BI Norwegian Business School - campus Oslo

GRA 19703

Master Thesis

Thesis Master of Science

Sustainability in the Ethiopian Coffee Supply Chain

Navn:	Birta Ros Ivarsdottir, Kristina Arveschoug Myklestu

Start:	15.01.2020 09.00
Finish:	01.09.2020 12.00

Birta Rós Ívarsdóttir
Kristina Arveschoug Myklestu

Master Thesis
BI Norwegian Business School

Sustainability in the Ethiopian Coffee Supply Chain

Hand-in date:
01.07.2020

Campus:
BI Oslo

Examination code and name:
GRA 19703 Master Thesis

Supervisor:
Marianne Jahre

Program:
Master of Science in Logistics, Operations and Supply Chain Management

This thesis is a part of the MSc program at BI Norwegian Business School. The school takes no responsibility for the methods used, results found, and conclusions drawn.

Abstract

Coffee is one of the most important commodities in the world, and Ethiopia is among the largest producers and exporters of coffee. A large share of Ethiopia's population is either directly or indirectly dependant on the coffee industry. There is a recognition that companies are responsible for the social, environmental and economic consequences of the operations of their supply chain. A minor change in the coffee industry will have potential social, environmental and economic consequences for Ethiopia and its population. This highlights the importance of considering long-term sustainability of the Ethiopian coffee supply chain. Our aim is to discuss how the Ethiopian coffee supply chain can become more sustainable.

To answer our research question, we conducted an exploratory case study. Our primary data was collected through semi-structured interviews, informal conversations, observations, field notes and visual data throughout a field trip to Ethiopia. We combined our primary data with secondary sources. We assured quality of our data and followed ethical guidelines.

Based on our findings we have mapped a general Ethiopian coffee supply chain, consisting of the following steps: production, harvesting, primary processing, Ethiopian Commodity Exchange, Control and Liquoring Unit, secondary processing, domestic consumption, export and end-consumer. Further, we identified the main challenges and opportunities in terms of sustainability along the coffee supply chain. The main challenges and opportunities include smallholder farmer restrictions, coffee quality, waste management, and aspects related to the coffee price. Our findings reveal that the main improvement potential lies within cooperatives and unions, certification schemes, the Ethiopian Commodity Exchange, secondary processing and waste management.

In conclusion, we see that sustainability implications play an important role in the overall sustainability of the Ethiopian coffee supply chain. Our contribution to the field is a map of a general Ethiopian coffee supply chain, and an overview of some of the main sustainability challenges and opportunities along the chain. In addition, our research has detected areas in which the coffee supply chain can become more sustainable.

Acknowledgements

First, we would like to express our gratitude towards our supervisor, Marianne Jahre for valuable feedback and support throughout the process.

Second, we would like to thank the SUSTAIN Project for giving us the opportunity to go on a data collection field trip to Ethiopia. We would like to express our appreciation to Jimma University, for greeting us with open arms during our stay in Jimma, Ethiopia. And, to all the participants who provided their knowledge and expertise to aid us in our research. We also thank our fellow students Simen and Sahil for great company during our research trip.

Third, we would like to thank our friends and family for supporting and motivating us throughout our studies at BI Norwegian Business School.

Lastly, we would like to thank each other for a great collaboration and beautiful friendship.

Table of Contents

List of Figures

List of Pictures

List of Tables

List of Abbreviations

CE	Circular Economy
CLU	Control and Liquoring Unit
ECX	Ethiopian Commodity Exchange
GDPR	General Data Protection Regulation
NSD	Norsk Senter for Forskningsdata
RA	Rainforest Alliance
SCM	Supply Chain Management
SSCM	Sustainable Supply Chain Management
TBL	Triple Bottom Line

1 Introduction

1.1 Background and Motivation

Coffee is one of the most popular beverages consumed worldwide. As stated by Woldesenbet, Woldeyes and Chandravanshi (2015, p. 1467) “coffee is one of the most important agricultural commodities in the world economy”. Ethiopia is the birthplace of coffee, and is famous for its Arabica coffee type (Minten, Dereje, Engida, & Kuma, 2019; Minten, Tamru, Kuma, & Nyarko, 2014; Tefera & Tefera, 2014). It is one of the world’s biggest producers of coffee, currently being the 5th largest producer in the world, after Brazil, Vietnam, Colombia and Indonesia (ICO, 2020a; Minten et al., 2019; Walton, 2020). There has been a significant increase in the recorded total coffee production in Ethiopia from the crop year 1990/91 to 2018/19 (ICO, 2020a). The total production was documented as 2.9 million bags of coffee (each bag containing 60kg) in 1990/91, whereas the total production in the crop year 2018/19 was 7.8 million bags (ICO, 2020a). The country has suitable climatic and environmental conditions – both in terms of temperature, landscape, soil type, altitude above sea level and precipitation levels – for the production of high quality coffee (FAS, 2019; Minten et al., 2014; Tefera & Tefera, 2014).

Coffee is also one of the most exported goods worldwide (Woldesenbet et al., 2015). Ethiopia was the 9th largest coffee exporter in 2018, accounting for around 3% of the global coffee trade (ICO, 2020a; Minten et al., 2019). It is the major agricultural export crop in Ethiopia, with a share of around 34% of the total export value from the country in 2017/18 (FAS, 2019). The export value of coffee increased by 113% from 2004/05 to 2013/14, mainly due to higher coffee prices in the market (Minten et al., 2019). The amount of coffee exported from Ethiopia has increased significantly from the crop year 1990/91 to 2018/19 (ICO, 2020a). The export of Ethiopian coffee was 0.85 million bags (each bag containing 60kg) in 1990/91, while 3.8 million bags were exported in 2018/19 (ICO, 2020a).

High quality coffee can obtain higher prices in the market, and its quality depends on how it is handled along all the stages of the supply chain (Beshah, Kitaw, & Dejene, 2013; Garo, Shara, & Mare, 2016; Wiersum et al., 2008). A supply chain can be defined as “the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce

value in the form of products and services in the hands of the ultimate consumer" (Christopher, 2016, p. 13). Therefore, the supply chain encompasses the movement of three main flows, namely, information, money and products and/or services in both directions along the chain (Ahi & Searcy, 2013; Barroso, Machado, & Machado, 2011; Chopra & Meindl, 2016; Seuring & Müller, 2008).

In Ethiopia, the coffee industry provides income to a large number of households, meaning coffee production is vital for both the country's economy and social well-being (Gashaw, Habteyesus, & Nedjo, 2018; Minten et al., 2019; Woldesenbet et al., 2015). Due to the large scale of the country's coffee industry, around 25% of the population is directly or indirectly dependant on coffee production, processing and marketing (Chauhan, Hooda, & Tanga, 2015; Garo et al., 2016; Mitiku, Nyssen, & Maertens, 2017b; Tefera & Tefera, 2014). This entails that even a slight alteration or improvement in the coffee industry could potentially have major social, environmental and economic significance for Ethiopia and its population (Beshah et al., 2013; Woldesenbet et al., 2015).

