

Since the past two decades, in Ethiopia, the coffee sector, as one of a country's primary agricultural concerns, it has been undergone significant changes. Of course, new agri-business practices, new handlings and coffee processing techniques, as well as an organized marketing platform - that of ECX, the newly applied coffee reform (IP Model), and somewhat the coffee traceability marketing practice are among the schemes implemented in the country. The clear objective of such strategy is manifested by addressing the increasing demand of international buyers/customers to get quality and safety coffee beans in reliable and sustainable manner, by increasing the volume of the hard currency which the country earns from the sector.

Basically, the distance that coffee products and apparel industries travel from the farm where it is produced to the table where it is consumed is too longer. On the other hand, the ultimate customers want to get the product in its actual fresh or nearby times. Otherwise, they are claiming for its guaranty. The structure of the supply chain that coffee pass-through can be considered as a world-class, and involved increased fragmentation, multifaceted and multiple actors as a world wide of agro-food supply chains. The involvement of large number of actors, the unpredictability of the supply chain and the hydroscopic nature of the coffee product have heightened the need for assurance of quality and safety in relation to the products, production processes to ensure traceability, and compatibility among the product, 'Food Traceability Factsheet', (CFIA) [7 ref.#].

Implementing effective traceability marketing system enables agro-food businesses to better managing of risks and guarantying the ultimate customers and allows a quick reaction to emergencies recalls, and withdrawals of the detected fraud product from the market, if any. Thus, having a document and records of genuine information and traceable system about product health alongside the entire supply chain, country of origin at any point from producer to consumer has played a significant role in assuring traceability to the worldwide concern of today. Ultimately, this situation smoothes the way to be certified/qualified by quality product concerning global organizations like FairTrade which in turn insures sustainability and better income to all participants/actors.

By giving more emphasis for the currently growing concern of product traceability, especially to the world agricultural commodity markets, ECX as a dynamic and visionary institution which rapidly and continuously respond and adapt to the changing, competitive, and highly fragmented business environment, it has been started to implement coffee traceable marketing system since the past couple years. On doing so, ECX uses its own traceability model which starts from the washing and hulling stations of different districts up to its selected warehouses and the purchased coffee products from ECX warehouses to the exporters' warehouses, which ends in two supply chains. Fortunately, in this regard the ECX could be said a pioneer institute to bring the traceability issue in the Ethiopian coffee marketing system 'Traceability Requirement Study' (ECX, 2017).

However, the traceability model that ECX has been practicing completely lacks the true concept of tractability, due to the blending and mixing up of different coffee types to and from the exchange's warehouses. Thus, blending of coffee which originates from the diverse coffee growing districts makes the coffee to lose its original identity and information which disagreeing with the concept of traceability that describes the product history from "Farm to table". This concept is believed to provide the information about the product though entire supply chain at any point where the demand arises, 'Traceability Requirement Study' (ECX, 2017).

On the one hand the volume of coffee production puts Ethiopia at 5th rank in the world (ECEA annual report, 2018), and besides being the back bone of the country's economy by bringing the hard foreign currency better than any other agricultural export commodity, coffee plays great role by creating a great deal of job opportunities for the country's citizens. On the other hand, the country is not harvesting an equitable foreign income from the high metric tons of coffee beans it is exporting yearly. This is mainly believed to be due to lack of meeting traceability requirements and sustainable supply of quality products which most international buyers put as criteria to buy high volume and to pay better price the whole year. Unfortunately, the coffee traceability project the country has implemented with financial and material aids of the UNDP & NGO's so as to exploit the global opportunity via the ECX plat form '*Traceability Requirement Study'* (ECX, 2017), could not be satisfactory as it was expected initially. Why?

By and large, though traceability is a global concerning issue and an emerging market opportunity for those who could meet sustainable supply of quality and safety exportable

commodities for the global market, unfortunately in Ethiopia yet it hasn't given enough coverage. That is why it is difficult to get researches done on the field matter. For this research beyond referring international researches it was not easy to get an Ethiopian similar research which was done on traceability in order to see the gap and to use it as a local initiative research material. Hence, the researcher is obliged to refer a merely case study that was undergone by a team established by Ethiopia Commodity Exchange in 2017, under the title of "Traceability Requirement Study' simply to collect the feedbacks regarding the implementation of the partial coffee traceability market and the identity preservation (IP) model on its warehouses, from different coffee stakeholders through focus group discussion and document reviews.

Therefore, in this research some of the main factors that are assumed to affect the implemented coffee traceability marketing practice in ECX Jimma branch, have been investigated by asking the following basic research questions which are proposed by the researcher.

- ➤ What does the implemented coffee traceability trend look like in ECX Jimma branch?
- ➤ What are the factors that affect the implemented coffee traceability practice?
- ➤ What are the advantages/benefits of coffee traceability marketing system, at all?

1.4Objectives

1.4.1 General Objective

The general objective of this research is to examine the factors that affect the implemented coffee traceability marketing system in ECX Jimma branch.

1.4.2 Specific Objectives

This research has tried to address the following specific objectives:

- To analyze the implemented coffee traceability marketing practice in ECX Jimma branch.
- To analyze the main factors that affect coffee traceability practice in ECX Jimma branch.
- > To analyze the advantages of implementing coffee traceability marketing system.
- > To analyze whether there are fertile situations to implement full coffee traceability marketing system in Ethiopia.

1.5 Scope of the Study

As the traceability concept is new, vast and the implemented coffee traceability practice has been undergone in many other ECX branches that are located in different regions of the country, the researcher believed that it would be much more comprehensible if the study has been conducted throughout all exercising branches. However, provided that the researcher is living in Jimma town and aims to undergo the research along with his regular work, and fearing time and money scarcity, he was enforced to limit the study on ECX Jimma branch only.

1.6 Significance of the Study

The researcher believes that this study does have a significant role to play in shading light on how to apply the complete traceability practice besides to coffee, in more other commercial commodities which are currently marketed in ECX (like sesame, soya bean, haricot bean (red and white), Mung bean, and chickpea) and those which have contracts to be marketed in future (like niger seed, maize, and wheat), under the ECX market. The study also does have a paramount importance in providing a better ground for investors and other stakeholders, which are keenly concerned with traceability issue, as the country has permitted direct exporting to privates and cooperative unions. Moreover, the researcher would believes that this study can potentially serve as a stepping stone for further research in the field area, as there is scarcity in the same field in the country. Finally, as a researcher one will also develop an experience of studying different issues, analyzing research problems, and evaluating different research articles with basic knowledge of same field.

1.7 Limitation of the Study

As it has been tried to point out in the scope of the study, the horizon of study is confined merely at ECX Jimma branch. Further, though traceability is a new concept and an emerging global concern that needs due attention from all corners so as to trace back and track forward products from Farm to table, in this study only few among several factors that could affect the implemented coffee traceability system in ECX Jimma branch are covered. Similarly, shortage of time to cover this wide-ranged concept, the deficiency of data concerning the subject matter in Ethiopian context, and the ongoing pandemic COVID-19 derived communication restrictions were the big challenges encountered during the study.

1.8 Organization of the Paper

The research focused on the examining of factors that could affect the implemented coffee traceability marketing system in Ethiopia Commodity Exchange (ECX) Jimma branch, including the rational to study the subject matter in detail.

The research is structured as follows: **Chapter 1** is introduction which contains backgrounds of the study and the research area. **Chapter 2** contains reviews of literatures with regard to traceability and its components. The research design and methodology is presented in **chapter 3**. Particularly, this session shows the research questions to be addressed and followed by a discussion of the underlying principles of mixed research methods. **Chapter 4** incorporates data presentation, discussion and interpretation of the results of different methods used. Specifically, the results of surveys with questionnaires, interviews, and documentary analysis are presented in this chapter. Finally, **chapter 5** presents summary/findings, conclusion and recommendations.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURES

As there is great scarcity of literatures in Ethiopian context because of lack of researches in the field area and as coffee is regarded to be a food item, the researcher has been obliged to use more of literatures that have been done on traceability of different food products. Therefore, in this chapter different global and local, theoretical and empirical knowledge based literatures with multidimensional traceability issues in relation to the problem area have been discussed. Generally, the chapter contains three sections: theoretical literatures, empirical literatures and conceptual framework.

2.1 Theoretical Literatures

2.1.1 Traceability Concepts and Definitions

The notion of "traceability" first originated in different fields related to health, space and arming activities, but it has also extended to industrial sectors, including the food industry sector. In the past decades, the need for information regarding animal health and food quality and safety has significantly increased for governments, regulators, businesses and consumers, as a result of several crises. Encountered issues underlined the need to develop instruments that could guarantee reliable information throughout the food chain and could enhance food safety, (Corina Ene, 2013) [11].

Traceability is known as the 'one-step-back-one-step-forward' principle; traceability is the ability to identify the origin of food and feed ingredients and food sources, particularly when products are found to be faulty. A traceability system allows an organization to document and/or to locate a product through the stages and operations involved in the manufacture, processing, distribution and handling of feed and food, from primary production to consumption. It can therefore facilitate the identification of the cause of nonconformity of a product, and improve the ability to withdraw or recall such product if necessary and prevent unsafe products from reaching the customers (ISO, 2007).

The European Union's General Food Law entered into force on January 1, 2005. The law included important elements such as rules on traceability and the withdrawal of dangerous food

products from the market. Under the European Union Law, "Traceability" is defined as the ability to track any food, feed, and food producing animal or substance that will be used for consumption, through all the stages of production, processing and distribution ('Official Journal of European Communities', 2002).

Moe (1998) defines traceability as the ability to track a product batch and its history through the whole, or part, of a production chain from harvest through transport, storage, processing, distribution and sales or internally in one of the steps in the chain (for example the production step).

Traceability is a widely used term, and a broad concept, for which there are many definitions and applications. In practical terms it is about meeting legal requirements and marketplace demands and expectations, as well as implementing internal quality management objectives and improving business performance. Moreover, there is no single universally acceptable system of traceability; it depends on many factors including the objective, e.g. assurance of food safety, product quality attribute or product identity, the nature of the product and type of production operation. Although legal requirements and adopted international standards and private voluntary standards often require traceability systems, none is prescriptive in the way traceability is achieved. It is up to the operator to define the scope of the traceability system and how it is to be achieved based on their particular needs.(UNIDO, 2013) [30]

Traceability system was firstly used in recall system of cars, aircraft and other industrial products. However, early 2000, the EU proposed traceability system, which was the first time to put forward the traceability system that should be taken into the legal system. Since then the scope of traceability extended to the entire food/ any consumable product and apparel industries including the agricultural products traceability system that has been accepted by the consumers. (*Wang et al.* 2007)

Subsequently, the traceability system in products safety management in the developed countries and some districts has a rapid development, in addition to the European Union, other countries like U.S.A, Japan, Canada, New Zealand, Australia, the Netherlands and other agricultural production powers have set up products supply chain traceability system, (*Wang et al*, 2007)

According to the Codex Alimentarius Commission (CAC 60-2006) [10], traceability or product tracing means "the ability to follow the movement route of a food product through specified stage(s) of production, processing and distribution". Traceability allows thereby the tracking of a product, following its path from raw materials until exposure for selling, including their path to the final consumer. According to Codex (2001) traceability considered as a product differentiation system and is commonly used by the food industry. Once contamination has been detected, traceability systems allow the source of a product to be identified, thereby enabling the situation to be remedied and limiting costs to total or partial product withdrawal from the market. Traceability has to be primarily viewed as a means to enhance safety in the food chain. There recent development of traceability systems for production and market sectors has sought to translate attention from the primary concept of food safety into the search for a consumer price premium. This approach appears to be becoming increasingly established in product strategies even if there seems to be no theoretical motivation in support, traceability systems do not guarantee achievement of product quality rather it simply trace from field to the fork.

Traceability, according to the International Organization for Standardization, ISO 9001:2000), is an assessment of products to identify the path from which a product has originated and to whom it has been supplied and consists of an interlinking chain of records between steps in a process of operation and/or between different stages in a supply chain. In view of this, traceability is the ability to identify, trace and track the whole history, distribution, location, and application of products, parts, and materials till the end user (i.e. From farm to fork, or Seed to Shelf, Farm to Table, (Raspor, 2008).



Figure 1. Motivational forces for traceability (modified from Olsen, 2009).

Due to globalization in product trade, any product chain integrity not only includes safety concerns but also origin fraud and quality concern. Consumers also demand verifiable evidence of traceability as an important criterion of product quality and safety. To tackle these requirements, there is a need for a traceability system giving information on origin, processing, retailing and final destination of foodstuffs. (Bertolini, et al, 2006), and (Peres, et al, 2007).

2.1.2 Objectives of Traceability

The main purpose of traceability development is to increase security and safety throughout the food chain and to establish an acceptable model for raw material supply, food production, marketing and consumption. Traceability systems are likely to detect raw materials or products, identifying them downstream and upstream of the production chain, regardless of the time and place of the technological flow, (Muntean, et al, 2007)

Firms have three primary objectives in using traceability systems: improve supply management, facilitate trace forward and track backwards for product safety and quality; and differentiate and market products with subtle or undetectable quality attributes. The benefits associated with these objectives include lower cost distribution systems, reduced recall expenses, and expanded sales of products with attributes that are difficult to discern. (Golan et al., 2004). Not only just a way to improve product safety systems, traceability can also be seen as a strategic tool to improve the

quality of raw materials and to improve inventory management and as a source of competitive advantages, (Alfaro, et al, 2009), and (Viðarsson, et al, 2010).

2.1.3 Importance of Traceability

Traceability is a preventive, necessary, supplement of food safety systems, which increases the efficiency of a food company, when used correctly. In practice traceability means collection, documentation, maintenance and application of information related to all processes in the supply chain, which guarantees for the consumers the information on origin and life history of a product (Opara, et al, 2001).

Traceability is important for many reasons like responding to the food security threats, documenting chain of custody, documenting production practices, meeting regulatory compliance or analyzing logistics and production costs. USDA Economic Research Service states that besides ensuring a safe food supply use of a traceability system results in lower cost of distribution systems, reduced recall expenses, and expanded sales of products with attributes that are difficult to discern and in every case, the benefits of traceability translate into larger net revenues for the firm (Golan, et al, 2004). Traceability is required for controlling crisis situations by enabling effective recalls, delivering precise information to consumers and regulatory authorities and for safety of consumers (EVIRA, 2007). A well thought-out traceability system is fundamental for achieving optimal benefits from quality control, production control and to fulfill consumer demands (Moe, 1998).

2.1.4 Effectiveness of Traceability Systems

In all cases, traceability depends on the correct collection and recording of relevant data, coordinated within the context of a food safety management system. Analytical tests (e.g. DNA tracking or forms of mass spectrometry to verify origin) may be able to be performed to verify data. A traceability system is effective when a product can be completely traced across the supply chain both back words and forwards. The information should be readily accessible in order to know what, how much and from where product/needs to be recalled in case of product safety issues (*EU requirements* 178/2002).

2.1.5 Traceability Model

There are three main models how traceability trace sustainability claims. These models offer different approaches to tracking a claim and assuring it at each point in the supply chain. The three models are *Product Segregation*, *Mass Balance*, and *Book and Claim* (see image below). They are differentiated by the extent to which certified and non-certified materials are permitted to mix, as well as by claims that can be attached to the final product.

Models with less stringent controls around the handling of certified and non-certified materials are less complex and thus less expensive. However, wherever possible, the type of certification and the model of traceability used should depend on the sustainability claims and the materials being traced rather than the cost of implementing the model. Product segregation is best suited and should be prioritized, when possible, if there is a risk of being involved in human rights or labor abuses when sourcing a certain commodity. The Mass Balance and Book and Claim models are open to criticism for commodities where Product Segregation is available.

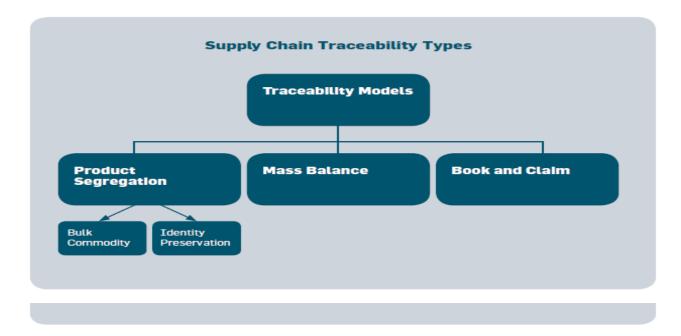


Figure-2: Supply Chain Traceability Types (Source: United Nations Global Compact, BSR team: Tara Norton, Julia Beier, Lauren Shields, 2014 'A guide to Traceability practical approach to advance sustainability in global Supply Chain')

2.1.5.1 Product Segregation

The Product Segregation model implies that certified materials and products are physically separated from non-certified materials and products at each stage along the value chain. This ensures that certified and non-certified materials and products are not mixed and that the end product comes from a certified source. At the end, consumers know that 100 percent of their products consist of certified materials.

There are two segregation models to traceability: Bulk Commodity and Identity Preserved (IP).

a. Bulk Commodity

The segregation model of Bulk Commodity separates certified from non-certified materials but allows mixing of certified materials from different producers. All producers must comply with the certification standards.

b. Identity Preservation

The Segregation model of Identity Preservation (IP) requires segregation of the certified material from the non-certified material and doesn't allow mixing of certified materials throughout the value chain to provide traceability from a specific plantation or primary processor to the final users. The IP model enables the traceability of products back to the originating farm, forest or production site. Identity preservation has been possible in the case of fair trade bananas, where a physical link between smallholder producers and consumers has been achieved.

The IP model is sometimes criticized for being cost and resource intensive and requiring advanced technology since all material sources must be strictly separated controlled and monitored at each stage of the supply chain. Companies must know all their suppliers and collect and verify data at all levels throughout the supply chain.

2.1.5.2 Organic Produce

The Segregation model is important to the organic produce sector, where organic and nonorganic fruits and vegetables are strictly separated. However, organic items from different farms and producers are regularly combined in order to achieve supply on a large scale. Despite the bulking from different regions, all producers and farmers must commit to growing organic food and comply with organic certification standards.

2.1.6 Supply Chain Traceability

According to ISO 22005; product traceability standard requires that each company know who their immediate supplier is and to whom the product is being sent, on the principle of one up and one-down. It states that food safety is the joint responsibility of all the actors involved (International Organization for Standardization, 2007). Thus, all the actors involved in the food supply chain are required to store necessary information related to the food product that link inputs with outputs, so that when demanded, the information can be provided to the food inspection authorities on a timely basis. For effective supply chain operations, the activities of all partners in the supply chain must be synchronized.

In order to achieve a fully traceable supply chain, it is important to develop systems for chain traceability as well internal traceability. This includes linking, to the best extent possible, units of output with specific units of input. Each supply chain actor should have an internal record keeping system that would enable them to trace back their ingredients and track forward the products so as to determine the cause of the problem or to efficiently recall the associated (or contaminated) food products. Each actor must be able to trace back and track forward the product information based on one-up and one-down basis. Developing a traceability system is however, a complex undertaking as it involves all the stages of production, handling, storage, processing, transportation, and distribution (Maitri Thakur, et al. 2009).

2.1.7 Goal of Effective Traceability

For reasons cited above, effective traceability systems benefit businesses and entire sectors from a production, marketing, and value chain management perspective. The following benefits should be considered the goals of a well-designed traceability system (Samara singhe, et al, 2009).

Market benefits: Traceability is essential to the survival of business in regulated markets. Food products need to be labeled or identified to facilitate their origins and contents to the consumer. This will become the norm in supermarkets as new traceability regulations are implemented.

Quality and safety management: Businesses can use traceability to respond strategically to consumers' increasing concerns about the potential risks posed by a food safety issue or a

product's integrity being compromised. An effective traceability system strengthens the food safety management capabilities of any business.

Reduced cost of production: When traceability is viewed as an outcome of possessing an effective ICT system, businesses are able to monitor performance and communicate more effectively than otherwise possible. The involved businesses are able to make more informed management decisions, minimize the resources invested in non-value adding activities, and reduce waste efforts along the entire value chain. Harmonizing traceability systems and requirements also enables businesses to reduce their costs, often while simultaneously increasing revenue.

Product recall: Product recalls tend to be bad news. But companies that successfully manage a recall can turn the bad news into a good news story by containing the crisis. A critical ingredient in effective management of a crisis is visibility — this means reliable and accurate information about a company's affected products and any associated food safety data. More than that, transparent traceability systems allow a company to provide the assurance needed to restore consumer and market confidence.

Traceability systems help firms isolate the source and extent of safety or quality – control problems. Firms have an incentive to invest in traceability systems because they help minimize the production and distribution of unsafe or poor quality products, which in turn minimizes the potential for bad publicity, liability and recalls (Golan et al., 2004). Gledhill proposes that meat processors can minimize risk by proactively adopting more stringent standards relative to "life cycle traceability" of their products; such trace back offers a strategic advantage that can greatly reduce costs in the event of a product recall and reinforce the confidence of customers and consumers in the strength and integrity of a company's products and brands. Domestic and export customers, to protect their investment in "own brands", are demanding that their suppliers trace back food product to source-of-origin (Smith et al., 2005).

2.1.8 Standardization of Information

One of the biggest challenges with supply chain traceability is the exchange of information in a standardized format between various links in the chain (Thakur and Donnelly, 2010). To facilitate electronic interchange of such product information, international, non-proprietary

standards are required such as the ones highlighted by Jansen-Vullers, et al, (2003). Folinas et al. (2006) stated that standards must describe how information can be constructed, sent and received and also how the data elements in the information should be identified, measured, interpreted and stored. Previous studies have shown that there is currently no standardized way of formatting information for exchange in traceability systems. Research suggested that structured data lists, vocabularies and ontology will be appropriate tools in achieving effective universal data exchange (Donnelly et al. 2009, Dreyer et al., 2004; TRACE 2, 2008). Individual companies have made great progress in proprietary technologies for automated data capture and electronic data coding. However the benefit of these is lost when the data element transmission is required for use outside the originating company as it is only effective when there is an identical software system at the receiving end (Donnelly, 2008).

2.1.9 Traceability through Information Exchange

Electronic Data Interchange (EDI) is commonly used in the B2B (Business-to-Business) environment as a reliable mode for electronic data exchange between business and trading partners. EDI is a set of standards for structuring information that is to be electronically exchanged between and within business organizations and other groups. EDI implies a sequence of messages between two parties, either of whom may serve as originator or recipient. The effectiveness of using EDI has been widely investigated and it is evident that the standard can be used efficiently by organizations with mature IT capabilities. This is generally not the case for all actors in the supply chain (Bechini et al., 2008). On the other hand, the increasing popularity of XML (Extensible Markup Language) for information interchange has made it easy for businesses of any size to use this technology. The main purpose of XML is to facilitate the sharing of structured data across different information systems, particularly via the internet. Both EDI and XML formats are structured to describe the data they contain. The main difference is that the EDI structure has a record-field-like layout of data segments and elements; which makes the EDI file shorter, but not easily understandable. The XML format has tags, which are more easily understood, but make the file bigger and verbose (Electronic Data Interchange Development, 2008).

2.1.10 The Risk Factors Impact on Food Traceability

The risk factors that affect food traceability can be divided into two main categories, technical risk factors and managerial risk factors (Fotopoulos et al, 2009; Luning et al, 2007). The technical risk factors are the factors which occur during the application and innovation concerning food traceability technology. Such as the information identification technology, the information collection technology, the information exchange technology, the logistic tracking technology. The application of any new technology requires a testing period. During this period, the authenticity of the food traceability activities is easily influenced, distorted or uncollectable. This will decrease the quality of the results of traceability and increase the risk.

The managerial risk factors are focused on the existing and potential human-centered risk factors. During the process of food traceability, they are locating in the various parts of the FSC. For instance, misuse low quality raw materials, data loss or fraud, warehouse pollution, transport problems, vicious competition, food traceability standards differences, safety awareness, etc. In comparison with the technical risk factors, managerial risk factors are much more complex and more difficult to control. It has higher concealment and subjective, food traceability can be affected in every link of the food supply chain. If a problem occurs, it will result in a great deal of damage for the quality of food traceability (Chen 2005; Zhao et al. 2007).

2.1.11 Traceability and Legislation

Traceability has a legal framework in many countries including the European Union and Viet Nam. In the EU food law food business operators must be able:

- To identify from whom and to whom product has been supplied.
- To have systems and procedures in place that allow for this information to be made available to competent authorities upon their request.

This requirement relies on the one step back/one step forward approach, i.e. external traceability, and implies that food business operators must be able to:

- Identify from whom product materials has been received (the previous point in the chain);
- Identify the businesses to whom they have supplied products (the next point in the supply chain); and
- Make the information available to the Competent Authorities in a timely manner.

In Viet Nam the Ministry of Agriculture and Rural Development (MARD) "guide to traceability, recall and handling of unsafe agro-forestry food products" (Circular No. 74/2011/TT-BNNPTNT) specifies that:

- A food business operator (FBO) must have in place a traceability system with principle of one step back/one step forward to ensure the ability to identify and follow an entity at a specific stage in the chain of production and trading;
- Through traceability systems, the FBO shall have information recorded on suppliers of raw material and recipients of its final products during its operation;
- After each stage of production, a product must be labeled or identified in an appropriate manner to facilitate traceability, (source: Traceability in the Green Coffee Supply Chain: UNIDO. 2013, Vienna)

Various food safety and traceability laws exist in several countries. European Union's General Food Law entered into force on January 1, 2005. The law included important elements like rules on traceability and the withdrawal of dangerous food products from the market. Under the European Union Law, "Traceability" is defined as the ability to track any food, feed, food-producing animal or substance that will be used for consumption, through all the stages of production, processing and distribution (Official Journal of the European Communities, 2002).

Since January 1st 2005 it has become mandatory for all food products to follow a procedure of traceability. The European Union issued two laws which, amongst others, provided the definitive thrust for setting traceability procedures that met the absolute priority for food safety. One of these, EC Reg. 178/2002 established the general principles and requisites of food legislation and set up the European Authority for Food Safety, establishing procedures in the ambit of food safety. The other, EC Regulation 1830/2003, concerned traceability and the labeling of GM products or their derivatives. ('Effects of Traceability on the Italian Fresh Vegetables Market' Francesco Caracciolo and Luigi Cembalo, 2010)

2.2 Empirical Literatures

Though there is high scarcity of the subject matter literature with context of Ethiopian situation, I have taken two empirical literatures named traceability manual-"Traceability in Green Coffee

Supply Chain"; "Traceability Requirement Study" which have a great value to evaluate the implemented coffee traceability marketing system in ECX, and lastly different researches on the importance of traceability have been discussed. Hence, the first one gives general overview of the key traceability requirements on green coffee beans with empirical illustrations, and the second one illuminates the core facts about the implemented traceability practice, and the last one discusses different evidences about the importance of traceability (traceable products).

2.2.1 Traceability in Green Coffee Supply Chain

The Traceability Manual - "Traceability in Green Coffee Supply Chain" has been prepared and published by the UNIDO in June, 2013 with the expertise contribution of Dr. Chris Knight, based on the case analysis undergone in Vietnam, by the UNIDO project which was conducted over the period July 2008 – December 2012, in order to support its green coffee export by participating 9 large coffee companies, the country's institutions and exporters to meet the demands of foreign markets, has shown a good illustration for the application of traceability on green coffee beans.

It is obvious that there is no single universally acceptable system of traceability; it depends on many factors including the objective, e.g. assurance of food safety, product quality attribute or product identity, the nature of the product and type of production operation. Although legal requirements, adopted international standards, and private voluntary standards together with identified and traced food supply chain often require traceability systems, none is prescriptive in the way traceability is achieved. It is up to the operator to define the scope of the traceability system and how it is to be achieved based on their particular needs. These issues highlight the practical difficulties in establishing and implementing a traceability system in a food business operation such as a farmer, trader or processor of green coffee.

To demonstrate the application of traceability in green coffee production three case studies were presented in the study in order to illustrate three scenarios:

1. External traceability systems based on the one step back/one step forward principle to identify what is received (one step back) and where finished product is sent (one step forward), that is to identify the producer and/or trader of previous and next stages in the supply chain.

- 2. Internal and external traceability systems that link what is received (external one step back traceability) with what is produced (internal process traceability) and where it is sent (external one step forward traceability), that is to trace what product is produced from what materials, when and how and where is it sent.
- 3. Bar code systems and how these facilitate the traceability and identify what is received (one step back), what is produced (process traceability) and where the product is sent (one step forward). After the case studies have been conducted for five consecutive years (over the period July 2008 December 2012), the analyzed findings under the three systems are summarized as follows:
- 1. **External traceability**: This case study represents external traceability only. i.e. the application of the one step back and one set forward approach. It represents the minimum that might be reasonably expected of a business in terms of traceability. i.e.
- **Supplier traceability** (one step back): information relating to suppliers (previous point in the supply chain) of materials received is linked to the goods received record.
- **Process traceability**: information relating to products produced from which raw materials what, when and how is not established.
- **Customer traceability** (one step forward): Information relating to whom product is supplied (next point in the supply chain) is linked to the product consignment record.
- **2. Internal traceability**: This case study illustrates the identification of materials one step back/one step forward, that is to trace where raw materials were acquired from (supplier traceability) and to which customer/organization the products was supplied to (customer traceability), and process traceability, that is what is produced from which raw materials, when and how. It is summarized as follows:
- -Supplier traceability (one step back): information relating to from whom materials are received (previous point in the supply chain) is linked to the goods received record.

- **Process traceability**: information relating to products produced (from what materials, when and how) is linked to Goods Received Number (materials used) and Processed Product Number (processing history).
- Customer traceability (one step forward): Information relating to whom product is supplied (next point in the supply chain) is linked to the product consignment record. It represents full external and internal traceability. It does represent good practice and is consistent with meeting the requirements of international standards and most private voluntary standards.

It is based on internationally accepted norms for traceability. It would provide customers with the assurance of traceability required. There is however a need for suitable resources to be provided, including good quality personnel, time for training and development of the system, and potential Improvement activities.

- **3. Barcode traceability:** This case study illustrates the use of bar codes to facilitate the identification of materials in a traceability system. It is summarized as follows:
- •Supplier traceability (one step back): information relating to from whom materials are received (previous point in the supply chain) is linked to the goods received record and GRN bar code.
- **Process traceability**: information relating to products produced (from what materials, when and how) is linked to Goods Received Number (materials used) and Processed Product Number (processing history) and GRN and PPN bar codes.
- **Customer traceability** (one step forward): Information relating to whom product is supplied (next point in the supply chain) is linked to the product consignment record and PCN bar code.

As in the second case study this represents full external and internal traceability, including associated benefits and potential concerns. However, there are additional significant benefits; principally relating to the identification of product lots/batches based on the adoption of international accepted standards and norms that uses readily available and well accepted technologies.(UNIDO's Project case studies on green coffee, 2013)

2.2.2 The Traceability Requirements Study

The second practical literature is taken after a group of experts under the Ethiopia Commodity Exchange have undergone a study in 2017. It was done with the objective of addressing the traceability requirements. On doing so, in their findings they identified three main issues that trapped the piloted coffee traceability practice in ECX. The first one is due to the massive scale of the coffee trade and the predominantly small size plantation (small farmers), tracing green coffee back to the farm level was a challenge.

Secondly, they observed that the eATTS (Electronic Assets Track and Traceability Systems) has a limitation in attaining traceability concept as it only tries to capture traceable data starting from washing station and ends at delivery to exporters. Lastly, the IP (identity preservation) trading model has a limitation of attaining traceability requirements as it lacks to capture traceability issues beyond the ECX scope. i.e. as the mandate to follow the sold commodities (coffee beans) once they are loaded from ECX warehouses by exporters is not ECX's scope, it is mandated by other stakeholders like Ministry of Trade and Ethiopia Coffee and Tea Development and Market Authority (ECTDMA). Generally, though the study has identified some key factors it has missed to examine other factors for the unsuccessfulness of the practice, such as lack of legislation, promotional factors and controlling mechanism could assist the system to achieve its goals. Therefore, in this research as much as possible it will be tried to address the remaining factors that affect the performance of the implemented coffee traceability practice in ECX, with particular focus on ECX Jimma branch.

2.2.3 The Importance of Traceability

The economic literature has studied the phenomenon and functioning of traceability in various respects. Although traceability arose for the main purpose of ensuring food safety, Dickinson and Bailey (2002) showed, in an experimental market study, that consumers are willing to pay a price premium for those products that clearly show they are traceable.

Traceability is a capability to monitor a specific product throughout the whole supply chain, allowing the identification of critical control points the hazard analysis and critical control points (HACCP) approach, can then be used to define which actions should be taken to avoid future quality problems. In any case problems to occur, a well-established traceability system allows

the companying to identify their source and to take corrective actions to avoid their reoccurrence. Juan and Godfrey (1999) define traceability as the ability to track the records, processing parameters and the places a product has been storing the information in a system.