The concern for sustainability emerged as a response to environmental and social concerns for the future, as current practices of consumers and businesses were recognized as unviable in the long term (UN, 1987). An important trend impacting supply chains is the increased requirement, or expectancy, of visibility and traceability, as stakeholders are demanding more insights and knowledge due to sustainability concerns (Carter & Rogers, 2008; Christopher, 2016; Francisco & Swanson, 2018). There is a recognition among stakeholders that companies are responsible for not only the economic consequences of their supply chain operations, but also for the environmental and social performance of their suppliers and overall supply chain (Christopher, 2016; Genovese, Acquaye, Figueroa, & Koh, 2017; Koberg & Longoni, 2019). To be truly sustainable, businesses must consider the triple bottom line in the short and long term (Chopra & Meindl, 2016). It is believed that actors that are proactive in their response to these sustainability measures will gain from it in the long run (Carter & Rogers, 2008; Christopher, 2016).

From this, we see that sustainability in the Ethiopian coffee supply chain is highly relevant. We have identified a lack of research on this topic, especially of literature

that includes all three dimensions of the triple bottom line, that is, the social, environmental and economic dimensions of sustainability. These dimensions will be defined in the literature review of our thesis. Further, there is a lack of literature that considers many stages of the Ethiopian coffee supply chain. Our motivation is therefore based on the relevance and lack of research on the topic of the Ethiopian coffee supply chain.

1.2 Research Questions and Aim

Because of the growing awareness of sustainability and the importance of the Ethiopian coffee supply chain, we have developed the following research question that we explore in our master thesis:

Research question: *How can the Ethiopian coffee supply chain become more sustainable?*

Based on this, our aim is to discuss how the Ethiopian coffee supply chain can become more sustainable. This topic is very broad and complex, therefore we start by mapping out a general Ethiopian coffee supply chain to gain an overview of relevant actors and activities. From this, we have formulated our first sub-question:

Sub-question 1: *What does a general Ethiopian coffee supply chain look like?*

Thereon, we identify and discuss sustainability challenges and opportunities within three dimensions: social, environmental and economic. We also explore current practices that aim at handling the identified challenges and make use of the identified opportunities. This leads to our second sub-question:

Sub-question 2: *What are the sustainability challenges and opportunities in the Ethiopian coffee supply chain?*

The research question along with the two developed sub-questions, will aid us in our research.

1.3 Structure of Thesis

This thesis is divided into five chapters. The first chapter provides the background and motivation to the research, as well as the aim and research questions. The second chapter, is a literature review that gives an overview of relevant theories and concepts. It is divided into three main parts, namely supply chain mapping, sustainability, and sustainable supply chain management. The third chapter is a description of our research methodology, where we discuss the chosen research strategy, design, data collection method and process, as well as how the quality was assured, including some of our main challenges and limitations. The methodology also includes an explanation of our approach to the research. The fourth chapter addresses our findings and discussion. Finally, the last chapter is our conclusion and we present our research contribution, and suggestions for future research.

2 Literature Review

Our research question is: *How can the Ethiopian coffee supply chain become more sustainable?* To investigate this, we have conducted a literature review of the following concepts and theories: supply chain mapping, sustainability and the triple bottom line, and sustainable supply chain management. Based on this, we have developed a conceptual framework to aid us in answering our research question.

2.1 Supply Chain Mapping

Supply chain maps provide a simplified visual representation that should correspond to the structural elements of the supply chain, and therefore include the flows of material, information and money both within the actors themselves and up- and downstream in the chain (Barroso et al., 2011; Craighead, Blackhurst, Rungtusanatham, & Handfield, 2007; Gardner & Cooper, 2003; Wichmann, Brintrup, Baker, Woodall, & McFarlane, 2018). Maps can illustrate simplified flows of physical goods, for example following the stream of goods downstream in the supply chain from the initial suppliers to the end-consumer (Craighead et al., 2007; Gardner & Cooper, 2003). Supply chain maps can also visualize a more complex, cyclical form, which "might follow the delivery of a service or the procedures for returns, recalls, and recycling efforts" (Gardner & Cooper, 2003, p.

56). The most important aspects to include in a supply chain map is a representation of "who supplies whom with what (for which end-product) from where?" at a given point in time (Wichmann et al., 2018, p. 1728). Further, supply chain maps can be described as a "unique framework that links business processes, metrics, best practices and technological features into a unified structure to support communication among supply chain entities" (Barroso et al., 2011, pp. 170–171).

2.1.1 Map Appearance

Visual Language

Supply chain maps use visual language and should be in the form of a diagram or chart (Andriani, Aisha, Pranita, Siswanto, & Suryadi, 2019; Barroso et al., 2011; Basole, Bellamy, & Park, 2017; Gardner & Cooper, 2003). A good map is characterized by applying standardized icons, preferably color- or symbol-coded to enhance the ease of understanding and use (Barroso et al., 2011; Basole et al., 2017; Farris, 2010; Gardner & Cooper, 2003; Park, Bellamy, & Basole, 2016). Some of the most common visuals are nodes and links (Craighead et al., 2007; Gardner & Cooper, 2003). Nodes typically represent an entity, company, single actor, location or strategic business unit in the supply chain, while links are flows, movements, processes or relationships among nodes, and are normally drawn as uni- or bidirectional arrows (Craighead et al., 2007; Gardner & Cooper, 2003).

To show the different features and relationships between actors in the supply chain, symbols, shapes and arrows of different sizes and thicknesses can be applied, as well as variations between solid and dashed arrows (Basole et al., 2017; Farris, 2010; Gardner & Cooper, 2003). In addition, different colors and labels can be applied to visualize the map (Basole et al., 2017). The "geovisual techniques allow the manager to easily identify differences in relationships and where to investigate further" (Farris, 2010, p. 175). Gardner and Cooper (2003) clarify that it is possible to have maps with only information relating to the links or the nodes in the network.