There is also increasing evidence that consumers are demanding certified and traceable products, which is a main driver for traceability. For example, "in the United States, 39 percent of those surveyed in 2012 recognize the Rainforest Alliance CertifiedTM green frog seal, 30 percent understand what the certification means and 23 percent indicated they are more likely to buy a product that carries the Rainforest Alliance Certified seal" .(http://www.rainforest-alliance.org)

The most recent UTZ certified impact report on coffee, cocoa and tea, released in January 2014, indicates that the implementation of certifications results in higher yields for farmers. As one country study shows, certified farmers in Colombia were able to maintain higher levels of production compared to conventional farmers. The impact of the traceability scheme is shown by an increase from 52 percent in the first year to 169 percent by the fourth year in terms of production between UTZ certified farmers and the control group, (UTZ Certified 2014, Press release: 'UTZ certified farms show higher yields and better crops')

The appearance of genetically modified organisms (GMOs) and the need for identity preservation of GMO and non-GMO agricultural chains has further exacerbated declining consumer confidence on products safety and the increasing concern over potential negative impacts of agriculture on the environment and ecological diversity. Closely related to these factors is the introduction of new product safety legislations that have placed responsibilities on producers, processors, caterers and other handlers in the supply chain to ensure product safety. More than before, an essential feature of product quality management system for finished products can be traced back to their raw material and thus to their original producer and previous handlers in the chain. In the same way, forward traceability is also essential to guarantee the location of products and facilitate their recall when safety and quality standards have been breached. *Giese*, *J.H*,(2001).

2.3 Conceptual Framework

For the study, with accordance to the literature review and the practical factors encountered in the process, the researcher, as an intimate person to the focal organization, has formulated some hypothetical factors such as, *Awareness creation/development*, *Supply chain intricacy*, *Legislation*, *and controlling system*. In doing so, these factors, if they really affect the performance of the implemented coffee traceability marketing practice in ECX Jimma branch has been analyzed.

The researcher believes that after installation of such new, promising, expensive system, (i.e. coffee traceability marketing system), to include or neglect at least these four packages/factors during the pre and post implementation periods, can play the lion share for the success or failure of the performance. Therefore, to find out the actual factors that affect the performance of the implemented coffee traceability practice, particularly in ECX Jimma branch, thereby to point out the bottlenecks that interwoven the system and then to contribute ways for the interventions to be done, the researcher has used these factors as independent variables for the survey.

Therefore, activities/interventions which are done to suffice awareness creation/development, the supply chain problems, the legislation, and controlling system would be expected to play great role on the improvement of the traceability system performance. In the study questionnaires based on these variables to find out the real factors that affect the implemented coffee traceability marketing system are prepared and distributed to the respective respondents to collect valuable data to analyze the whole situation.

Furthermore, interviews to be held wih higher officials of both ECX and ECTDMA Jimma branches have focused to extract more data about the implemented system and whether there are fertile situations that the country has endowed in nature in order to implement the complete traceability system for better performance and market exploitation, and also could be analyzed to interlink interventions and predictions that could be expected to be undertaken onwards.

CHAPTER THREE

3 RESEARCH DESIGN and METHODOLOGY

In this chapter the research methodology which is used for this study will be discussed. Topics of coverage in this chapter include research design, sources of data, population and data type, sampling design, data collection method, data collection instruments, data analysis and presentation method, finally validity and reliability tests and ethical consideration are included.

3.1. Research Design

The type of research design undertaken in this study was descriptive and explanatory research designs, with **qualitative** and **quantitative** approach. Because as the nature of the study leads to investigate factors that could affect the implemented coffee traceability system in ECX Jimma branch, both approaches are necessary to address the questions.

The Rationale for research design: as descriptive research is a fact finding investigation and it is used to describe the current state of affairs or reports what happened in the past and what is on currently. Likewise, explanatory research design is adopted to analyze and explain the influence of different factors that could affect the implemented coffee traceability system.

3.2. Sources of Data

For the study it has been used information, evidences and facts which are gathered from both primary and secondary data sources.

The primary sources of data were the responses of the selected respondents through the distributed questionnaires (both open-ended and close ended ones, additionally the five-point Likert scale type that ranges from strongly disagreed to strongly agreed options) to supervisors and employees of both ECX Jimma branch, and the Jimma zone Coffee and Tea Development and Market Office (ECTDMO) staffs, and top coffee suppliers and buyers of Jimma branch, face-to-face interviews with higher officials of both organizations, group discussion held with exchange actors (coffee suppliers and buyers of the branch), and laborers of ECX Jimma branch warehouse. The secondary data were compiled by gathering information from different sources like ECX official websites and annual reports, published and unpublished documents of ECX,

proclamations, ECX's practical manuals, journals, recorded documents, ECX's research works, literatures, etc through readings and analyzing them thoroughly.

3.3. Target Population & Sampling Methods

The target population comprises 323 elements, of which 115 ECX Jimma branch permanent and outsourced employees, and 86 laborers of its warehouses, 10 Jimma zone coffee and tea development and marketing office staffs, 100 main coffee suppliers and 10 top coffee buyers/exporters of ECX Jimma branch, 2 top cooperative unions. Hence, to have a good representation of each important segment of the population, particularly, as some strata have too large or too small number of elements with heterogeneous population, in order to obtain more valuable and different information with respect to each group, the study has used the *Stratified Random sampling method* to draw 130 samples.

3.4. Method of data collection

Zikmund, (2003) defines data collection tools as an instrument that are used to collect information for the research to be conducted or the methods employed to collect research data. According to Cooper & Schindler (2006), the choice of the methods to use is influenced by the nature of the problem and the availability of the resource (time and money). In order to ensure the validity and reliability of the information from respondents, self-monitored questionnaires and interviews were employed as the necessary instruments for the study.

3.4.1 Primary data

Questionnaires were developed and distributed to the entire employees of Ethiopia commodity exchange Jimma branch who worked at different positions and departments and structured interviews for higher officials of the exchange and the ECTDMA of Jimma Zone as well. The questions used in the questionnaire were close and open ended, and a five-point Likert's scale type. The reason for using questionnaire was it is quick for gathering responses in a standardized way, and to make the study more objective and certain.

Questionnaire

In an attempt to collect data, personally administered questionnaires were prepared by the researcher and used as the main source of data gathering instrument. The items were prepared in accordance with the designed objectives and basic questions to be answered in the study. i.e.

concerning the factors that affect the implemented coffee traceability system in Ethiopia commodity exchange Jimma branch.

The questionnaire was preferred to other methods of data collection hoping that it may provide opportunities for obtaining reliable and valid information from more number of respondents. The first part of the questionnaire was about the demographic data and profile of respondents. It consisted of sex, age, education level, work experience, department and responsibilities in the organization. Part two reflects the major elements that are assumed to affect the implemented traceability system as per the variables hypothesized. They are presented in five tables with five possible options to be rated by the respondents ranging from strongly disagree to strongly agree scales. The last part of the questionnaire contains close ended and open ended questions prepared for the department heads, and supervisors additionally. This is because it gives them chances to state and list all possible situations and factors pertinent to the investigation, if any. Moreover, close ended questions are used to shape the information in the way the researcher needs, but if all be open ended the researcher may deviate his idea towards the response of respondents without touching the objectives.

Interview

According to Drew, Hardman and Hart (1996), the advantage of the interview technique is that it enables the participants to enlighten the researcher about unfamiliar aspects of the setting and situation. It is also important to obtain information with regard to issues that require clarification and vital information that is not expected to access using questionnaires, and it was used concurrently with the design of the questionnaire. On doing so, in addition to the questionnaire, structured interview has been conducted with 3 key officials of ECX and with the head of the Ethiopian coffee and tea development and marketing authority Jimma Zonal office. Of course, structured interviews are used for the researcher to understand the topic deeply and investigate the case thoroughly then to infer possible solutions through the answers provided. Hence, the researcher has made the interview with these officials in accordance with the objectives of the study and the basic questions rose in the statement of the problem so as to identify particular factors that affect the implemented coffee traceability practice generally in ECX, and particularly in ECX Jimma branch, and to analyze whether there are fertile situations in Ethiopia that enable to implement the complete traceability system in the country.

Focus Group Discussion

Focus group discussions on a specific topic at a particular location and at a specified time provide the opportunity for a flexible, free-flowing format for the members. The unstructured and spontaneous responses are expected to reflect the genuine opinions, ideas, and feelings of the members about the topic under discussion. Focus groups are relatively inexpensive and can provide fairly dependable data within a short time frame. Hence this is applied to collect relative information from some selected ECX Jimma branch exchange actors.

3.4.2 Secondary data

The secondary data were compiled from official files, pamphlets, practical manuals, proclamations, variety of books, published and unpublished documents, literatures, websites, annual reports proclamations, and newsletters that are believed to provide valuable information about the implemented coffee traceability marketing system, particularly.

3.5. Reliability and Validity of the Instrument

Creswell (2009) considers the reliability of the instruments as the degree of consistency that the instruments or procedure demonstrates. In order to determine the reliability of a measure one needs to test for both consistency and stability using Cronbach's alpha reliability coefficient to test for the consistency of scale. The Cronbach's alpha reliability coefficient values range from 0 to 1 with the higher (the closer the coefficient is to one coefficients) indicating a higher internal consistency reliability and therefore a better measuring instrument Sekaran (2000).

To confirm validity of the instruments, the questionnaires were developed and pilot study was carried out on coffee suppliers, exporters' agents, and cooperative unions of Jimma town which were not included in the sample of the main study. The study was administered by selecting respondents from top list of 2 each (suppliers, exporters' agents, cooperative unions) and group discussion on the 'The implemented coffee traceability Vs exchange actors' title was held with Ethiopian Commodity Exchange Authority (ECEA) staffs of Jimma branch. The pilot test provides an opportunity for the researcher to check the questionnaires and minimize errors due to improper design of instruments, such as problems of wording or sequence, (Adams et al. 2007).

Before conducting the pilot-test, respondents were oriented about the objectives of the pilot-study, how to fill out the items, evaluate and give feedbacks regarding relevant items. Then draft

similar questionnaires were dispatched and filled out by the selected respondents for the pilot study. After the questionnaires were returned back, necessary modifications were made for the questionnaires of the main research.

To check the reliability and validity of the questionnaires, Cronbach's alpha reliability test was employed after the pilot test was conducted. All items were carefully entered in to SPSS version 20 and the average result found from the respondents was (.929). which showed the questions are reasonably accepted and valuable for the intended study.

Table 3.1: Summary of the Reliability Test on Scaled items

Table 3.1.	Summary	of the	Reliability	Test on	Scaled items
Table 3.1.	Summar v	or me	Kenabinty	1 est on	Scaled Items

	NT C	G 1 W :	C , 1T,	C 1 1
	No of	Scale Variance	Corrected Item-	Cronbach
	items	if Item Deleted	Total	's Alpha
			Correlation	
Awareness development	8	10.590	.918	.899
Supply chain intricacy	8	13.493	.938	.896
Legislation	5	15.892	.844	.928
Controlling System	10	15.479	.823	.925
Traceability Performance	12	10.147	.907	.910
Average	43			0.929

Source: Survey data, 2020

Cronbach's alpha coefficient normally ranges between 0 and 1, George and Mallery (2003) provide the following rules of thumb: > 0.9 = Excellent, > 0.8 = Good, > 0.7 = Acceptable, > 0.6 = Questionable, > 0.5 = Poor, and < 0.5 = Unacceptable. Hence, by this technique it is noted that the Alpha of (0.929) is reasonably excellent to use the questions for the intended research.

3.6 Data Processing and Analysis

Both primary and secondary data were analyzed using qualitative and quantitative methods. Data analysis was made through combination of both descriptive and inferential statistics. Questionnaires were first collected, edited, coded and entered into computer software named SPSS version 20 (Statistical Package for Social Sciences). Then the edited data coded and arranged in to suitable categories, so that they were organized and classified into groups having similar characteristic that makes the information ready for analysis. The data processing has employed two phases, data clean-up and data reduction. During data clean-up the collected raw data were edited to detect anomalies, errors and omissions in the responses and checked that whether the questions were answered accurately and uniformly.

The descriptive statistics such as percentage and frequency were used to analyze data obtained through the Libert scale rating options and close-ended questionnaire regarding the factors affecting the implemented coffee traceability market in ECX Jimma branch.

According to Sekaran(2000:401), inferential statistics allow to assume the data through analyzing the relationship between two or more variables and how several independent variables explain dependent variable. Hence, the following both inferential statistical methods were used in the study.

Pearson Correlation Coefficient

The study was aimed at examining factors that affect the implemented coffee traceability in ECX Jimma branch and the researcher thought as Pearson correlation helps to show the relationship between the variables, to measure the linear association between two variables i.e. the independent and dependent variables, (Hair et al. 2008). According to Duncan C. and Dennis H. (2004), correlation coefficient can range from -1 to +1. The value of -1 represents a perfect negative correlation while a value of +1 represents a perfect positive correlation. A value of 0 correlations represents no relationship between the variables. According to Pallant, (2010), these types of model assumed to provide a clue of directions, positive when one variable increases and so do the other one or negative when one variable increases and the other decreases.

Linear Regression Analysis

Besides to the Pearson correlation linear regression analysis was also used to investigate the association in which the effects of two or more independent variables on a single dependent variable, Zikmund et al. (2010). Linear regression is a method of estimating or predicting a value on some dependent variable given the values of one or more independent variables. In this study multiple linear regression was employed, John Adams, et al. (2007:198).

According to Malhotra (2007) using descriptive survey method helps the researcher in picturing the existing situation and allows relevant information using appropriate data collecting instrument. Simple and multiple regressions are employed to identify and predict the relation and contribution of variables for the study objectives. Furthermore, descriptions were made based on the results of the tables and figures using mean value, percentage, rank order and standard deviation. The data collected through interviews and documents were analyzed qualitatively by descriptive statements. The results that were obtained from the interviews used concurrently to strengthen the analysis of the questionnaires.

The regression has been developed from the hypothesis set with the support of theoretical background. Finally, the results of both descriptive as well as inferential results were presented by appropriate figures and tables. The linear regression is also shown by the following equation formula:

$$Y = \beta 0 + \beta X + e$$

Where: the left-hand variable, Y represents the dependent variable in the model, where as X represents the independent variables. $\beta 0$ is the constant term, β represents the coefficient associated with each independent variable, and e is the error term.

Generally, by using the above equation to show the relation between dependent and independent variables of the research the following linear regression formula is developed:

$$Yi = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + e$$

Where: Yi is the outcome or the dependent variable (traceability performance), $\beta 0$ is the constant which would be equal to the mean if all slope coefficients are 0, X1= Awareness development, X2= Supply chain intricacy, X3= Legislation, and X4 = Controlling system are independent

variables, β 1, β 2, β 3, β 4, are the coefficients associated with each independent variable & measure the change in the mean value of Y per unit change in their respective independent variables, and e is the standard error.

3.7 Ethical consideration

Ethics in research has to do with the responsibility of researchers to be honest and respectful to all individuals who are affected by the research studies or reports of the results of the studies .Gravetter & Forzano, (2006). Ethical consideration plays a role in all research studies and all researchers must be aware of it. Therefore the researcher communicated with ECX Jimma branch and the Jimma zone ECTDMA office legally, using the letter of JU. The purpose of the study was made clear for all participants. All communication with the concerned bodies were accomplished at their voluntarily agreement without harming and threatening their personal and institutional wellbeing. The identity of the respondent was also kept confidential.

CHAPTER FOUR

4. DATA PRESENTATION, INTERPRETATION and ANALYSIS

This chapter deals with data presentation, interpretation and analysis of the study. It has three parts. The first part tells about the background of the respondents, the second part is about factors that affect coffee traceability marketing system in ECX Jimma branch, and the third part is the interpretation of correlation, and regression results.

To achieve the objectives it was tried to collect data from a total of 130 respondents which consisted of 105 questionnaires that were distributed to 85 staffs of Ethiopia Commodity Exchange (ECX) Jimma branch and 10 staffs of same departments (quality and market dept') of Ethiopian Coffee and Tea Development and Market Authority (ECTDMA) Jimma zonal office, 17 selected top exchange actors/clients of ECX Jimma branch (i.e.10 top suppliers/their agents, 5 top buyers/their agents, and 2 top cooperative unions), and from interviews made with higher officials of both organizations, and two round focus group discussions held on 'The implemented coffee traceability Vs coffee actors', with the exchange actors and 20 laborers of ECX Jimma warehouse. However, due to the current inconvenient nationwide situation (the impact of the COVID-19 restrictions), as the communication was hard while studying the case, almost 85.7% of the questionnaires (by 90 respondents) was filled and returned, but the rest 15 questionnaires were unreturned. Moreover, the secondary data were also used for the analysis.

Generally, after editing, coding and tabulation, the survey data were conducted and entered to SPSS version 20 for analysis. The study has used descriptive method along with inferential statistics (correlation and regression) to interpret the results. Hence, the first and the second parts of the paper are analyzed by using descriptive statistics such as frequencies and percentages, and the third part is analyzed by employing Pearson multiple correlations to show the relationship among dependent and independent variables, and the multiple linear regressions to show the extent to which the independent variables affect the dependent variable.