Geographical Representativeness

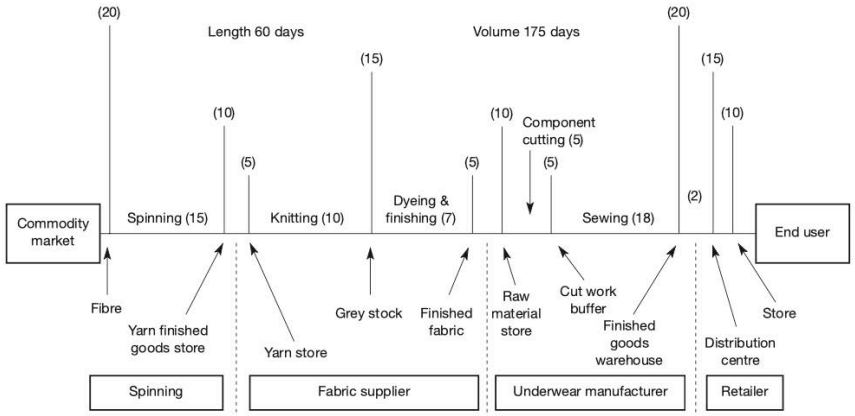
A visual attribute of maps is the spatial aspect, that is, whether the map is geographically representative or not (Acquaye, Genovese, Barret, & Koh, 2014; Barroso et al., 2011; Gardner & Cooper, 2003; Smith, Fannin, & Vlosky, 2009;

Wichmann et al., 2018). Spatial visualization can be achieved when the map is illustrated on an actual geographical map, capturing the essence of the supply chain's environment (Barroso et al., 2011; Busse, Schleper, Weilenmann, & Wagner, 2017; Gardner & Cooper, 2003; Smith et al., 2009). Some maps illustrate the geographical location of suppliers, in other cases, they show the locations of other actors and the movement of goods (Wichmann et al., 2018). An example of a geographical representative map is shown in figure 1.

Representation of Time

A supply chain map can be "a time-based representation of the processes and activities that are involved as the materials or products move through the chain" (Christopher, 2016, p. 147). The map can either function as a description of the current state of the supply chain, providing a deeper and common understanding of the current situation including the supply chain actors, structure and complexity, or as a visualization of future states (Barroso et al., 2011; Gardner & Cooper, 2003; Lambert, 2008). Since supply chains are dynamic and rapidly changing, maps need to be continuously updated (Ahi & Searcy, 2013; Barroso et al., 2011; Lambert, 2008; Park et al., 2016; Wichmann et al., 2018). According to Christopher (2016), there are two types of time that should be acknowledged in maps, namely, horizontal and vertical time, as shown in figure 2. While horizontal time is "time spent in process", either "in-transit time, manufacturing or assembly time, time spent in production planning or processing", vertical time "is time when nothing is happening and hence the material or product is standing still as inventory" (Christopher, 2016, pp. 147–148). During vertical time, no value is added, and even though no value is necessarily being added during horizontal time either, there is at least some activity in process (Christopher, 2016).

Figure 6.13 Supply chain mapping – an example



Source: Scott, C. and Westbrook, R., 'New strategic tools for supply chain management', *International Journal of Physical Distribution and Logistics Management*, Vol. 21, No. 1, 1991

Figure 2: This figure illustrates a supply chain map where horizontal and vertical time are depicted (Christopher, 2016, p. 149).

2.1.2 Focal Point and Scope

The focal point and scope serve as a way of describing the map's perspective (Gardner & Cooper, 2003). Due to varying purposes and usages, the map's perspective will vary (Gardner & Cooper, 2003; Wichmann et al., 2018). Supply chain maps can provide an overview of the entire supply chain, rather than focusing solely on a small section of the chain (Gardner & Cooper, 2003). The "focus could be on a particular use or user, on a theme such as a type of value added, or generic, covering all aspects of supply chain structure" (Gardner & Cooper, 2003, p. 46). Supply chain maps are typically either firm-centric by taking in the perspective of a focal firm or industry-centric where the focus is on several companies (Gardner & Cooper, 2003). It is often challenging to map industry relationships with a particular supply chain as the level of analysis, therefore, supply chain maps that aim to uncover such relationships typically take on a more general form (Goodarzi, Fahimnia, & Sarkis, 2019). A generic map can be beneficial as it can enable "an analysis of the most pressing sustainability hotspots" in the chain (Busse et al., 2017, p. 34). A generic map is shown in figure 1.

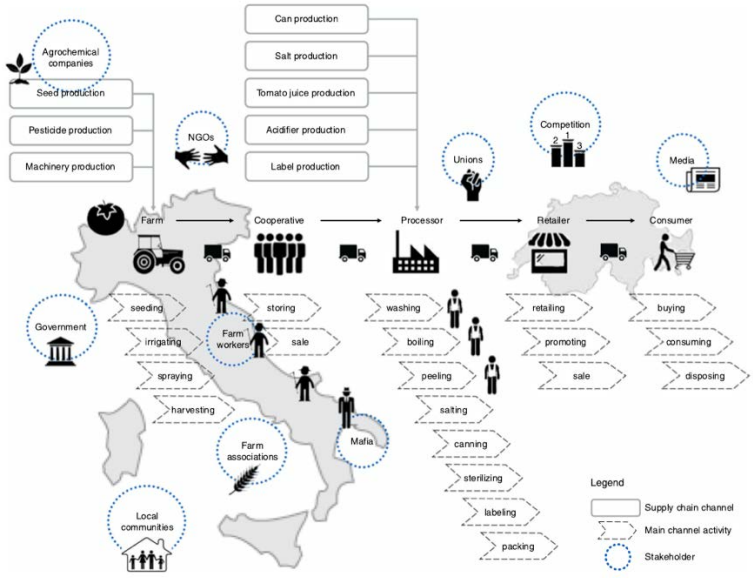


Figure 1: This figure illustrates a generic supply chain map depicted on an actual geographical map (Busse et al., 2017, p. 31).

Supply chain maps vary in terms of geometric attributes and structural dimensions (Basole & Bellamy, 2014; Gardner & Cooper, 2003; Wichmann et al., 2018). Maps can include various tiers in different directions, as well as variations in the horizontal and vertical structure (Basole et al., 2017; Gardner & Cooper, 2003; Wichmann et al., 2018). Tiers are "the number of sequential business units performing transactions leading to the final consumer" (Gardner & Cooper, 2003, p. 47). The number of tiers included in supply chain maps may vary, however, due to the increased pressure on sustainability standards throughout all levels of the supply chain, it has become more important to manage multi-tier supply chains (Wilhelm, Blome, Bhakoo, & Paulraj, 2016).

Direction is "the coverage up or down the channel of distribution" (Gardner & Cooper, 2003, p. 47). If there is a focal company, it can either be supplier-oriented, having an upstream direction, or customer-oriented, with a downstream direction, as shown in figure 3 (Gardner & Cooper, 2003; Wichmann et al., 2018). Since many companies map their supply chains based on their own perspective as a focal firm, their maps will be influenced by their place in the chain (Lambert, 2008). If there is no focal company, the direction can take on an industry-centric view, where both directions are considered (Gardner & Cooper, 2003). The map should include as many upstream and downstream parties and supplier tiers as relevant (Christopher,

2016). The horizontal structure of the map is the number of tiers the supply chain consists of (Basole et al., 2017; Wichmann et al., 2018). The vertical structure represents the amount of entities within each tier (Basole et al., 2017; Wichmann et al., 2018).

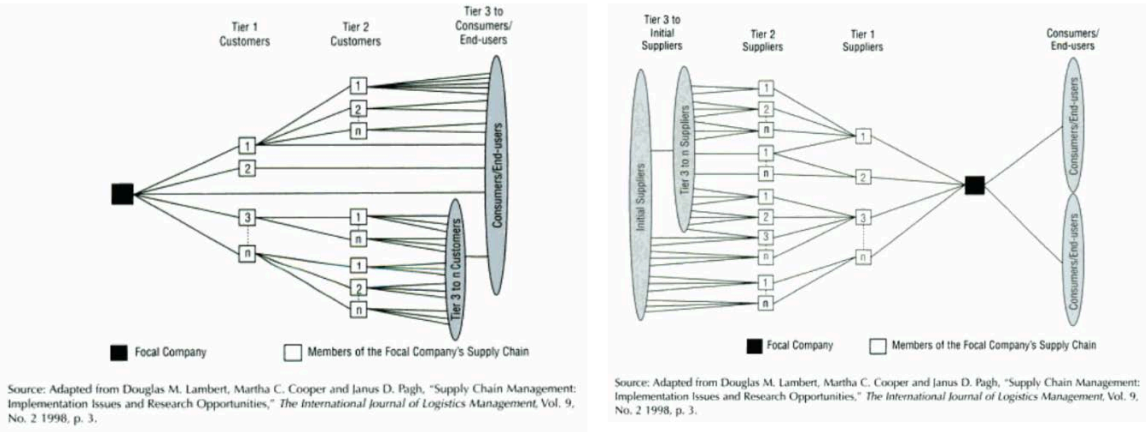


Figure 3: The map on the left is customer-oriented, while the map on the right is supplier-oriented (Lambert, 2008, p. 201).

The chosen scope will influence the level of complexity of the map, as a larger scope will typically include more actors and interdependencies, thus, a network with fewer actors and links is considered to be less complex (Barroso et al., 2011; Craighead et al., 2007; Falasca, Zobel, & Cook, 2008; Lambert, 2008; Mandal, 2014). This complexity is illustrated in figure 4. In many cases, supply chain networks are very complex, making the mapping process difficult (Craighead et al., 2007; Lambert, 2008). Therefore, it is rather rare to include the whole supply chain in the map (Farris, 2010; Lambert, 2008). Overly complicated and detailed maps can be a disadvantage when conveying information, and the costs of the map might outweigh the benefits (Barroso et al., 2011; Farris, 2010; Gardner & Cooper, 2003). Thus, the information density, that is, "the amount of information integrated into the visual display", should be considered when creating a map (Gardner & Cooper, 2003, p. 56).

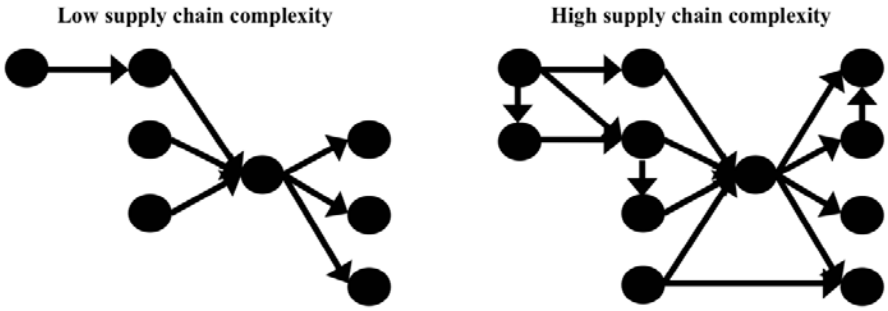


Figure 4: This figure illustrates supply chain complexity. The figure on the left depicts low complexity, while the figure on the right depicts high complexity (Falasca et al., 2008, p. 599).

Simplification methods

There are several simplification methods that can be applied to the mapping process that are especially beneficial when dealing with complex supply chain networks, as they provide an overview of the network and the most central activities, actors and processes (Barroso et al., 2011; Lambert, 2008). To simplify the mapping process, it can be useful to exclude non-critical members of the chain (Barroso et al., 2011). It is common to differentiate between primary and supporting supply chain members (Lambert, 2008). While primary members encompass "all those autonomous companies or strategic business units who carry out value-adding activities (operational and/or managerial) in the business processes designed to produce a specific output for a particular customer or market", supporting members "are companies that provide resources, knowledge, utilities or assets for the primary members" (Lambert, 2008, pp. 199–200).

Another simplification method is to focus on critical activities and entities, and exclude other aspects, for instance, including a specific component of a product in the map, rather than including an entire organization with all its departments, products, suppliers and customers (Barroso et al., 2011; Gardner & Cooper, 2003). Maps can also be simplified by distinguishing between primary and supporting activities (Chandra & Kumar, 2001; Christopher, 2016; Smith et al., 2009; Tikkanen & Jaakkola, 2019). While primary activities are directly involved in the physical creation of a product, secondary activities provide support to the primary ones (Chandra & Kumar, 2001; Christopher, 2016; Smith et al., 2009; Tikkanen & Jaakkola, 2019).

2.1.3 Purposes of Mapping

Visibility

Supply chains often have multiple tiers, are widely geographically dispersed, and are increasingly global and complex as the number of actors and interdependencies increase (Basole & Bellamy, 2014; Christopher & Peck, 2004; Craighead et al., 2007; Gardner & Cooper, 2003; Mandal, 2014; Wichmann et al., 2018). This complexity is illustrated in figure 5. Companies may operate in several supply chains simultaneously, which further increases complexity (Kim & Rhee, 2012). Increased globalization and complexity of supply chains make understanding, visualizing, tracing, and managing supply chains more challenging (Basole & Bellamy, 2014; Basole et al., 2017; Farris, 2010; Gardner & Cooper, 2003). This can result in a loss of supply chain visibility and transparency, which makes it more difficult for all actors to coordinate and collaborate across the chain, overall making it demanding to optimize the efficiency, costs and sustainability (Mandal, 2014; Saberi, Kouhizadeh, Sarkis, & Shen, 2019; Wichmann et al., 2018).

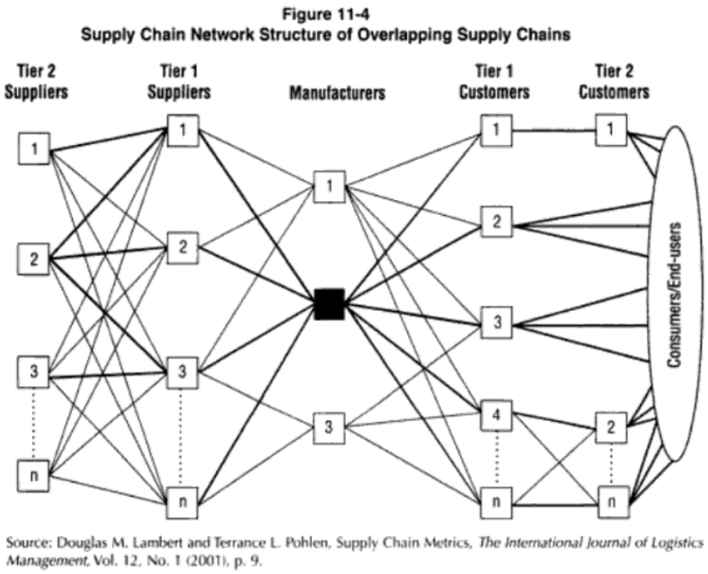


Figure 5: This figure illustrates the complexity of supply chain mapping, as supply chain actors can overlap and be part of multiple networks (Lambert, 2008, p. 203).