4.1. Demographic profiles (Background) of the Respondents

Description of the characteristics of the target population gives some basic information about the sample population involved in the study. From the data collected and tabulation, the following significant characteristics of the respondents have been obtained.

Table 4.1: Demographic profiles of the respondents

Variable	Variable categories	Frequency	Percentage (%)
Gender/sex	Male	66	73.33
	Female	24	26.67
	Total	90	100
Age	< 25 yrs	7	7.8
	25+ 35	46	51.1
	35+ 45	33	36.7
	45+ 55	3	3.3
	>55yrs	1	1.1
	Total	90	100
Education level	Certificate	10	11.1
	Diploma	15	16.6
	Degree	59	65.6
	Master's degree	6	6.7
	PHD	-	-
	Total	90	100
Service year in the Org.	< 3yrs	10	11.1
-	3+ to 6	24	26.7
	6+ to 9	37	41.1
	> 9 years	19	21.1
	Total	90	100
Department in the org.	Finance & Admin	5	5.6
	Quality Operation	25	27.8
	Warehouse Operation	55	61.1
	IT Operation	4	4.4
	Client Relationship	1	1.1
	Total	90	100
Position/status	Head	2	2.2
	Dept Supervisor	6	6.7
	Expert	45	50.0
	Supportive	37	41.1

Source, Survey data, 2020

As it is understandable from the above table 4.1, of the respondents, 66 (73.33%) were males and the rest 24 (26.67%) were females. Regarding their age 79 (87.8%) were found between 25 and 45 years old which is active working age, and mature enough to mitigate performance errors. Among respondents 65 (72.3%) have got at least first degree and some have above. This quality capacitated the firm to apply newly emerging systems such as traceability, because the majority workforces can understand and adapt new technologies easily, and their responses for the questionnaire could be also expected more responsive. Besides, 80 (88.9%) respondents have more than 3-years experience of the work. This means the majorities knew the implemented coffee traceability system well from the scratch, and can evaluate its progression well. Of the respondents 80 (88.9%) were also working on quality, and warehouse operations departments. Both departments are areas where almost 95% of the decisive and core activities of the firm are undertaking. All assurances of the quality of traceable coffees take place there, and incorporate: controlling malpractices, identifying and sorting coffee types, cupping and grade approving of each variety, depositing the products for specified days with IP model, and finally delivering the traceable consignment to buyers. Therefore, since these respondents are believed to be the representatives of the market and the exchange actors, they were most keen and responsive to answer the survey questionnaires by evaluating the internal and external impacts, identifying the bottlenecks that are challenging the implemented coffee traceability marketing system in ECX, and they can contribute feasible/fact-based opinions for the solution to solve problems. Finally, 82 (91.1%) respondents were found at non managerial levels which could make them confident and self responsible on their work and give trustworthy responses to the survey questions, too.

4.2. Current status of factors affecting the implemented coffee traceability

In the survey in order to find out the actual factors that affect the implemented coffee traceability marketing system in ECX Jimma branch, though there are many more factors such as pre barcoding malpractices, and post selling handlings, that might illuminate additional affecting situations, due to source scarcity (capacity and time), the researcher was obliged to focus only on four basic factors (i.e. awareness developing, supply chain intricacy, legislation, and controlling system) as independent variables, and traceability performance as dependent variable. Hence, as data collecting instruments, along with interviews and group discussions held with key officials and selected groups respectively, the researcher has prepared and distributed semi-structured

questionnaires that focused on the hypothetical factors, to the target respondents. And finally, their responses to the questions listed under each variable have been summarized and analyzed.

4.2.1. Awareness development

Sometimes, even the concerned organization has got a new system/project that is believed to transform the sector's contribution to the country's image or economy, considerable time and efforts might not be invested on it so as to develop awareness about the system to the relevant actors and stakeholders, before and after its implementation. During such an occation, especially once the pre implementation period has gone out, side to side implementing the system, it would be very nesseciating to exhaust all possibilities to develop and expand the awareness about the project's benefits by informing and updating the situations happening there. Because it could play irreplaceable role in the entire activities that have been doing to ensure the sustainability of the system. On this regard, surveying how much it has been done about the implemented coffee traceability marketing system in ECX Jimma branch was an interesting issue for the study. Hence, the fact has been investigated through respective questionnaires that were prepared and dispatched by the study to the target respondents. Hereby, the questions under awareness development factor and the results of the questionnaire have been summarized as follows:

N.B. Where the Likert type scale is used to evaluate the variable by the given items in the tables below, the numbers/letters stand for: 1= strongly disagree (SD), 2= disagree (D), 3= neither agree nor disagree (N), 4= agree (A), 5= strongly agree (SA).

Table 4.2: Descriptive analysis of Awareness creation / development

Factors / items		1	2	3	4	5
		SD	D	N	A	SA
Implementing effective coffee traceability awareness	Freq				14	76
in the society across the supply chain is very critical	%				15.6	84.4
and brings about friendly cooperation.						
Lack of continual and substantial awareness	Freq		15	6	31	38
developing/training on the implemented traceable						
coffee marketing system to exchange actors by using	%		16.7	6.7	34.4	42.2
all possible communication means.						
Lack of similar understanding about coffee traceability	Freq		1	7	30	52
among the concerned bodies/ stakeholders due to new	%		1.1	7.8	33.3	57.8
entrants.						
Lack of persistent commitment and motivation with	Freq	56	17	10	7	
the exchange's employees in supporting the	%	62.2	18.9	11.1	7.8	
traceability system.						
Lack of updating and dispatching information about	Freq		1	4	52	33
the progression of the implemented coffee traceability	%		1.1	4.4	57.8	36.7
market by the concerned bodies.						
Lack of periodic evaluation system & report the	Freq		13	5	51	21
traceability performance by the regulatory bodies.	%		14.4	5.6	56.7	23.3
Insufficient standardized & structured exchange						
information system with the entire coffee actors via	Freq				51	39
electronic platforms such as price ticker or websites to						
update the daily traceable coffee prices, at national and	%				56.7	43.3
global markets.						

Source, Survey data, 2020

Table 4.2 represents the descriptive analysis of awareness development/creation, the result showed that, 84.4% and 15.6% of respondents were strongly agreed and agreed respectively on ECX implementing effective coffee traceability awareness in the society across the supply chain is very critical and brings about friendly cooperation. This implies that ECX was effective on implementing the coffee traceability awareness. Concerning lack of continual and substantial awareness developing/training on the implemented traceable coffee marketing system to exchange actors by using all possible communication means, larger proportion 76.6% of respondents were agreed and/or strongly agreed on the issues. This indicates as the organization was not using all possible communication means continually and substantially to develop

awareness about the implemented traceable coffee marketing system to exchange actors after it has inaugurated the system once.

However, 91.1% of respondents were agreed and strongly agreed on Lack of similar understanding about coffee traceability among the concerned bodies / stakeholders due to new entrants. This implies there were new entrants in the coffee market that cause the loss of similar understanding on the coffee traceability. Thus, it should be necessary to develop periodic continuous training and awareness development program. Regarding Lack of persistent commitment and motivation with the exchange's employees in supporting the traceability system larger proportion 81.1 % of respondents were disagreed and or strongly disagreed on the above statement. This implies that the employees had persistent commitment and motivation in supporting the traceability system. The reason for this might be the improved outcome which was identified with in a time.

On the intervention of awareness development activities larger proportions of; 94.5%, 80%, and 100% of respondents were agreed and or strongly agreed on lack of updating and dispatching information about the progression of the implemented coffee traceability market by the concerned bodies, lack of periodic evaluation system & report the traceability performance by the regulatory bodies and insufficient standardized & structured exchange information system with the entire coffee actors via electronic platforms such as price ticker or websites to update the daily traceable coffee prices, at national and global markets respectively. This implies that there was poor information access on the progression of coffee traceability status, lack of periodic evaluation and insufficient standard & structured exchange information. This could make a problem to determine the traceability status.

Regarding the system awareness issue, the interviews made with ECX Jimma branch officials confirmed that: as coffee traceability system is a newly emerging market to the country, it needs a day-to-day follow up of similar global exchanges, by higher ECX officials and ensuring standardized exchange information system by the concerned regulatory authorities (ECTDMA and ECEA) alongside the ECX organization. Moreover, informing the progressions made in the system continually, reporting the feedbacks timely, use of accessible languages and pre-informed technical words peculiar to the market to update the ongoing traceability market, and announcing the daily price changes to all market actors using all understandable and accessible media, are

among the areas where awareness developing could impose its impact on the implemented traceability system. The key officials added that: though there were some initial works done on this area by the concerned government regulatory bodies and by ECX, as the system is global concern and goes more advancing, the concerned bodies altogether need to perform more to come up with excellence, onwards too.

4.2.2. Supply chain intricacy

It is inevitable that for successful performance of product traceability system, the role of well defined supply chain structure is an inimitable factor. Especially, when there is some problem in relation to the product safety, and consequently it arises accountability, thanks to the well structured supply chain routes, the responsible body will be identified easily. i.e. effective recall can be done, the relevant information can be dispatched on demand, and corrective measures can be taken shortly so as to reduce the incidence of additional risks. Hence, the multidimensional advantages of the factor impressed the researcher to understand the real situations of the supply chain complexity along the implemented coffee traceability marketing system in ECX Jimma branch. So that the study has tried to investigate what were there, through the questionnaire he dispatched to the selected respondents. Hence, the questions assessed under the issue and the responses given are summarized as follows:

Table 4.3: Descriptive analysis of Supply chain intricacy

Factors / items		1	2	3	4	5
		SD	D	N	A	SA
ECX lacks to ensure chain tracability for coffee actors that	Freq			3	42	45
may assist to retrieve the information they demand.	%			3.3	46.7	50.0
ECX lacks to ensure coffee traceability requirement from	Freq		2		9	79
washing station to ultimate consumer using the tracking	%		2.2		10.0	87.8
and tracing pattern of complete coffee history through	70		2.2		10.0	07.0
well-established chain traceability.						
ECX lacks well-established chain traceability to crosscheck	Freq			1	2	87
and control over the coffees delivered from its warehouses	%			1.1	2.2	96.7
lest the exporters mix different types together before sending	70			1.1	2.2	90.7
to foreign buyers.						

ECX suppliers do not know whether ECX delivers their	Freq	2	2	34	52
coffee to buyers by mixing with other suppliers' coffee	%	2.2	2.2	37.8	57.8
products.					
ECX has never received a claim for coffee quality that has	Freq	11		79	
been delivered from its warehouses by coffee buyers	%	12.2		87.8	
through chain traceability.					
The current Coffee supply chain traceability is highly	Freq		1	42	47
fragmented and diversified.	%		1.1	46.7	52.2
The traceability system that ECX has implemented lacks to	Freq		2	56	32
establish frequent contacts with supply chain members.	%		2.2	62.2	35.6
Lack of integrated supply chain traceability from one end	Freq		1	12	77
to another makes difficult in maintaining smooth	%		1.1	13.3	85.6
communication.					

Source, Survey data, 2020

Table 4.3 represents the descriptive analysis of supply chain intricacy, the result showed that, 96.7% and 88% of respondents of the respondents were agreed and/or strongly agreed on the statements ECX lacks to ensure chain tracability for coffee actors that may assist to retrieve the information they demand.and ECX lacks to ensure coffee traceability requirement from washing station to ultimate consumer using the tracking and tracing pattern of complete coffee history through well-established chain traceability respectively. This could suggest that there was a lack of ensuring coffee traceability and lack of ensuring chain traceability for coffee at ECX. Additionally, 97.9% of respondents were reported that ECX lacks well-established chain traceability to crosscheck and control over the coffees delivered from its warehouses lest the exporters mix different types together before sending to foreign buyers. This implies that there was no unique system of traceability for ECX to crosscheck and control over the coffee delivered from its warehouses.

In realtion to supply chain intricacy factors, larger proportions 95.6%, 87%, 99% and 98.9% of the respondents were agreed and or strongly agreed on the statements of; ECX suppliers do not know whether ECX delivers their coffee to buyers by mixing with other suppliers' coffee products, ECX has never received a claim for coffee quality that has been delivered from its

warehouses by coffee buyers through chain traceability, The current Coffee supply chain traceability is highly fragmented and diversified and The traceability system that ECX has implemented lacks to establish frequent contacts with supply chain members respectively. This implies that ECX suppliers had poor information about for mixing their products with other suppliers, ECX ignored claim for coffee quality that has been delivered from its warehouse, as there was highly fragmented supply chain traceability currently.

The interviews held with higher officials of ECX Jimma branch and Ethiopian coffee and tea development and marketing authority (ECTDMA) Jimma zonal office also approved that as the coffee supply chain traceability is highly fragmented and diversified it has complicated the full implementation of integrated chain traceability while its absence affected the system badly. Consequently, it was difficult for buyers/companies to trace each step in the route of a given product when they faced quality problem. So without ensuring integrated chain traceability structure among the supply members and buyers, the traceability system cannot transform the coffee market ahead.

The officials further revealed that in the past three implementation years, among the weaknesses faced the traceability practice in ECX was the mixing of different grade coffee consignments while sold products were delivered to the buyers/exporters. This has been done in ECX warehouses, in favor of exporters that were given priority by the directives of the regulatory bodies (ECTDMA) and Ministry of Trade (MoT). But such abnormal operations on the contrary, could have twofold impacts. Firstly, it can affect the traceability system itself. Secondly, it could block or avert the opportunity of special traced coffee suppliers to get special prices/markets which could be harvested after winning the competition of Cup of Excellence in the foreign cupping markets.

Generally, it is suggested by the study that if good chain traceability is maintained to interlock all involving parties in the system, it would be easy to identify the path from which a product is originated and to whom it is supplied, and ensure an interlinked chain of records between steps in a process operation and/or between different stages in a supply chain. Unfortunately, this trend was missed in the existing coffee traceability practice of ECX.

4.2.3. Legislation

For better performance of a newly implemented modern marketing system, like that of coffee traceability marketing system in ECX, a number of supporting issues should be lined with as guaranty for all involving actors. Among many others, to back the system by making special binding rules so as to comply the global requirements, to capacitate the respective regulatory bodies by enforcing surveillance activities with regulations and directives, and to control and evaluate the system and all involving parties systematically and periodically, can be mentioned as immediate activities. Focusing on this factor, in the survey the following issues were investigated by the questionnaire distributed to target respondents to see the impacts.

Table 4.4: Descriptive analysis of Legislation

Factors / items		1	2	3	4	5
		SD	D	N	A	SA
Lack of well-established legal frameworks for coffee	Freq				27	63
traceability in the country.	%				30.0	70.0
Lack of legislation for tracking & tracing of coffee products	Freq			2	40	48
through the entire coffee supply chain traceability.	%			2.2	44.5	53.3
Lack of governing rule and regulations to allow well-	Freq			2	35	53
organized exchange of information and availability to competent authorities.	%			2.2	38.9	58.9
Lack of regulations that prohibit the coffee actors, not to mix	Freq			1	49	40
different coffee types and origins together.	%			1.1	54.4	44.5
Lack of special binding rules to penalize those who did	Freq		5		18	67
malpractices against the traceability system.	%		5.6		20	74.4

Source, Survey data, 2020

Table 4.4 represents the descriptive analysis of legislation, the result showed that, 100 % and 97.8% of respondents of the respondents were agreed and/or strongly agreed on the statements lack of well-established legal frameworks for coffee traceability in the country and lack of legislation for tracking & tracing of coffee products through the entire coffee supply chain traceability respectively. This implies that there were a lack of legal framework and legislation in

the country regarding coffee traceability. This could have a great impact on strengthening the regulation and follow up procedures of the traceability tasks.

On the other hand, majorities of 97.8%, 98.9% and 94.4% of respondents were agreed and/or strongly agreed on the statements: lack of governing rule and regulations to allow well-organized exchange of information and availability to competent authorities, lack of regulations that prohibit the coffee actors, not to mix different coffee types and origins together, lack of special binding rules to penalize those who did malpractices against the traceability system respectively. This implies that there was a poor state of legislation on the regards of setting governing rules and regulations for sharing well organized information, regulating illegal coffee actors and handling malpractices. This might increase mal-practicing, compromised coffee quality and also market deformation.

The interviews that the researcher made with higher officials of the Ethiopian coffee and tea development and market authority Jimma zonal office, and the exchange's Jimma branch officials also confirmed that at the country level there is deficiency of special binding rules that support the coffee traceability system and prohibit the practices against the traceability concept in unique way, from end to end. Consequently, the implemented system is just running by the rules and regulation that was proclaimed for the existing coffee market under ECTDMA, which practically affected the traceability performance.