As a consequence of an increasingly complex supply chain structure, uncertainties and risks are higher, thereby increasing the probability of disruptions (Craighead et al., 2007; Mandal, 2014; Wichmann et al., 2018). To overcome these challenges and risks, it is important to gain knowledge and visibility of the structure of the

chain, as well as of the interactions within the network (Basole & Bellamy, 2014; Wichmann et al., 2018). Companies should create visibility throughout the network to have the "ability to manage the efficiency, resilience, and sustainability of its supply chain" (Wichmann et al., 2018, p. 1726). Among the tools and methods that can be applied to increase supply chain visibility are supply chain maps (Barroso et al., 2011; Wichmann et al., 2018).

Mapping can facilitate understanding of the architecture of supply and demand networks, the actors involved, and provide an overview of interrelationships, creating structural visibility (Barroso et al., 2011; Basole & Bellamy, 2014; Busse et al., 2017; Christopher, 2016; Farris, 2010; Gardner & Cooper, 2003; Lambert, 2008). Structural visibility can be defined as "the extent to which actors within the supply chain have access to or share timely information about supply chain operations, other actors and management which they consider as being key or useful to their operations", and includes knowledge of supply chain members and of network interdependencies (Wichmann et al., 2018, p. 1727). Various visibility degrees will affect the understanding of the structural aspects of the network, thereby highlighting the importance of increasing visibility to gain a proper picture of the supply chain (Basole & Bellamy, 2014).

Strategic Mapping

The purpose of supply chain mapping varies, normally having a strategic nature (Barroso et al., 2011; Gardner & Cooper, 2003; Wichmann et al., 2018). The information and level of detail displayed in the supply chain map will determine whether the map is strategic or not (Gardner & Cooper, 2003). If the map has a strategic purpose, it should take on a general form, as this enables a meaningful representation of the supply chain's multiple tiers (Gardner & Cooper, 2003). This means that when the focal point is a specific company, maps can be used as a tool to connect the single firm's corporate strategy to an overall supply chain strategy (Barroso et al., 2011; Farris, 2010; Gardner & Cooper, 2003).

Communication

By providing a visual representation of the relationships between supply chain actors, a supply chain map has the potential to improve communication, as it can provide consistent communication to the actors involved, creating a common

perspective (Barroso et al., 2011; Farris, 2010; Gardner & Cooper, 2003; Lambert, 2008; Lambert & Enz, 2017). Visualization can be very helpful, as it can convey a lot of information in a structured and simple manner (Barroso et al., 2011; Basole et al., 2017; Gardner & Cooper, 2003; Park et al., 2016). Supply chain maps can help to exchange knowledge among companies and departments, and be a helpful tool to quickly inform new actors of their position in the network and of the network's composition (Andriani et al., 2019; Farris, 2010; Gardner & Cooper, 2003). Another advantage is that they break language barriers and allow people who speak different languages to understand the supply chain network (Christopher & Peck, 2004; Wichmann et al., 2018).

Identification of Opportunities and Challenges

The visual representation can serve as a tool to detect areas to examine in more detail, detect issues and realize improvement opportunities, and has the potential to better task performance across the supply chain network (Barroso et al., 2011; Christopher, 2016; Gardner & Cooper, 2003; Lambert, 2008; Park et al., 2016). They can detect the central features of each actor, such as power and competitive potential, and the relative importance of the different members and activities (Barroso et al., 2011; Basole & Bellamy, 2014; Busse et al., 2017; Gardner & Cooper, 2003). Maps can help identify constraints, critical activities and processes, actors and relationship linkages that should be considered and concentrated on (Barroso et al., 2011; Christopher, 2016; Christopher & Peck, 2004; Gardner & Cooper, 2003; Lambert, 2008; Wichmann et al., 2018). Moreover, maps can help companies identify ineffective network configurations, overlapping, duplication, or non-value adding activities (Andriani et al., 2019; Barroso et al., 2011; Christopher, 2016; Christopher & Peck, 2004; Gardner & Cooper, 2003; Lambert, 2008).

Maps can detect bottlenecks and critical paths (Barroso et al., 2011; Christopher, 2016; Christopher & Peck, 2004; Gardner & Cooper, 2003; Lambert, 2008). First, bottlenecks are the most time-consuming activities in the chain and are limited by the available capacity, and will determine the throughput time of the chain (Christopher, 2016; Christopher & Peck, 2004). Second, a critical path is characterized by long lead times, a single source of supply with no short-term alternative, lack of visibility and of information-sharing between actors, and a high degree of risk (Christopher, 2016; Christopher & Peck, 2004). By identifying these

aspects, maps can enable managers to identify which supply chain actors and processes are wasteful (Barroso et al., 2011; Lambert, 2008). This can be done by identifying "excess or scarce inventories, inefficient processes, unnecessary actions" and "expedited shipments" (Barroso et al., 2011, p. 169). By mapping the supply chain, it is possible to detect non-value adding idle time, enabling managers to reduce the lead time by focusing their efforts on these parts of the network, thus reducing the supply chain's response time to meet market demand (Christopher, 2016; Lambert, 2008).

Even though all nodes within a supply chain should be value adding, and therefore, important, some nodes are more important and value-contributing than others, and thus, have a higher node criticality (Craighead et al., 2007; Falasca et al., 2008). Node criticality is relative to the other nodes in the supply chain and is highly context-dependent, and can be identified by mapping the supply chain (Craighead et al., 2007; Falasca et al., 2008; Mandal, 2014). Mapping can detect the criticality of a single supplier in a supply chain, and this may lead to more flexible sourcing strategies from multiple sources, or alter the supply base strategy (Barroso et al., 2011; Christopher & Peck, 2004; Mandal, 2014). This type of criticality is illustrated in figure 6.