Generally, the survey result on legislation factor illuminated that the absence of well-established, governing rules and regulations which could back the traceability marketing system, and capacitate the existing rule to penalize those who did malpractices on traceability, in special way, could result in emerging of new forgery incidences by illegal actors on traceable products which in turn can destroy the country's goodwill in the customers mind totally. Therefore due attention is needed in issuing binding rules for the system.

4.2.4. Controlling System

No matter how the implemented project/system is derived from best trends/benchmarks that can bring remarkable progression to the sector and to the country at all, unless it is accompanied by good follow-up and controlling system it will not be successful. Therefore, what was the controlling system on the implemented traceable coffee marketing system in ECX Jimma branch

has been investigated by the study via the survey questionnaire distributed to the respective respondents and their responses are summarized as presented below.

Table 4.5: Descriptive analysis of Controlling System

Factors / items		1	2	3	4	5
		SD	D	N	A	SA
Lack of well defined controlling system from one end to another to follow up the chain traceability by the concerned	Freq.				33	57
regulatory authority.	%				36.7	63.3
Lack of patriotic integration among the anti illegal trade	Freq.			1	51	38
controlling taskforce members.	%			1.1	56.7	42.2
Lack of experience of the workers of the regulatory	Freq.			5	46	39
authority due to intermittent structural change.	%			5.6	51.1	43.3
Lack of active follow up and periodic evaluation by the	Freq.				23	67
respected higher officials of the regulatory body.	%				25.6	74.4
Lack of persistent packaging of traceable coffee bags with	Freq.			2	44	44
barcode tags at the washing/hulling stations.	%			2.2	48.9	48.9
Lack of sufficient incentives for the regulatory body so as to mitigate malpractices which have been badly affecting	Freq.		5		50	35
the one step back and one step forward traceability controlling approach.	%		5.6		55.6	38.8
Lack of consistency and commitment by the taskforce to	Freq.			3	35	52
take actions, as the members are composed of different sectors.	%			3.3	38.8	57.9
Insufficient exchanging / updating relevant information	Freq.			1	55	34
about the controlling system of coffee traceability between the regulatory body and ECX.	%			1.1	61.1	37.8
Insufficient logistics that hinders the regulatory authority						
from conducting periodical field assessments as per the	Freq.			2	61	27
plan to control illegal trends against the coffee traceability	%			2.2	67.8	30.0
marketing system.						
Lack of well-established chain traceability to control over	Freq.			4	12	74
the coffee delivered from ECX warehouses by the exporters	%			4.5	13.3	82.2
whether they mix different types and origins in their private warehouses before sending to foreign buyers.						

Source, Survey data, 2020

Table 4.5 represents the descriptive analysis of controlling system, the results showed that,100 %, 98.9%, 94.4% and 100 % of the respondents were agreed and/or strongly agreed on the statements lack of well defined controlling system from one end to another to follow up the chain traceability by the concerned regulatory authority, lack of patriotic integration among the anti illegal trade controlling taskforce members, lack of experience of the workers of the regulatory authority due to intermittent structural change and lack of active follow up and periodic evaluation by the respected higher officials of the regulatory body respectively. These indicates that there exist undefined/poorly defined controlling system for the chain traceability, lack patriotic integration for illegal trade, lack of experience of workers on the regulation procedures and poor follow up of the system. This could indicate the poor state of the controlling system in relation to coffee traceability implementation.

Whereas similarly majority 97.8%, 94.4%, 96.7% 98.9% of the respondents were agreed and/or strongly agreed on the statements; lack of sufficient incentives for the regulatory body so as to mitigate malpractices which have been badly affecting the one step back and one step forward traceability controlling approach, lack of consistency and commitment by the taskforce to take actions, as the members are composed of different sectors, insufficient exchanging / updating relevant information about the controlling system of coffee traceability between the regulatory body and ECX and insufficient logistics that hinders the regulatory authority from conducting periodical field assessments as per the plan to control illegal trends against the coffee traceability marketing system. These implied that there was an insufficient incentive for regulatory bodies to control mal practicing, poor consistency and commitment by the task forces, insufficient exchange of relevant information among different parties and insufficient logistics. The above findings showed that there was a poor supporting system to the controlling system of coffee traceability.

Further, the interviews held with key officials of both organizations (ECX and ECTDMA) of Jimma branch revealed that the coffee traceability system that has been undertaking in ECX didn't accommodate the complete traceability requirements, i.e. product's history just began at washing/hulling stations where the first barcode tagging on each traced coffee bag is done, and ended at ECX's warehouse or at the exporter's private warehouse. That is why the controlling system of coffees delivered from ECX's warehouses was more difficult to identify whether

exporters mix different type grades and origins in their private warehouses before sending to foreign buyers.

Moreover, as the controlling taskforce was composed of different sectors so that members were busy in their respective regular jobs but inconsistent in the taskforce duties. Further, the system was liable to malpractices and members have been twisted by illegal traders unless they were committed to perform their duties with patriotic integration. Simultaneously, since most illegal trends are conducted in the field it was difficult to control them only sitting in the offices. On the other hand, there was no sufficient incentive or allocation of contingent budget for the regulatory authority to facilitate the works to be done by the taskforce, so that their motivation was weak to protect the traceability and mitigate malpractices against the system.

Generally, it is believed by the study that the discourses so far discussed based on four estimated variables give clues about the impacts of the factors on traceability performance and at the same time to indicate constructive remedies that enable the concerned body or policy makers to take knowledgeable corrective decisions in order to sustain at least the coffee traceability marketing system in ECX.

4.2.5. The Current Coffee Traceability Marketing Practice at ECX

In the survey, it was attempted to include what the ongoing coffee traceability marketing practice in ECX looked like currently. To investigate the situations, the study, after dispatching the questionnaire to the relevant respondents and gathering their responses back, has summarized and presented the result as follows:

 ${\bf Table 4.6: Descriptive \ analysis \ of \ the \ Current \ Coffee \ Traceability \ Marketing \ at \ ECX}$

Evaluation items		1	2	3	4	5
		SD	D	N	A	SA
At the current coffee traceability practice, ECX lacks to	Freq.			2	17	71
enhance effective communication from farm to end consumer.	%			2.2	18.9	78.9
At the current coffee traceability practice, ECX lacks to	Freq.			1	44	45
meet global standard and marketing demands.	%			1.1	48.9	50.0
At the current coffee traceability practice, ECX lacks to	Freq.				23	67
meet its customer demand and requirements.	%				25.6	74.4
At the current coffee traceability practice, ECX	Freq.			1	14	75
couldn't recognize whether its suppliers mix different coffee types back to the washing /hulling station.	%			1.1	15.6	83.3
At the current coffee traceability practice, ECX	Freq.			2	2	86
deposits each supplier's coffee separately based on Identity preserved (IP) model.	%			2.2	2.2	95.6
At the current coffee traceability practice, ECX delivers each client's coffee separately to the buyers/ exporters	Freq.	86	3	1		
from its warehouses maintaining the IP model.	%	95.6	3.3	1.1		
At the current coffee traceability practice, ECX lacks to	Freq.		1	2	19	68
build trust and loyalty among the stakeholders.	%		1.1	2.2	21.1	75.6
At the current coffee traceability practice, ECX loads	Freq.		2	1	46	41
different client's coffee, and coffee grades together.	%		2.2	1.1	51.1	45.6
At the current coffee traceability practice, ECX	Freq.			1	21	68
couldn't recognize whether Exporters/buyers mix different coffee types & origins forward in processing stations to export.	%			1.1	23.3	75.6
At the current coffee traceability practice, ECX	Freq.	81	7	1	1	
provides better decision identifying through tracking and tracing product problem and notify the consumers immediately by using back & forward traceability principle.	%	90.0	7.8	1.1	1.1	
At the current coffee traceability practice, ECX lacks to	Freq.			1	41	48
describe the entire history of coffee products from farm to ultimate consumer.	%			1.1	45.6	53.3
At the current coffee traceability practice, ECX lacks to	Freq.			1	20	69
enhance brand promotion, product differentiation and product recalls.	%			1.1	22.2	76.7

Source, Survey data, 2020

Table 4.6 represents the descriptive analysis of the coffee traceability marketing practice at ECX, the result showed that, 97.8 %, 98.9%, 100% and 98.9 % of the respondents were agreed and/or strongly agreed on the statements; at the current coffee traceability practice, ECX lacks to enhance effective communication from farm to end consumer, at the current coffee traceability practice, ECX lacks to meet global standard and marketing demands, at the current coffee traceability practice, ECX lacks to meet its customer demand and requirements and at the current coffee traceability practice, ECX couldn't recognize whether its suppliers mix different coffee types back to the washing /hulling station. This indicate that ECX on its current coffee traceability practices fail on enhancing effective communication, lack to met global standards, fail to meet customer demand and fails to recognize the suppliers mixing different coffees. These all are possible reasons on the coffee market fluctuations, on the price since those were determinants for the coffee quality to be maintained.

Similarly, 97.6% of the respondents were agreed and or strongly agreed for At the current coffee traceability practice, ECX deposits each supplier's coffee separately based on Identity preserved (IP) model. This indicates ECX facilitate the ways to tackle and ensured the suppliers products from mixing each other. However, 98.6% of the respondents were disagreed or strongly disagreed on At the current coffee traceability practice, ECX delivers each client's coffee separately to the buyers/ exporters from its warehouses maintaining the IP model. This implies that as there was a possibility of mixing supplier products during the delivery of coffees.

And also 97.8 % of respondents were disagreed and strongly disagreed on at the current coffee traceability practice, ECX provides better decision identifying through tracking and tracing product problem and notify the consumers immediately by using back & forward traceability principle. Thus ECX had poor decision identifying through tracking and tracing product problem. These indicate that there was no intervention ECX had taken on taking measures of the traceability outcomes.

Whereas the majority; 96.7%, 96.7%, 98.9%, 98.9% and 98.9% of the respondents were agreed and or strongly agreed on the statements; at the current coffee traceability practice, ECX lacks to build trust and loyalty among the stakeholders, at the current coffee traceability practice, ECX loads different client's coffee, and coffee grades together, at the current coffee traceability practice, ECX couldn't recognize whether Exporters/buyers mix different coffee types & origins

forward in processing stations to export, at the current coffee traceability practice, ECX lacks to describe the entire history of coffee products from farm to ultimate consumer and at the current coffee traceability practice, ECX lacks to enhance brand promotion, product differentiation and product recalls. This could indicate that ECX had poor trust building with stakeholders, ECX load loads different customers products simultaneously with different grades, ECX could not know entire history of coffee, and also fails on brand promotion and product differentiation. This could indicate that the overall coffee traceability practice was found on its unsatisfactory state.

Moreover, the interviews made with ECX Jimma branch and ECTDMA Jimma zone key officials, regarding the current coffee traceability marketing status revealed that the system has been swaying interwoven by many challenges, such as: firstly, as the traceability system that ECX implemented is not complete, it does not have well-established chain traceability route that enables to follow one step up and one step down approach to trace back product's history when demand occurs. So, no one takes responsibility. Secondly, as the export directives of the country clearly favor exporters, sometimes, ECX is obliged to prioritize exporters' needs when it delivers sold coffees from its warehouses, by loading different grades at lump-sum violating the IP model, which is a part of the traceability requirement. Thirdly, as the country has no binding laws for traceability, the activities of all partners in the supply chain cannot be synchronized to ensure effective supply chain operations. Lastly, either ECX or ECTDMA has no access or mandate to check what is done in the exporters' private warehouses while they reprocess the traced coffee they bought from ECX to send abroad, except that the CLU (coffee liquoring unit, a division of ECTDMA) approves the coffee quality irrespective of its origin, for final packaging. Finally, both officials concluded that due to such and other more factors, unless the government and all concerned bodies have given full support, developing a safe traceability system is however, a complex undertaking.

4.3 The analysis of Pearson's Product Moment Correlation Coefficient

According to, Hair et al., (2008) The Pearson correlations help to calculate a measure of relationships between the independent and dependent variables and indicate the strength of relationships between the studied variables and help to measures the linear association between two metric variables. According to Leedy and Ormond (2010), correlation is the statistical process which discovers whether two or more variables are associated with one another.

The Pearson product-moment correlation coefficient, r; is the most frequently used measure of association and the basis of many multivariate calculations (Correlation coefficients take on values between -1 and +1, ranging from being negatively correlated (-1) to uncorrelated (0) to positively correlated (+1). According to Pallant, (2010), these types of model assumed to provides a clue for directions, positive when one variable increases and so do the other one or negative when one variable increases and the other one decrease.

Based on these assumptions the relationships between the independent variables (awareness creation/development, supply chain intricacy, legislation and controlling system) and dependent variable (traceability performance) is analyzed by the Pearson correlation as presented under:

Table 4.7: Pearson Correlations

		Pearson	Correlation	ns:		
		Awaren ess Creation /dev't	Supply chain intricacy	Legislation	Control ling System	Traceabilit y Performan ce
Awareness Creation/	Pearson Correlation	1	.880**	.771**	.781**	.912**
Dev't	Sig. (2-tailed)		.000	.000	.000	.000
	N	90	90	90	90	90
Supply chain	Pearson Correlation	.880**	1	.846**	.828**	.901**
intricacy	Sig. (2-tailed)	.000		.000	.000	.000
	N	90	90	90	90	90
Legislation	Pearson Correlation	.771**	.846**	1	.853**	.767**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	90	90	90	90	90
Controlling System	Pearson Correlation	.781**	.828**	.853**	1	.723**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	90	90	90	90	90
Traceability Performanc	Pearson Correlation	.912**	.901**	.767**	.723**	1
e	Sig. (2-tailed)	.000	.000	.000	.000	
	N	90	90	90	90	90
**. Correlation	is significant at th	e 0.01 level (2	2-tailed).			

Table 4.7, demonstrates the results of Pearson's Product Moment Correlation on the relationship between factors (awareness creation/development, supply chain intricacy, legislation and controlling system) and current ECX traceability performance for the sample respondents. It shows that, the correlation coefficients for the relationship between the indicated factors and traceability performance are linear and positive ranging from medium to high correlation coefficients.

The results in the above table indicate that, there is a positive and significant relationship between awareness creation and traceability performance (r = 0.912, p < 0.01), supply chain intricacy and traceability performance (r = 0.901, P < 0.01), legislation and traceability performance (r = 0.767, P < 0.01) and controlling system and traceability performance (r = 0.723, p < 0.01). The finding on table 4.7 above further indicates that among independent variables interference the higher relationship is found between awareness creation and traceability performance and supply chain intricacy and traceability performance according the value of their correlation coefficient.

Therefore, from the results of the multiple regression analysis, it is clear that awareness creation and supply chain intricacy are the most influential factors in explaining the traceability performance of the ECX Jimma branch. Hence, the interventions done by the ECX especially, on these both factors can change its traceability performance.

4.3.1 Results of Pearson's Product Moment Correlation Coefficient

Information relating to whom product is supplied (next point in the supply chain) is linked to the product consignment record. It represents full external and internal traceability. It does represent good practice and is consistent with meeting the requirements of international standards and most private voluntary standards. Thus, awareness creation could improve one usage of products traceability. In a summary, Pearson correlation analysis indicated that awareness creation/development positively predicted traceability performance of ECX Jimma branch. This could suggested as awareness creation had a positive relationship with significant interference of traceability performance (which p-value= 0.000 (< 0.01) and r=0.912). A system-level approach is used to develop models for implementing the traceability system. The usage requirements of the traceability system are defined by the UML (Unified Modeling Language) Use Case diagram technique (Eriksson and Penker, 2000). The Use Case diagrams are closely connected to

scenarios. A scenario is an example of what happens when someone interacts with the system. The above facts could suggest that in order to determine usage requirements the users should have to inform to create or develop awareness with different scenario.

Effective supply chain traceability can only be achieved with a combination of internal traceability and chain traceability. Each actor in the supply chain must not only know who their supplier is, but also to whom the trade units are being sold. In a summary, Pearson correlation analysis indicated that, supply chain intricacy positively predicted traceability performance of ECX Jimma branch. This could suggested as supply chain intricacy had a positive relationship with significant interference of with traceability performance (which p-value= 0.000 (< 0.01) and r=0.901). Each actor must be able to trace back and track forward the product information based on one-up and one-down basis. Developing a traceability system is however, a complex undertaking as it involves all the stages of production, handling, storage, processing, transportation, and distribution (Maitri Thakur, et al., 2009). Thus, according to the above findings supply chain intricacy could able to enhance traceability performance of ECX.

Traceability has a legal framework in many countries including the European Union and Viet Nam. In the EU food law food business operators must be able: to identify from whom and to whom product has been supplied to have systems and procedures in place that allow for this information to be made available to competent authorities upon their request. In a summary, Pearson correlation analysis indicated that, legislation positively predicted traceability performance of ECX Jimma branch. This could suggested as legislation had a positive relationship with significant interference of with traceability performance (which p-value= 0.000 (< 0.01) and r=0.767). According to the literature which indicates various food safety and traceability laws exist in several countries. European Union's General Food Law entered into force on January 1, 2005. The law included important elements like rules on traceability and the withdrawal of dangerous food products from the market. Under the European Union Law, "Traceability" is defined as the ability to track any food, feed, food-producing animal or substance that will be used for consumption, through all the stages of production, processing and distribution (Official Journal of the European Communities, 2002). The above facts which suggest legislation could able to provide a guide for the effectiveness of traceability performance.