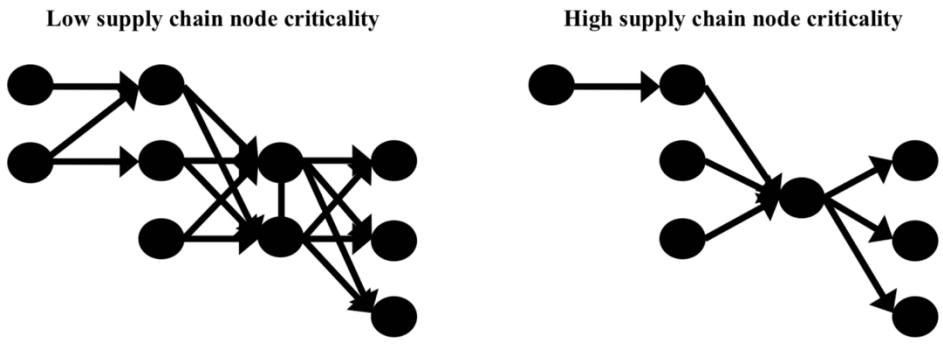


Figure 6: The figure on the left represents a low degree of node criticality, while the right depicts a high degree of node criticality (Falasca et al., 2008, p. 600).

Since maps can depict actual geographical locations, the purpose of mapping can be to detect and assess the geographical context and vulnerability of the supply chain (Wichmann et al., 2018). Supply chain maps can also identify the supply chain's density, that is, the quantity and geographical spacing of nodes within a supply chain (Craighead et al., 2007; Falasca et al., 2008; Mandal, 2014). Supply

chains are considered dense when the average distance measured between nodes is short and nodes are bundled closely together (Craighead et al., 2007; Falasca et al., 2008; Mandal, 2014). The more dense supply chains are, the more disruptive they typically are (Craighead et al., 2007). Maps can be used to identify which geographical and non-geographical areas or parts of supply chains are densely populated, and can help uncover complexity (Craighead et al., 2007; Mandal, 2014). In terms of risk assessment, geographical representative maps can be helpful to determine geographical vulnerability of various actors in the chain (Wichmann et al., 2018).

By identifying critical and non-critical processes and actors through mapping, a suggestion for modification or redesign of management procedures and practices, and network structures can be provided, thereby increasing agility, flexibility and responsiveness, resulting in enhanced supply chain performance (Andriani et al., 2019; Barroso et al., 2011; Christopher, 2016; Falasca et al., 2008; Farris, 2010; Mandal, 2014). Activities and processes can be improved as unnecessary complexity can be removed or outsourced (Andriani et al., 2019; Gardner & Cooper, 2003). Thus, maps can enhance decision-making, which in turn can increase the innovation opportunities and the sustainable competitive advantage of the chain (Barroso et al., 2011; Christopher, 2016; Farris, 2010; Gardner & Cooper, 2003; Wichmann et al., 2018).

2.1.4 Mapping Approach

There are several approaches that can be used to map processes and thereby create supply chain maps (Andriani et al., 2019; Barbrow & Hartline, 2015; Lambert, 2008; Park et al., 2016). One approach consists of the identification of the processes and actors to map, information gathering, data handling and analysis, and finally visual representation in the form of a supply chain map on the required level of aggregation (Andriani et al., 2019; Lambert, 2008). Another approach consists of running iterative and extensive interviews, thereon, constructing the supply chain map, and finally examining the map with stakeholders who revise it and give their review until the map is as accurate and representative as possible (Andriani et al., 2019; Barbrow & Hartline, 2015; Basole et al., 2016). A third approach is to arrange

a platform where the most important actors in a business process or chain can discuss and collaborate to develop a collective map (Barbrow & Hartline, 2015).

To determine the appropriate mapping approach, the aim of the mapping process and the requirements of the companies involved must be considered (Barbrow & Hartline, 2015). Further, the approach will depend on the "the staffing availability, and participants' willingness to invest energy into the mapping efforts" (Barbrow & Hartline, 2015, p. 36). Different mapping methods and appearances can have varied advantages and disadvantages, as they can highlight various structural elements of a supply chain (Acquaye et al., 2014; Park et al., 2016). In some cases, it may be helpful to develop multiple maps to gain more insight and understanding of the network (Park et al., 2016). This lays the ground for future supply chain analysis (Barroso et al., 2011; Gardner & Cooper, 2003; Lambert, 2008).

2.2 Sustainability

The most widely used definition of sustainability was developed by the Brundtland Commission of the United Nations in 1987 (UN, 1987). The goal of sustainable development is to "ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1987, p. 24). Moreover, sustainability is "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change" depends on both current and future needs (UN, 1987, p. 25). As Kuzeljevic (2016, p. 38) highlights, sustainability "could be a practice of doing something to achieve consistent results, it could be not losing what you've already accomplished, it could be as cost-effective as possible, and it could be ensuring resources are not diminished". Ahi and Searcy (2015, p. 2884) argue that sustainability is necessary for "tackling issues such as climate change, biodiversity loss, decreasing material availability, and meeting energy consumption requirements". It is also vital to be able to continue with the world's economic growth without harming the environment nor using up all the available resources (Chopra & Meindl, 2016; Christopher, 2016).

2.2.1 The Triple Bottom Line

A definition that expanded the Brundtland definition of sustainability is the so-called triple bottom line (TBL), coined by John Elkington in 1994 (Awaysheh & Klassen, 2010; Chopra & Meindl, 2016; Christopher, 2016; Wilson, 2015). This concept emphasizes three dimensions of sustainable development, namely the social, environmental and economic dimensions (figure 7) (Chopra & Meindl, 2016; Christopher, 2016; Geissdoerfer, Savaget, Bocken, & Hultink, 2017; Shou, Shao, Lai, Kang, & Park, 2019; Swanson & Orlitzky, 2018). These dimensions are also referred to as people, planet and profit (figure 7) (Christopher, 2016; Geissdoerfer et al., 2017; Laurell, Karlsson, Lindgren, Andersson, & Svensson, 2019; Swanson & Orlitzky, 2018; Zhang, Padmanabhan, & Huang, 2018).

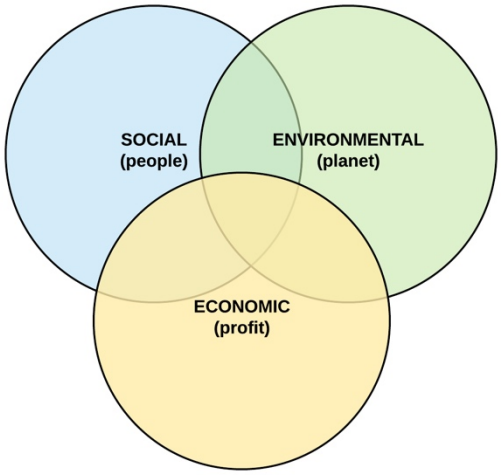


Figure 7: This figure illustrates the triple bottom line.

The three dimensions are not mutually exclusive, but are linked to each other (Braccini & Margherita, 2019; Christopher, 2016; Geissdoerfer et al., 2017). They "cumulatively affect one another through mutual causality and positive feedbacks" (Geissdoerfer et al., 2017, p. 759). Research shows that the social and environmental dimensions will have an impact on the economic dimension (Swanson & Orlitzky, 2018). It is important to comply with the environmental dimension to obtain a positive outcome for the social dimension (Zhang et al., 2018). In other words, the dimensions are equally important and interlinked, and no dimension should be prioritized above another (Christopher, 2016; Henriques & Richardson, 2004; Swanson & Orlitzky, 2018). All three elements of the TBL should be considered to ensure that activities and business processes are viable and

sustainable in the long term (Chopra & Meindl, 2016; Christopher, 2016; Junior, de Oliveira, & Helleno, 2018; Zhang et al., 2018). By considering all three dimensions, companies can gain a holistic view of their business endeavours (Ahi & Searcy, 2015; Braccini & Margherita, 2019; Longoni & Cagliano, 2018).

Klassen and Vereecke (2012, p. 104) explain that companies play a significant role in supply chains' sustainability as they "can influence conditions (either through action or inaction) that result in specific social outcomes". Changing towards being more sustainable is often challenging for companies, as it requires both complex, time-consuming and long-term changes in terms of company culture, strategy and organization (Savitz & Weber, 2014). It is important to understand that "differences in organizational culture could be associated with differences in firms' beliefs and practices" (Dyck, Walker, & Caza, 2019, p. 1235). Companies might be motivated to adopt a TBL approach due to ideological or ethical reasoning, or simply because management believes in what the dimensions stand for and feel a moral obligation to act in accordance with them (Dubey et al., 2017; Longoni & Cagliano, 2018; Swanson & Orlitzky, 2018). In other cases, companies might adopt the TBL approach to improve their practices or as a marketing tactic to comply with stakeholder expectations and legislations of sustainability (Christopher, 2016; Devika, Jafarian, & Nourbakhsh, 2014; Dubey et al., 2017; Prasad et al., 2018; Shou et al., 2019; Swanson & Orlitzky, 2018; Woldesenbet et al., 2015).

As a result of an implementation of this sustainability approach, companies can obtain different intangible benefits, such as enhanced company image, employee commitment, and increased customer satisfaction and competitiveness (Ahi & Searcy, 2015; Ferro, Padin, Høgevold, Svensson, & Varela, 2019; Goddard, 2017; Lankoski, 2017; Savitz & Weber, 2014). This means that if sustainability practices are in place, companies can improve their reputation (Ansari & Kant, 2017; Carter & Rogers, 2008). However, if companies fail to consider all aspects of sustainability throughout their supply chains, it could potentially have a serious negative effect on their reputation, and thus harm their results (Formentini & Taticchi, 2016; Leppelt, Foerstl, Reuter, & Hartmann, 2013).

The TBL can also be a useful tool as it allows sustainability to be operationalized and measured both within a company and in relation to other stakeholders affected

by the business (Geissdoerfer et al., 2017; Seuring & Müller, 2008). This means that the TBL can be used to evaluate a company's performance in terms of sustainability (Swanson & Orlitzky, 2018). This can in turn help companies benchmark their performance and practices across the three areas (Swanson & Orlitzky, 2018; Zhang et al., 2018). It can also be used to identify "the impact of sustainability-related efforts in the supply chain" (Chopra & Meindl, 2016, p. 509). Companies are increasingly measuring and considering their sustainability progress and performance to remain competitive (Ahi & Searcy, 2014; Ansari & Kant, 2017; Lim, Tseng, Tan, & Bui, 2017).

Quantification of the TBL is in many cases challenging (Ahi & Searcy, 2015; Goh, Chong, Jack, & Faris, 2020). Measuring and assessing performance is challenged by a lack of standardization of measures, in particular within the social dimension of the TBL (Ferro et al., 2019; Goh et al., 2020; Rajak & Vinodh, 2015). Some state that it is more clear how to measure the performance of the environmental dimension compared to the social dimension (Schaltegger & Wagner, 2017). In terms of the economic dimension, there are many ways of measuring economic and financial data (Henriques & Richardson, 2004). Economic performance can be quantified using market, operational or accounting-related measures (Golicic & Smith, 2013; Koberg & Longoni, 2019).

According to Seuring and Müller (2008, p. 1699), "the integration of the three dimensions of sustainability are still rare". Although there has been some development in the area, many practitioners and researchers have a tendency to prioritize the economic dimension, and pay less attention to the social and environmental (Chopra & Meindl, 2016; Nichols, Stolze, & Kirchoff, 2019; Tate & Bals, 2018). As Wilson (2015, p. 440) put it, "companies are in business to be economically successful". One of the reasons why this is a recurring issue, is because companies benefit from the rewards they are given for their financial performance, even if what they are producing and delivering to society may be harmful socially or environmentally (Henriques & Richardson, 2004).

The environmental dimension has lagged somewhat behind in terms of research, however, in recent decades, there has been an increased focus on the environmental dimension of the TBL (Henriques & Richardson, 2004). This can be due to a

widespread recognition and awareness of climate change and natural resource depletion, leading to changes in demand (Vachon & Mao, 2008; Wilson, 2015). Other practitioners and researchers focus on two of the dimensions, the economic and environmental, rather than considering all (Shou et al., 2019; Tate & Bals, 2018). The "world's natural and social capital is often considered free and therefore is often without economic value or a measure of its gain or loss" (Henriques & Richardson, 2004, p. 18). So, the social dimension of the TBL is often not prioritized, yet it is gaining more attention due to its importance (Ahi & Searcy, 2015; Brandenburg, Govindan, Sarkis, & Seuring, 2014; Rajak & Vinodh, 2015).

Social Dimension

The social dimension of the TBL can be defined as a combination of social, ethical and political issues that are relevant to consider for a company's workforce, customers and community development (Chopra & Meindl, 2016; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018). Further, it can be defined as "the ability to positively affect workers' welfare, well-being, and safety as well as community development" (Longoni & Cagliano, 2018, pp. 1097–1098). The supply chain literature has a similar definition of the social dimension, where Klassen and Vereecke (2012) define it as "product or process-related aspects of operations that affect human safety, welfare, and community development" (Nichols et al., 2019, p. 537). When addressing social sustainability, human rights and labor standards should be considered (Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Mani et al., 2016; Shou et al., 2019). The social dimension also concerns education and training of the workforce (Chopra & Meindl, 2016; Christopher, 2016; Shou et al., 2019).

Some important characteristics of the social dimension are relationships, mutual understanding and objectives, shared norms, values and ethics, as well as collective behavior (Awan, Kraslawski, & Huiskonen, 2018; Dubey et al., 2017; Foot & Ross, 2017; Mani et al., 2016). Employees must be aware, be involved, loyal, motivated and accept the matter in question to work in accordance with the company's objectives and values (Ahi & Searcy, 2015; Dubey et al., 2017; Longoni, Golini, & Cagliano, 2014). The social dimension depends on intangible resources as it includes employees' individual skills, knowledge, abilities and intelligence, as well as the organizational culture and ability to innovate (Formentini & Taticchi, 2016;

Henriques & Richardson, 2004). This can enhance cooperation and enable companies to build a network within the company with its stakeholders (Dubey et al., 2017).