In a summary, Pearson correlation analysis indicated that, controlling system positively predicted traceability performance of ECX Jimma branch. This could suggested as controlling system had a positive relationship with significant interference of with traceability performance (which p-value= 0.000 (< 0.01) and r=0.723). As in the second case study this represents full external and internal traceability, including associated benefits and potential concerns. However, there are additional significant benefits; principally relating to the identification of product lots/batches based on the adoption of international accepted standards and norms that uses readily available and well accepted technologies (UNIDO's Project case studies on green coffee, 2013). The above fact suggests that the controlling system aid with technology for better traceability outcomes.

4.4. Assumptions of Multiple Linear Regressions

Multiple linear regressions allow a more sophisticated exploration of the interrelationship among a set of variables. It can be used to address a variety of research questions and indicate how well a set of variables is able to predict a particular outcome, Pallant (2005). In the context of this study, the study has used standard multiple linear regression. In standard multiple linear regression, all independent variables are entered into the regression equation at once.

The assumptions of MLR tested with SPSS and identified as primary concern in this research includes: auto regression, multi co linearity, normality, and homoscedasticity. Detailed definitions, descriptions and interpretations of these assumptions discussed in below.

4.4.1 Multi co linearity

Co linearity (also called multi co linearity) refers to the assumption that the independent variables are uncorrelated Darlington, 1968; Keith, (2006). The researcher is able to interpret regression coefficients as the effects of the independent variables on the dependent variable when co linearity is low. This means that we can make inferences about the causes and effects of variables reliably. Multi co linearity occurs when several independent variables correlate at high levels with one another, or when one independent variable is a near linear combination of other independent variables. Tolerance levels for correlations range from zero (no independence) to one (completely independent) Keith, (2006). The VIF is an index of the tolerance.

4.4.2 Normality

Normality refers to the normal distributions of the residuals about the predicted dependent variable scores. This assumption is based on the shape of normal distribution and gives the researcher knowledge about what values to expect Keith, (2006). Normality tests are used to determine whether a data set is well-modeled by a normal distribution or not, or to compute how likely an underlying random variable is to be normally distributed Gujarati, (2009). Normality can be checked through histograms of the standardized residuals, Stevens,(2009). Histograms are bar graphs of the residuals with a superimposed normal curve that show distribution. As depicted in the figure below; which is an example of a histogram with a normal distribution from the SPSS software, there is no normality problem on the data used for this study.

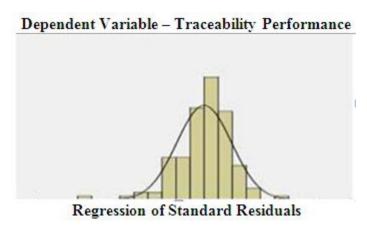


Figure 4: Histogram

4.4.3 Linearity

Linearity has the residuals should having a straight-line relationship with predicted dependent variable scores. It describes the dependent variable as a linear function of the predictor variables. Multiple regressions can accurately estimate the relationship between dependent and independent variables when the relationship is linear in nature. If the relationship between the dependent and independent variables is not linear, the results of the regression analysis have been under- or over- estimates the true relationship of the variables Osborne & Waters, (2002). According to Stevens (2009), linearity can be best cheeked by normal p-plot residual. As shown in the figure below, the relationship between the dependent and independent variables is linear. Hence, no linearity problem on the data used for this study.

Normal pp-plot of Regression Standard Residual Dependent Variable Traceability Performance

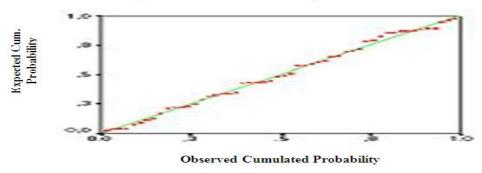


Figure 5: Normal p-plot

4.5 Regression Analysis tests

Besides to the descriptive analysis and person correlation, to show the extent to which the independent variable affect the dependent variable the multiple linear regression analysis was employed to investigating the association in which the effects of two or more independent variables on a single interval scaled dependent variable has been be studied simultaneously Zikmund et al., (2010). It is also used to understand by how much each independent variable (Awareness creation/development, supply chain intricacy, legislation, and controlling systems) explains the dependent variable (traceability performance). The findings are presented below:

We want to run a regression of current traceability performance (Y) on (X) determinants factors awareness creation/development (X_1) , supply chain intricacy (X_2) , legislation (X_3) and controlling system (X_4) for ECX Jimma branch. Current traceability performance (Y) = function of awareness creation/development (X_1) , supply chain intricacy (X_2) , legislation (X_3) , and controlling system (X_4) or, as relevant text book will have it,

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_k x_k + e$$

4.5.1 ANOVA Analysis (testing Significance of the model)

The ANOVA (Analysis of variance) of regression analysis between four independent variables which include: awareness creation/development, supply chain intricacy, legislation, and controlling system, in respect to dependent variable (traceability performance). As the result shows positive and significance for all values of the variables in this model summary as shown herewith. This is therefore, given F statistic of 163.747 and a probability value of 0.000 (i.e.

F=163.747, P value = 0.000). The probability value of (0.000) shows that there is a very low possibility that the statement overall regression model was insignificant. Hence, the overall regression model was significant and gives a logical support to the study model.

Table 4.9: ANOVA

Table 4.9: ANOVA ^a									
Model		Sum of Squares	Df	Mean Square	F	Sig.			
1	Regression	153.030	4	38.257	163.747	.000 ^b			
	Residual	19.859	85	.234					
	Total	172.889	89						

a. Dependent Variable: Traceability Performance

Source, Survey data, 2020

Therefore, the last column in the above table (ANOVA-table) shows the goodness of fit of the model. It is p-value or observed significance of the F. The lower this number, the better the fit. Typically, if "Sig" is greater than 0.05, we conclude that our model could not fit the data.

4.5.2 Model Summary (F-test)

The model summary of regression analysis between independent variables of (awareness creation/development; supply chain intricacy, legislation, and controlling system) has shown in table 4.10 below. These findings show that the factors studied in this study affect the Traceability performance up to 88.5% as indicated by the R Square. Thus, 88.5%, of the variances in coffee treatability can be explained by combined effect of the predictor/independent variables. The remaining variances on the dependent variable could be explained by other explanatory variables not included in this study.

Test of the goodness of fit of the model in this research showed negative results. From the result of F-test, it is known that the F-statistic 163.747 is higher than the critical value 3.141 (from t-table) and the probability (p-value or the Sig. value) 0.000 is smaller than alpha (0.05). Therefore, the model is fit.

b. Predictors: (Constant), Awareness Creation/development, Supply chain intricacy, Legislation, and Controlling System,

The \mathbb{R}^2 value test: This test is looking at the \mathbb{R}^2 value of the model summary which is .885> 0. As this value gets approach to +1, the better the model will be.

Table 4.10: Model Summary

	\Table 4.10: Model Summary ^b										
M	R	R	Adjusted	Std.	Change Statistics						
od el		Squar e	R Square	Error of the Estima te	R Square Change	F Change	Sig. F Change				
1	.941 ^a	.885	.880	.483	.885	163.747	.000				

a. Predictors: (Constant), Awareness Creation/development, Supply chain intricacy, Legislation, Controlling System

b. Dependent Variable: Traceability Performance

Source, Survey data, 2020

If, F = F, we had to compute it by hand the F value, it would be...

$$F = \frac{R^2/_{k-1}}{1 - R^2/_{(N-k)}}$$

Where value that is resulted from the calculation;

 R^2 = coefficient of determination:

K = number of variables (# of dependent and independent variables);

N = number of observations (# of sample respondents).

(K-1) = degree of freedom

Given

 $R^2 = 0.885...$ from regression summary table

$$K-1 = 5 - 1 = 4$$
, $1 - R^2 = 1-0.885 = 0.115$ and $N-k = 90-5 = 85 = df2$

Therefore, $F = 0.885/4 \div 0.115/85$

$$= 0.885/4 * 85/0.115 = 0.22125*85 \div 0.115 = 18.81/.115 = 163.533$$

$$= 0.22125*739.13 = 163.533$$

The value is similar, 163.533=163.747; the difference could be the effect of rounding.

Therefore, the results from the regression model summary and analysis of variance (ANOVA) above indicate that awareness creation/development, supply chain intricacy, legislation and controlling system could significantly contribute towards the R² value, which is a statistical measure of how close the data are to the fitted regression line. Based on the R²value of 0.885, these four variables could explain 88.5 % variation in the current traceability performance.

Thus 88.5% of the variances in coffee treatability can be explained by combined effect of the predictor/independent variables. The remaining variances on the dependent variable could be explained by other explanatory variables which have not been considered in this study.

4.5.3 The co linearity test

Multi co linearity refers to the assumption that the independent variables are uncorrelated. Small values for tolerance and large VIF values show the presence of multi co linearity. Multi Co linearity shows that the dependency of predictor variables with one another. As indicated in the table below,

Table 4.11: Co linearity statistics

Variables	Tolerance	VIF
Awareness Creation/development	.217	4.610
Supply chain intricacy	.150	6.645
Legislation	.210	4.766
Controlling system	.226	4.429

Dependent variable: Traceability performance

According to the information observed above on table 4.11 Output of variance inflation factor (VIF) column in the coefficients table of the regression output shows that VIF for AC (4.610), SCI (6.645), L (4.766), and CS (4.429), all are smaller than 10. It means that there is no problem of multi co linearity between independent variables. This can be further ascertained from the Tolerance column of the same table in which the tolerance for the four independent variables are 0.217, 0.150, 0.210 and 0.226 respectively, all > 0.1 indicating that there is no multi co linearity.

4.5.4 The Coefficients Test

Table of Coefficients helps us to see which among the four independent variables influences most the variance in Traceability Performance.

Table 4.12: Coefficients

Model		Un-standardized Coefficients		Standardized Coefficients	Т	Sig.
		В	Std. Error	Beta		
1	(Constant)	.869	.289		3.01	.001
	Awareness	.602	.084	.566	7.176	.000
	Creation/development					
	Supply chain intricacy	.830	.154	.511	5.396	.000
	Legislation	.171	.192	.071	.888	.377
	Controlling System	.434	.165	.204	2.631	.010

Source, Survey data, 2020

Based on the table, the regression model will be filled in as follows:

$Y = 0.869 + 0.566X_1 + 0.511X_2 + 0.071X_3 + 0.204X_4 + \varepsilon$

The regression coefficients are shown in the above table 4.12. The intercept, 0.869, is representing the estimated average value of current traceability performance when awareness creation/development; supply chain intricacy, legislation and controlling system are zero. Thus, an organization with no awareness creation/development; supply chain intricacy, legislation, and controlling system will have severe impact on the current traceability performance. The slop of independent variables also exhibits useful predictive information about the implication. The slop of awareness creation/ development; supply chain intricacy, legislation and controlling system are 0.566, 0.511, 0.071, and 0.204 means that organization current traceability performance changes increased by 0.566, 0.511, 0.071 and 0.204 when these variables increases by 1.

An examination of these four independent variables indicated that awareness creation/development represented the strongest positive interference on the organization traceability performance with the standard beta of 0.566 followed by supply chain intricacy with beta of 0.511, internal controlling system with β of 0.204 and legislation with β of 0.071. Thus, the

statistical results prove that awareness creation/development, supply chain intricacy, legislation and controlling system had a positive and linear relationship with current traceability performance.

From the results of the multiple regression analysis, it is clear that awareness creation and supply chain intricacy are the most influential factors in explaining the traceability performance of the ECX Jimma branch. So whatever is done in line with developing these activities can improve ECX's performance.

Generally, Pearson correlation also helped in identifying the relationship between the independent variables and dependent variable and the regression model has shown that how much each independent variable contributed to the outcome value. Hence, based on the results acquired all concerned bodies or policy makers especially, the Ethiopian coffee and tea development and marketing authority, and Ethiopian Commodity Exchange Authority along other stakeholders should give due attention and support the ECX to solve the existing problems of the system and attain the better of performance.

4.6 Summary of Qualitative data analysis

The qualitative data that were collected by semi-structured interviews that the interviewer made with managers of both ECX Jimma branch and ECTDMA Jimma zonal office, after presenting same questions that focused on the general assessment of the performance of coffee traceability marketing system that has been implemented by ECX Jimma branch have been summarized as under: the ECX manager said that:

Coffee traceability is the interventions that the coffee passes through, starting from the source of the seed to the ultimate consumer who uses the coffee at the end. Among other issues the major criteria for coffee traceability incorporate:

- The presence of bulk production that can be transacted the whole year, by meeting the global standard and customer requirements maintaining product's quality and safety with sustainable supplement.
- The presence of responsible integrated chain traceability system that shows product's history to respond product recalls at request.

• The presence of legislation and regulatory authority that support, protect, and control the system and all involving actors, and the presence of reliable logistics.

The ECX coffee traceability system was inaugurated before three years, in 2017. It is partial traceability system. In the past three years as a Jimma branch, a transaction of 45,000 tons of traced coffee was performed with exporters and international buyers.

In doing so, ECX's strength is to be first mover to introduce the system to the country. However, beside to its incompleteness the implemented system was challenged by many bottlenecks, such as lack of governing rules and regulation peculiar to the system, no well structured traceability chain, no enough infrastructure, incompetent human resource, lack of continual awareness to the employees, exchange actors and other stakeholders, being new concept to the country knowledge gaps with regard to subject matter, resistant to implement/ accept the system among exchange actors/stakeholders fearing the responsibility that might come with product recall. However, when problems occurred it has been trying to settle by negotiation.

Moreover, as the controlling taskforce was composed of different sectors so that members were busy in their respective regular jobs but inconsistent in the taskforce duties. Further, the system was liable to malpractices and members have been twisted by illegal traders unless they were committed to perform their duties with patriotic integration. Simultaneously, since most illegal trends are conducted in the field it was difficult to control them only sitting in the offices. On the other hand, there was no sufficient incentive or allocation of contingent budget for the regulatory authority to facilitate the works to be done by the taskforce, so that their motivation was weak to protect the traceability and mitigate malpractices against the system.

As Ethiopia is believed to be the birth place of coffee Arabica, which naturally endowed a variety of five demandable global cupping tests (i.e. Winy, Mocha, Fruity, Spicy, and Floral tests) and has bulk production that puts the country at fifth rank in the world, these qualities are fertile conditions that give the country competitive advantage over others. Simultaneously, if other traceability prerequisites like: trained human resource, governing rules and regulation, well established chain traceability, sound controlling system, and logistics are installed, and sustainable supplement with potential suppliers that meet global demand and customer requirement is ensured the country still can implement sound coffee traceability system.

Basically, the coffee traceability that ECX has been practicing is still partial system which starts from washing/hulling station and ends at the warehouse. So that it will be difficult to estimate its general impact, because once the exporter has bought traced coffees from ECX, all traceability history ends there and the exporter, lonely grabs the whole benefits that come from the system.

However, had the complete traceability marketing system been implemented in the country, it would provide enormous benefits for all coffee actors and for the country, as well. Hereby, we can see the benefits as per the actors, below:

For Coffee farmers/producers: They'll be incorporated in the traceability chain, so they will get better market, they'll be promoted to cooperate and produce quality coffee in abundant, they can get traceability certification which enables them to enjoy the global market easily, and they can harvest better incomes/profits from the sales,

For Suppliers: Create better quality assurance, as it permits tracing back, safety and guarantee to their coffee due to IP model, it can easily get product history/documentation, and market opportunity to sell more coffee

For Exporters: Opens up more opportunity in the global market, easy tracing mechanism for coffee quality dispute, helps to meet foreign market demand, easily access to a product's history, access to data and reports regarding products, and guarantees the product quality and safety.

For International buyers: Meets their demand, easily access to a product's history and information, confirms the sustainability of the product on the market

For ECX: Improved inventory, quality management and control, easy tracing mechanism of coffee quality disputes, easily access to a product's history, and increase transparency.

Regarding system follow-up, as the implemented coffee traceability system is partial the follow up system passes three phases which make it difficult to appraise. These are:

- The first phase follow up starts from woreda's washing/hulling station and ends at ECX warehouse by the Woreda ECTDMA and Market development offices
- The second phase follow up starts just after ECX Jimma branch receives the arrival from woreda, inspects its quality, then stores with IP Model and ends at delivery.

• The third phase follow up starts just after delivery from ECX warehouse and ends at the exporter's warehouse in Addis Ababa – by the Federal ECTDMA, and is finalized there.

Generally, as quality and safety product has been the concern of the world people, no doubt that traceability is continued becoming a global concern. Therefore, in the coming years by implementing the full traceability marketing system and expand it in the country, ECX along with concerned regulatory authorities, all exchange actors and stakeholders, has a plan to ensure coffee and other commodities passing through ECX should meet all traceability requirements."

By same interview held with key official of the ECTDMA Jimma zonal office, having expressing similar responses with the above ideas, added that: besides lack of direct governing rules to protect the system circularly, intermittent structural changes that the regulatory authority has been facing since the last two years brought about high turnover of employees in the authority that complicated the controlling and evaluation processes. Likewise, all higher officials of the regulatory bodies (ECTDMA: the Federal and Regional directors) unfortunately, have been assigned by the government body irrespective of their occupation, only favoring their political contribution. Simultaneously, they were busy in other current political issues, so that they were not at position to follow up and evaluate all accountable and responsible bodies keeping the schedules periodically. As the result, all the accumulated odd situations undoubtedly, have affected the coffee traceability performance.

Similarly, during the focus group discussion the researcher held with target top suppliers and buyers of ECX Jimma branch, and 20 laborers of the branch warehouse, under the title of 'The implemented coffee traceability Vs coffee actors', the central point of the majority responses indicated that all actors were unsatisfied with the system due to different opportunity costs they faced. Accordingly, in the warehouse management of traceability system, each consignment is stored separately with IP model. Unfortunately, this situation has been incurring unexpected costs on each party, in the ways they put in the discussion hereby:

Laborers: during loading and unloading, traced coffees take longer time than the non traced coffees in two ways: firstly, the scanning process of the barcode on each bag of traced coffee, while unloading to deposit, takes longer time. Secondly, during delivery when the remote batch away from the warehouse-gate is loaded, it also takes more time and tiresome to them, but in

both cases no additional wage is paid to laborers. Therefore, the system has been imposed great impact on their efficiency so that their income decreases and so does their motivation.

Suppliers: as the IP model consumes warehouse's holding capacity, especially, during peak season suppliers are forced to wait for days/weeks to unload their products as warehouses are congested with arrivals. Consequently, the supplier is liable to additional expenses like transport/rental cost, opportunity cost by losing the market with high price until it is unloaded and the GRN is given to order the selling, and their capital is also tied up until the coffee is sold.

Buyers/Exporters: they are also obliged to load each IP consignment they bought from ECX on separate truck maintaining its grade, or if they bought same grades the truck should make many rotation/turns between the weighbridge and the warehouse in order to check the balance/kilos of each IP consignment. Hereby, this situation increases their exportation cost high.

On the other hand, exporters though they are defending their violation against the traceability concept (arguing that they do it to meet their foreign customers demand), they are blamed to mix coffees of different grades and origins in their private warehouses after they delivered from the ECX, and if this is so, it vanishes the efforts done by all concerned bodies to ensure the traceability system.

4.7 Summary of Major Findings

According to the collected data from the target population, the study has processed and analyzed the raw data in order to present relevant results of the study as demonstrated above with full of interpretation and discussion. The findings on the result part of the study were sorted with descriptive and inferential statistics presentation. Therefore, based on the identified result of the study, the researcher has summarized the major findings of the study as shown below.

Regarding awareness creation/development as 76.7 to 100 percent of respondents were accepted that the intervention of ECX was effective on implementing the coffee traceability awareness initially, however they blamed it for not using all possible communication means continually and substantially so as to develop the awareness among the societies. Besides, lack of similar understanding on coffee traceability due to new entrants was identified and it affected the process. On the other hand, as it was explained by supervisors ECX employees had persistent

commitment and motivation in supporting the traceability system due to the improved outcome that was identified within a time and the great affinity they had to the knowhow of the new marketing system.

Moreover, the state of poor information access on informing and updating the progression of coffee traceability status by ECX and other concerned bodies, and lack of periodic evaluation system and reporting scarcity by the regulatory bodies were taken as weaknesses that affected the traceability activities.

Regarding the impact of supply chain intricacy on the implemented coffee traceability system, of the respondents ranging from 87.8 to 98.9 percent have believed that there was lack of well established supply chain traceability in the implemented system. This was portrayed by lack of ensuring coffee traceability requirements (it lacks complete tracking & tracing of product issues), no way to crosscheck and control over the coffees delivered from ECX's warehouses, there was possibility of mixing different coffee types and origins together in the exporters' private warehouses before sending the product to their foreign customers, whereas on the other side suppliers had no information that their products were mixed with others' products while ECX delivers them to the buyers, ECX has never received claims for coffee quality it has delivered from its warehouses, and the supply chain traceability was highly fragmented. These situations showed that the traceability system that ECX has implemented lacked to establish frequent contacts with supply chain members, and complicated the implementation of integrated chain traceability as its absence clearly affected the whole traceability system badly.

In addition to this, the directives of regulatory bodies (i.e. ECTDMA & MoT) favored exporters to load different types of coffees together so as to minimize their transaction/exportation costs. On the contrary, this situation has created twofold negative impacts on the system: first, it opposed the traceability concept, and second, it could block/avert the opportunity of special traced coffee suppliers to get better prices/markets that could be harvested by winning the 'Cup of Excellence' in the foreign/global cupping contests.

Concerning the legislation in the survey the majority respondents 94.4 to 100 percent have agreed on that there was poor state of legislation in accord to the implemented coffee traceability system that it had deficiency on setting governing rules & regulation, on sharing well organized

information to competent authorities, on regulating illegal coffee actors, on handling of malpractices against the traceability, and on follow up procedures of the traceability tasks, **which** in turn harmed it by increasing the practices of compromised coffee quality, and market deformation.

Furthermore, the interview held with officials of both organizations (ECTDMA and ECX) has confirmed that at the country level there was shortage of setting binding rules to protect the coffee traceability system, while there is a big possibility that a single forgery case can destroy the country's reputable image, in case illegal actors could corrupt the exporting traceable coffees. Concurrently, the implemented traceability system has been running by the rules & regulation that was proclaimed for the existing coffee market whiles practically unable to protect and support the system. Thus the existing poor legislation system has weakened the implemented coffee traceability system explicitly.

Regarding the controlling System the responses of target respondents that fall between 94.4-100 percent generally indicated that there was undefined/poorly defined controlling system for the chain traceability. The poor patriotic integration among the taskforce members to fight illegal trades against the system, lack of experience of workers of the regulatory authority due to its intermittent structural changes, and insufficient logistics that hindered active follow-up and periodic evaluation by the authority's higher officials clearly affected the traceability practice to be dim in ECX Jimma branch at all.

Besides, the responses from the interviews that revealed the political-stand oriented assignment of the directors of the regulatory bodies and their poor attention to regulate the concerned working organizations and stakeholders, the inconsistency of the controlling taskforces and the 'twisting gifts' from illegal traders to these members, are good indications to suggest that there was poor supporting system to engage the controlling system in supporting the coffee traceability marketing practice by the concerned bodies, too.

Regarding the survey on the current status of coffee traceability marketing in ECX Jimma branch, 96.7 to 100 percent respondents have revealed that: at the current coffee traceability practice: ECX lacks to enhance effective communication from farm to end consumer, lacks to meet global standard and marketing demands, lacks to meet its customer demand and

requirements, and couldn't recognize whether its suppliers mix different coffee types trace back to the washing/hulling stations. But all these are possible reasons for the coffee market fluctuation and at the same time, could affect the traceability system negatively.

Moreover, these respondents have witnessed that: the current coffee traceability practice in ECX Jimma branch lacks to build trust and loyalty among stakeholders, loads different client's coffee consignments altogether violating the IP-model, unable to recognize whether exporters mix different coffee types and origins track forward in their warehouses, lacks to describe the entire history of coffee products from farm to ultimate consumer, and therefore unable to address brand promotion and product differentiation at all.

Meanwhile, according to this study the inferential statistical results also had proven that all the hypothesized independent variables: awareness creation, supply chain intricacy, legislation, and controlling system had positive & linear correlation with the current traceability performance. Similarly, the results from the regression model summary & analysis of variance indicated that the goodness fit of the model and the estimated independent variables could also significantly contribute towards the R² value. Based on the R² value (0.885), these four variables could explain 88.5 percent variation in the current coffee traceability performance, and this implied the remaining variance on the dependent variable could be explained by other explanatory variables which are not considered in this study.

Generally, as Ethiopia is believed to be the birth place of coffee Arabica, which naturally endowed varieties of mostly five demandable global cupping tests (i.e. Winy, Mocha, Fruity, Spicy, & Floral tests), and has bulk production that puts the country at fifth rank in the world, these qualities are fertile conditions that give the country competitive advantage over the others. Therefore, if other traceability prerequisites/preliminaries like: trained human resource, governing rules and regulation, well established chain traceability, sound controlling system, and adequate logistics are installed, and sustainable supplement with potential suppliers that meet global demand and customer requirement are ensured the country still can implement sound coffee traceability system and can exploit the market opportunity widely.

CHAPTER FIVE

5. CONCLUSION and RECOMMENDATIONS

5.1. Conclusion

As so far it is discussed, this study attempted to examine factors that affected the implemented coffee traceability marketing system in ECX Jimma branch. The findings indicated that though ECX was initially effective in implementing the coffee traceability awareness however, couldn't make continual and substantial awareness developing/training activities on the implemented coffee traceability system to the exchange actors.

Further ECX had poor trust building with stakeholders on the traceability, due to loading different customers' products together with different grades at delivery time, unable to know the entire history of coffee as the implemented traceability starts from washing stations, and failed to achieve brand promotion and product differentiation that might increase the profit of all actors.

ECX had also poor legal framework lacking governing rules and regulation, and due to poor controlling system to mitigate malpractices against traceability, it could not use the coffee traceability marketing system at best. Moreover, as the traceability model that ECX has been practicing lacks the true concept of traceability, it was liable to many faults.

By and large, the accumulated deficiencies have made the implemented coffee traceability system weak and lame at ECX Jimma branch. Finally, the study has concluded that the discourses so far discussed based on four estimated variables and the reflections of the findings on the current status of traceability in ECX Jimma branch showed that the coffee traceability marketing system which was inaugurated before three years in ECX Jimma branch, is reached now on the verge of its departure.

Therefore, if ECX and all concerned bodies desire to sustain the system, besides facilitating immediate remedial activities to keep it on the track, they should have to think to implement the full traceability system so as to be competent and exploit the emerging global market opportunity at best, and make the ECX 'Center of Excellence' and 'Market of Choice.'

5.2 Recommendation

Nowadays, product traceability requirement, especially the issue of quality and safety on food products has becoming a global concern, so that every food product entering the global market is needed to meet global standards & customer demands in order to get market. No one knows our today's international coffee buyers in the coming years decide to buy coffees only passed through traceability tests.

Therefore, the study recommends that the ECX and all concerned bodies should have to perform the following activities with perspectives of their shares.

The ECX: In its **short-term** amendments, should have to evaluate its performance together with all concerned bodies, revise its activities to comply the quality system with the demand of its buyers so as to mitigate the blending of different origin coffees in their private warehouses that violates the traceability concept.

ECX should have to build a trust of suppliers by maintaining the IP-Model for not mixing their products with others' during delivery.

ECX should have to keep its employees commitment and motivation with designing legal enforcement, aligning effective communication channels to its customers to achieve measurable success on the implementation of integrated supply chain for coffee traceability markets.

ECX should have to set a legal frame work in collaboration with stakeholders and implement good controlling system supported with ICT to enforce the traceability marketing through the follow up based on the rules and regulation.

ECX to expand its market share should have to use the natural variety tests of Ethiopian coffee as competitive advantage for traceability to meet the foreign customer demands. For instance, among the five globally demandable Coffee Arabica tests (Mocha, Winy, Fruity, Spicy, and Floral tests, ECX report, 2019): fortunately, the Jimma coffee is certified by Q-Cuppers to meet the **Winy test** which is highly needed by European coffee consumers. Likewise, the Mocha test is the most demandable cupping test of the Middle East Arab coffee users, thus, the Harar coffee is approved to fit that test. Therefore, if the ECX with ECTDMA & other interested actors

participate in fair global Bazaars, Expos, and make at least Coffee Ceremonies in collaboration with Ethiopian Embassies in respected countries, change will come soon.

In its long-term plan and strategy, the ECX, as the first mover to implement the existing partial coffee traceability system, should have to take the initiative role to implement the complete traceability system, along with all concerned bodies, to be competent globally.

The Ruling Government:

• Should have to do substantial care when assigning the Ministries and Directors of the coffee and marketing sectors (MoT, ECTDMA, ECEA, and ECX), in addition to their political & patriotic stands focus should be given to their occupational and academic backgrounds, too.

The Ministry of Trade, ECTDMA, and ECEA (the Regulatory Bodies):

- Should have to revise the current coffee market rules and regulations and make amendments with special inclusion of binding rules to support and protect the complete coffee traceability system to be implemented in the country, by ECX and all stakeholders, so as to comply with other related legalities of the country and the global market concerns, too.
- Furthermore, as coffee is the major export commodity of the country, plays significant role in generating jobs for citizens, and believed to bring about 30% of the country's export income, these regulatory authorities and all concerned Federal & Regional bodies should have to give due attention and strengthen their structures from Federal to Kebele levels, to support the coffee traceability system.
- Besides, other market options like vertical integrations should be licensed to capable and well
 performer exporters to enhance the traceability system.

The Exporters and Suppliers: Should be trained about the importance & implication of coffee traceability system in the coffee market and in their sustainable profits periodically, and they should be also informed about the bad consequences of malpractices against product traceability on the country's images and export incomes, too.

The Coffee Farmers/growers: Should be given seasonal trainings on coffee quality and its impact on the outcomes of the traceability market. Further as they are producing export

commodity the government, Exporters, and respective companies should have to give them incentives and relevant subsidies to encourage the traced quality coffee production.

Other Stakeholders: Should be given continual trainings on coffee traceability system and its great opportunities to all coffee actors and to the country's sustainable income so as to contribute their irreplaceable share in implementing and protecting the coffee traceability system.

Generally, the ECX and all concerned bodies should have to do their best so as to encourage the country's emerging homegrown economic strategy with scientific exploitation of the global traceability market opportunity by employing the complete coffee traceability marketing system to meet the international buyers demand for quality and safety products and expanding this experience on other Ethiopian agricultural commodities, too.

5.3 Future Research Direction

As it has been said traceability is a newly emerging global market opportunity. Literatures revealed that many developing countries like Viet-name and Colombia have been exploiting such an opportunity by modernizing their coffee productions to meet the global market standard and customer demands. As the economy of the society increases their living standard is also expected to grow with, hence, to look for quality and safety products will be their concern, too. Therefore, Ethiopia as the birth place of coffee should have to take the fertile advantage of the traceability market at least in coffee product. Of course, this chance will be assured only if uninterrupted researches are made and the results are implemented in the field.

In doing so, researchers can play irreplaceable role in ensuring such ambitions by undertaking explicit studies to sort feasible areas and suggest investment opportunities to the concerned bodies by unveiling the problems and forwarding solutions to achieve the desired development.

Hence, in this study as per transforming the coffee traceability market it is recommended to investigate additional factors such as pre bar-coding malpractices, Post selling handlings, and technological impacts which are wide areas that need continuing study onwards. Because they might illuminate more situations to the existing traceability system, and clear the roadmap to propose and implement the complete traceability system that enables the country to harvest a big deal of hard currency that is needed for its development by replacing the export of products in non traceable mode for cheap markets.

By and large, to exploit such market opportunities widely, it is advisable to undergo relative researches on other agricultural export commodities like sesame, haricot bean, mung-bean to produce in bulk and quality so as to encourage the country's emerging home grown economic development strategy in all aspects.

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Annex –I SPSS Statistical out put

			Unstandardized Coefficients		t	Sig.
		В	Std. Error	Beta		
1	(Constant)	.869	.289		3.01	.001
	Awareness Creation	.602	.084	.566	7.176	.000
	Supply chain intricacy	.830	.154	.511	5.396	.000
	Legislation	.171	.192	.071	.888	.377
	Controlling System	.434	.165	.204	2.631	.010

		Pear	son Correla	ations		
		Aware ness Creati	Supply chain intricac	Legislat ion	Controlling System	Traceability Performance
		on	y			
Awareness	Pearson	1	.880**	.771**	.781**	.912**
Creation/dv	Correlation					
t'	Sig. (2-tailed)		.000	.000	.000	.000
	N	90	90	90	90	90
Supply	Pearson	$.880^{**}$	1	.846**	.828**	.901**
chain	Correlation					
intricacy	Sig. (2-tailed)	.000		.000	.000	.000
-	N	90	90	90	90	90
Legislation	Pearson	.771**	.846**	1	.853**	.767**
	Correlation					
	Sig. (2-tailed)	.000	.000		.000	.000
	N	90	90	90	90	90
Controlling	Pearson	.781**	.828**	.853**	1	.723**
System	Correlation					
•	Sig. (2-tailed)	.000	.000	.000		.000
	N	90	90	90	90	90
Traceability	Pearson	.912**	.901**	.767**	.723**	1
Performanc	Correlation					
e	Sig. (2-tailed)	.000	.000	.000	.000	
	N	90	90	90	90	90
**. Correlation	is significant at th	ne 0.01 leve	l (2-tailed).			
	-		·			

Variables	Tolerance	VIF
Awareness Creation/development	.217	4.610
Supply chain intricacy	.150	6.645
Legislation	.210	4.766
Controlling system	.226	4.429

	Table 4.8: Model Summary ^b										
Model	R	R	Adjusted	Std.	Change Statistics						
		Square	R	Error of	R	F	df1	df2	Sig. F		
			Square	the	Square	Change			Change		
				Estimate	Change						
1	.941 ^a	.885	.880	.483	.885	163.747	4	85	.000		

a. Predictors: (Constant), Controlling System, Awareness Creation , Legislation, Supply chain intricacy

b. Dependent Variable: Traceability Performance

Table 4.7: ANOVA ^a										
Model		Sum of df Squares		Mean Square	F	Sig.				
1	Regression	153.030	4	38.257	163.747	.000 ^b				
	Residual	19.859	85	.234						
	Total	172.889	89							

a. Dependent Variable: Traceability Performance

b. Predictors: (Constant), Controlling System, Awareness Creation , Legislation, Supply chain intricacy

Table A3 The t-distribution

The table gives critical values of t for significance at various levels, in a two-tailed/non-directional or a one-tailed/directional test, for different numbers of degrees of freedom. These critical values are the values beyond which lies that proportion of the area under the curve which corresponds to the significance level.

			ignificance lev		
	0.20	0.10	0.05	0.02	0.01
Degrees of	-		Significance le e-tailed/directi		-
freedom	0.10	0.05	0.025	0.01	0.005
1	3.078	6.314	12.71	31.82	63.66
2 3 4 5 6 7	1.886	2.920	4.303	6.965	9,925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.05
13	1.350	1,771	2,160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.97
15	1.341	1.753	2.131	2.602	2.94
16	1.337	1.746	2.120	2.583	2.92
17	1.333	1.740	2.110	2.567	2.89
18	1.330	1.734	2.101	2.552	2.87
19	1.328	1.729	2.093	2.539	2.86
20	1.325	1.725	2.086	2.528	2.84
21	1.323	1.721	2.080	2.518	2.83
22	1.321	1.717	2.074	2,508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.78
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.77
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.75
30	1.310	1.697	2.043	2.457	2.750
40	1.303	1.684	2.021	2.423	2.704
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.326	2.576

Table A9 The Pearson product-moment correlation coefficient

The table gives the critical values of the Pearson product-moment correlation coefficient, r, for different numbers of pairs of observations, N. For significance, the calculated value of r must be greater than or equal to the critical value.

	Sign	nificance level: two	-tailed/non-direction	
	0.20	0.10	0.05	0.01
	S	Significance level: o	ne-tailed/directiona	9/
N	0.10	0.05	0.025	0.005
3	0.951	0.988	0.997	1.000
4	0.800	0.900	0.950	0.990
5	0.687	0.805	0.878	0.959
6	0.608	0.729	0.811	0.917
7	0.551	0.669	0.754	0.875
8	0.507	0.621	0.707	0.834
9	0.472	0.582	0.666	0.798
10	0.443	0.549	0.632	0.765
11	0.419	0.521	0.602	0.735
12	0.398	0.497	0.576	0.708
13	0.380	0.476	0.553	0.684
14	0.365	0.458	0.532	0.661
15	0.351	0.441	0.514	0.641
16	0.338	0.426	0.497	0.623
17	0.327	0.412	0.482	0.606
18	0.317	0.400	0.468	0.590
19	0.308	0.389	0.456	0.575
20	0.299	0.378	0.444	0.561
21	0.291	0.369	0.433	0.549
22	0.284	0.360	0.423	0.537
23	0.277	0.352	0.413	0.526
24	0.271	0.344	0.404	0.515
25	0.265	0.337	0.396	0.505
26	0.260	0.330	0.388	0.496
27	0.255	0.323	0.381	0.487
28	0.250	0.317	0.374	0.479
29	0.245	0.311	0.367	0.471
30	0.241	0.306	0.361	0.463
40	0.207	0.264	0.312	0.403
50	0.184	0.235	0.279	0.361
60	0.168	0.214	0.254	0.330
70	0.155	0.198	0.235	0.306
80	0.145	0.185	0.220	0.286
90	0.136	0.174	0.207	0.270
100	0.129	0.165	0.197	0.256
200	0.091	0.117	0.139	0.182

Table A10 The Spearman rank correlation coefficient

The table gives the critical values of the Spearman rank correlation coefficient, ρ , for different numbers of pairs of observations, N.

	Sig	nificance level: two	-tailed/non-direction	nal
	0.20	0.10	0.05	0.01
		Significance level: o	ne-tailed/direction	a/
Ν	0.10	0.05	0.025	0.005
5	0.800	0.900	1.000	_
6	0.657	0.829	0.886	1.000
7	0.571	0.714	0.786	0.929
8	0.524	0.643	0.738	0.881
9	0.483	0.600	0.700	0.833
10	0.455	0.564	0.648	0.794
11	0.427	0.536	0.618	0.755
12	0.406	0.503	0.587	0.727
13	0.385	0.484	0.560	0.703
14	0.367	0.464	0.538	0.679
15	0.354	0.446	0.521	0.654
16	0.341	0.429	0.503	0.635
17	0.328	0.414	0.488	0.618
18	0.317	0.401	0.472	0.600
19	0.309	0.391	0.460	0.584
20	0.299	0.380	0.447	0.570
21	0.292	0.370	0.436	0.556
22	0.284	0.361	0.425	0.544
23	0.278	0.353	0.416	0.532
24	0.271	0.344	0.407	0.521
25	0.265	0.337	0.398	0.511
26	0.259	0.331	0.390	0.501
27	0.255	0.324	0.383	0.492
28	0.250	0.318	0.375	0.483
29	0,245	0.312	0.368	0.475
30	0.240	0.306	0.362	0.467
35	0.222	0.283	0.335	0.433
40	0.207	0.264	0.313	0.405
45	0.194	0.248	0.294	0.382
50	0.184	0.235	0.279	0.363
55	0.175	0.224	0.266	0.346
60	0.168	0.214	0.255	0.331

Annex-2

Jimma University Business and Economics College Management Department

Questionnaire and Interview prepared as part of Research Thesis in Partial Fulfillment of the Requirements for award of a master's degree of Business Administration (MBA)

Dear Respondent:

This study is deserved to collect relevant information from selected staff to abet in the assessment of "Factors Affecting the implemented Coffee Traceability Marketing System in ECX Jimma Branch". The information required is strictly for academic purpose so as to do the research thesis in partial fulfillment of the requirements for award of a master's degree of Business Administration (MBA). Thus, any data provided would be treated with the utmost confidentiality and shall be used only for the intended purpose. Hence, in completing the Questionnaire voluntarily, your honest opinion is highly requested.

Thanks a lot in advance!

Questionnaire Part

Instruction-1: Circle the appropriate answer or complete the data required

Section I: Demographic Data and profile of Respondents

1. Gender: A) Male B) Female
2. Age: ()
3. Education level: voluntarily
A) Certificate B) Diploma C) Bachelor degree D) Master's degree E) PHD
4. Service year in the Organization: ()
5. Your department in the organization?
A) Finance & Administration B) Quality Operation C) Client Relationship D) Warehouse Operation E) IT Operation
6. Your position in the organization?

A) Manager **B)** Head, branch **C)** Dept Supervisor **D)** Expert **E)** Supportive (Subordinate)

Instruction-2: Using the given Likert scales (1-5) below, please tick the mark (\checkmark) for the level of agreement you decided for each description presented as per the variable in the tables below.

{Strongly disagree (SD=1), disagree (D=2), neither agree nor disagree (N=3), agree (A=4), strongly agreed (SA=5)}

Section II. Factors affecting the implemented coffee traceability Practice

1. Awareness creation/Developing

No.	Factors / items	SD	D	N	A	SA
		1	2	3	4	5
1.	Implementing effective coffee traceability awareness in the					
	society across the supply chain is very critical and brings					
	about friendly cooperation.					
2.	Lack of continual and substantial awareness					
	developing/training on the implemented traceable coffee					
	marketing system to exchange actors by using all possible					
	communication means.					
3.	Lack of similar understanding about coffee traceability					
	among the concerned bodies/ stakeholders due to new					
	entrants.					
4.	Lack of persistent commitment and motivation with the					
	exchange's employees in supporting the traceability system.					
5.	Lack of updating and dispatching information about the					
	progression of the implemented coffee traceability market					
	by the concerned bodies.					
6.	Lack of periodic evaluation system & report the traceability					
	performance by the regulatory bodies.					
7.	Insufficient standardized & structured exchange information					
	system with the entire coffee actors via electronic platforms					
	such as price ticker or websites to update the daily traceable					
	coffee prices, at national and global markets.					

2. Supply Chain Intricacy

No.	Factors / items	SD	D	N	A	SA
		1	2	3	4	5
1.	ECX lacks to ensure chain tracability for coffee actors that					
	may assist to retrieve the information they demand.					
2.	ECX lacks to ensure coffee traceability requirement from					
	washing station to ultimate consumer using the tracking and					
	tracing pattern of complete coffee history through well-					
	established chain traceability.					
3.	ECX lacks well-established chain traceability to crosscheck					
	and control over the coffees delivered from its warehouses					
	lest the exporters mix different types together before					
	sending to foreign buyers.					

4.	ECX suppliers do not know whether ECX delivers their			
	coffee to buyers by mixing with other suppliers' coffee			
	products.			
5.	ECX has never received a claim for coffee quality that has			
	been delivered from its warehouses by coffee buyers			
	through chain traceability.			
6.	The current Coffee supply chain traceability is highly			
	fragmented and diversified.			
7.	The traceability system that ECX has implemented lacks to			
	establish frequent contacts with supply chain members.			
8.	Lack of integrated supply chain traceability from one end to			
	another makes difficult in maintaining smooth			
	communication.			

3.Legislation

No.	Factors / items	SD	D	N	A	SA
		1	2	3	4	5
1.	Lack of well-established legal frameworks for coffee traceability					
	in the country.					
2.	Lack of legislation for tracking & tracing of coffee products					
	through the entire coffee supply chain traceability.					
3.	Lack of governing rule and regulations to allow well-organized					
	exchange of information and availability to competent					
	authorities.					
4.	Lack of regulations that prohibit the coffee actors, not to mix					
	different coffee types and origins together.					
5.	Lack of special binding rules to penalize those who did					
	malpractices against the traceability system.					

4.Controlling System

No.	Factors / items	SD	D	N	A	SA
		1	2	3	4	5
1.	Lack of well defined controlling system from one end to another to follow up the chain traceability by the concerned regulatory authority.					
2.	Lack of patriotic integration among the anti illegal trade controlling taskforce members.					
3.	Lack of experience of the workers of the regulatory authority due to intermittent structural change.					
4.	Lack of active follow up and periodic evaluation by the respected higher officials of the regulatory body.					
5.	Lack of persistent packaging of traceable coffee bags with barcode tags at the washing/hulling stations.					

6.	Lack of sufficient incentives for the regulatory body so as to			
	mitigate malpractices which have been badly affecting the			
	one step back and one step forward traceability controlling			
	approach.			
7.	Lack of consistency and commitment by the taskforce to			
	take actions, as the members are composed of different			
	sectors.			
8.	Insufficient exchanging / updating relevant information			
	about the controlling system of coffee traceability between			
	the regulatory body and ECX.			
9.	Insufficient logistics that hinders the regulatory authority			
	from conducting periodical field assessments as per the plan			
	to control illegal trends against the coffee traceability			
	marketing system.			
10.	Lack of well-established chain traceability to control over			
	the coffee delivered from ECX warehouses by the exporters			
	whether they mix different types and origins in their private			
	warehouses before sending to foreign buyers.			

5.The Current ECX Coffee Traceability Marketing Practice

No.	Factors / items	SD 1	D 2	N 3	A 4	SA 5
1.	At the current coffee traceability practice, ECX lacks to enhance effective communication from farm to end consumer.	1	4	3	-	3
2.	At the current coffee traceability practice, ECX lacks to meet global standard and marketing demands.					
3.	At the current coffee traceability practice, ECX lacks to meet its customer demand and requirements.					
4.	At the current coffee traceability practice, ECX couldn't recognize whether its suppliers mix different coffee types back to the washing /hulling station.					
5.	At the current coffee traceability practice, ECX deposits each supplier's coffee separately based on Identity preserved (IP) model.					
6.	At the current coffee traceability practice, ECX delivers each client's coffee separately to the buyers/ exporters from its warehouses maintaining the IP model.					
7.	At the current coffee traceability practice, ECX lacks to build trust and loyalty among the stakeholders.					
8.	At the current coffee traceability practice, ECX loads different client's coffee, and coffee grades together.					
9.	At the current coffee traceability practice, ECX couldn't recognize whether Exporters/buyers mix different coffee types & origins forward in processing stations to export.					

4.0				
10.	At the current coffee traceability practice, ECX provides better			
	decision identifying through tracking and tracing product			
	problem and notify the consumers immediately by using back			
	& forward traceability principle.			
11.	At the current coffee traceability practice, ECX lacks to			
	describe the entire history of coffee products from farm to			
	ultimate consumer.			
12.	At the current coffee traceability practice, ECX lacks to			
	enhance brand promotion, product differentiation and product			
	recalls.			
	(For high or officials and denoutment has de-	1\		
	(For higher officials and department heads o	nly)		
Inst	(For higher officials and department heads or ruction III: Based on the questions presented give your knowledge)		acts.	
	ruction III: Based on the questions presented give your knowle	edgeable f		
	•	edgeable f		
Sect	ruction III: Based on the questions presented give your knowle	edgeable fa	actice	rgone
Section 1- H	ruction III: Based on the questions presented give your knowled ion-III About the performance of the implemented coffee trace. Has your organization (ECX Jimma branch) or the ECX Hea	edgeable fa eability pr d office so	actice	rgone
Section 1- I	ruction III: Based on the questions presented give your knowle	edgeable fa eability pr d office so	actice	rgone

1-	Has your organization (ECX Jimma branch) or the ECX Head office so far undergone
	an evaluation of the implemented coffee traceability marketing system?
	A) Yes B) Nothing at all C) I have no information
2-	If your answer for the above question is "yes" when was it? And what was the result?
	-The Evaluation year/period was
	- The result was:
	A) Successful B) Fair C) Unsuccessful D) Nothing at all E) I have no information
3-	Justify any of your answer you have given on Q-2, by quoting tangible facts?
1-	If your answer is "Nothing at all" on Q-2, can you describe some details about its performance since its inauguration up to now? (hint. how many tones or trucks consignments you served)
5-	What were the major bottlenecks so far faced during the traceability implementation (if they have been assessed or identified so far)
5-	What are the benefits the Coffee Traceability Marketing System gave so far to the

coffee actors (farmers, traders, and exporters), and to the country at all?

7-	What should be done to implement the full coffee traceability marketing system generally in ECX, and particularly in ECX Jimma branch?				
8-	What is thought about the future of coffee traceability market in ECX Jimma branch or at the Head office?				
	Are there still fertile situations to implement the full coffee traceability marketing system ECX? Explain it.				

Interview - Part

Interview to be held with higher officials of ECX Jimma branch, and Jimma Zone Ethiopian Coffee and Tea Development and Marketing Authority (ECTDMA) office

- 1. What is coffee traceability? What are its criteria? Is it applicable in Ethiopian context?
- 2. What are the benefits of practicing coffee traceability market for Ethiopian coffee producers, suppliers, and exporters?
- 3. When was the coffee traceability marketing inaugurated in ECX? Does it fulfill the traceability criteria? What about its performance? (strength/benefits and the weakness/loss?)
- 4. How does your organization follow up the coffee traceability performance?
- 5. Does the classification of coffee types that the ECX has already been using in the existing marketing have conformity with the implemented traceability system?
- 6. What is the current status of the implemented coffee traceability market?
- 7. What are the problems encountered during the implementation of coffee traceability market, if any? How do you overcome the problems?
- 8. What is the future plan of ECX / ECTDMA towards coffee traceability marketing system so as to ensure its sustainability and expansion?

Thank You for Your Golden Cooperation!