According to Henriques and Richardson (2004, p. 121), social capital is "the stock of networks, stakeholder relationships and shared rules that help organizations and their surrounding communities work more effectively" and enable goal-achievement. Besides, social capital "consists of the bonds between employees within a business, and also of the bridges the business builds with its surrounding communities" (Henriques & Richardson, 2004, p. 123). Many companies consider social capital to be a valuable resource, as it can aid their innovation and trust-building, and develop communities (Henriques & Richardson, 2004; Junior et al., 2018). Focusing on the social dimension can help provide a redistribution of wealth throughout the world by using capabilities in a more balanced and efficient way, and thus, provide more opportunities for people in local communities and reduce poverty (Castka & Balzarova, 2008; Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Vachon & Mao, 2008).

To ensure that companies and their supply chains utilize their knowledge in the most optimal way in the quest of becoming more sustainable, they can adopt knowledge management (Lim et al., 2017; Martins, Rampasso, Anholon, Quelhas, & Leal Filho, 2019). This form of management can be applied as a "platform whereby people share and transform information into actions to achieve organisational competitiveness" (Lim et al., 2017, p. 807). It can be beneficial to apply knowledge management in a sustainability context, as it can improve the "compliance with the guidelines of economic, environmental and social sustainability", and thereby be the foundation for the development of sustainability practices (Martins et al., 2019, p. 490).

Companies can develop more socially responsible practices by for instance adopting social standards, such as the ISO 26000 and SA8000 and supplier standards, conducting audits, and conforming with local labor laws (Awaysheh & Klassen, 2010; Castka & Balzarova, 2008; Chopra & Meindl, 2016; Koberg & Longoni, 2019). Moreover, companies can initiate collaborative projects with their partners to enhance their collective sustainability practices within the social

dimension, by for instance working together to improve the well-being, health and safety conditions of their workforce (Shou et al., 2019). By adopting such practices, it is possible for companies to adopt a monitoring system that evaluates the sustainability performance of the actors they do business with, in terms of social concerns (Shou et al., 2019).

Environmental Dimension

Environmental sustainability can be defined as a company's impact on the environment and depends on the company's efforts to preserve biodiversity in the ecosystem and protect the community (Chopra & Meindl, 2016; Christopher, 2016; Junior et al., 2018; Lankoski, 2017; Longoni & Cagliano, 2018). The main concerns include energy use, water, land and air pollution, waste reduction, conservation of scarce resources, as well as climate change related issues (Christopher, 2016; Koberg & Longoni, 2019; Lankoski, 2017; Shou et al., 2019). In the supply chain literature, the environmental dimension is defined by Srivastava (2007) as "integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumer, and end-of-life management of the product after its useful life" (Nichols et al., 2019, p. 537). By focusing efforts towards the environmental dimension of sustainability, it can result in a "reduction of natural resource consumption and pollutant emissions and the elimination of organizational activities that can degrade the ecosystem" (Longoni & Cagliano, 2018, pp. 1097–1098). Moreover, the company's operations can also have a positive impact on the environmental dimension (Lankoski, 2017).

There are several activities and measures that companies can engage in and introduce to their supply chains to improve their environmental footprint (Chopra & Meindl, 2016; Longoni & Cagliano, 2018; Wilson, 2015). The appropriate solutions will depend on the environmental issue in question, as different issues can require separate actions (Lankoski, 2017). One of the principal actions is related to resource consumption reduction, that is, to have a focus on efficiently utilizing existing resources, and considering alternatives for recycling and reusing resource input (Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Lim & Lam, 2016; Longoni & Cagliano, 2018). Moreover, the aim should be to avoid

non-renewable resources such as “coal, oil, and gas” (Lim & Lam, 2016, p. 733). And, instead apply “renewable substitutes” (Schilling & Chiang, 2011, p. 990).

Other central initiatives include the reduction of air emissions, waste, and a reduction of the usage of agrochemicals that have a harmful effect on the environment and the community (Chopra & Meindl, 2016; Koberg & Longoni, 2019; Longoni & Cagliano, 2018; Wilson, 2015). In addition, the protection of water quality and reduction of energy consumption are among the key activities to improve the environmental footprint (Chopra & Meindl, 2016; Wilson, 2015). To carry out sustainable practices, it can be beneficial to focus on product innovation activities and the development of technologies, processes and eco-friendly products and services (Chopra & Meindl, 2016; Wilson, 2015).

Companies can develop more environmentally responsible practices by for instance adopting environmental standards such as ISO 14001 to help the adoption of environmental management systems (Koberg & Longoni, 2019; Roehrich, Hoejmose, & Overland, 2017). However, some state that standards and environmental management systems simply reduce costs rather than enhance the performance of the environmental dimension (Schaltegger & Wagner, 2017).

Additionally, companies can invest in preventive measures and emissions control (Chopra & Meindl, 2016; Koberg & Longoni, 2019). They can develop supplier selection criteria based on environmental objectives (Roehrich et al., 2017). It can also be valuable to establish collaboration arenas for actors in a supply chain, so they can improve their environmental practices and performance by for example training their workforce to comply with environmental targets (Shou et al., 2019). Further, companies can create evaluation systems to assess the performance of actors in an environmental sustainability context (Henriques & Richardson, 2004; Shou et al., 2019).

Economic Dimension

The economic dimension can be defined as having “the ability to generate consistent profit over time” (Longoni & Cagliano, 2018, p. 1098). It can also be described as a representation of profits and income, and aims to reduce costs and secure financial yields to relevant stakeholders (Braccini & Margherita, 2019;

Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018). Thus, the main focus of the economic dimension is related to financial performance in terms of sales and growth in earnings (Braccini & Margherita, 2019; Shou et al., 2019). In the supply chain literature, economic sustainability is defined by Closs, Speier and Meacham (2011) as the "effort to enhance total (firm) value while reducing supply chain cost associated with the manner in which the firm conducts its business" (Nichols et al., 2019, p. 537).

Several authors explain that the economic dimension is related to the social and environmental dimensions (Braccini & Margherita, 2019; Kumar & Goswami, 2019; Laurell et al., 2019). There is a growing awareness amongst businesses that it is vital to consider sustainable practices, not only for the positive effect on the planet, but also as a way to gain profits and competitive advantages (Ansari & Kant, 2017; Christopher, 2016; Genovese et al., 2017). The economic dimension can focus on the economic impacts practices and actions have on stakeholders rather than just on financial results (Goh et al., 2020). For instance, the economic dimension can impact the livelihood of the actors involved by providing enhanced financial security through raised wages and reduced poverty (Arowoshegbe & Emmanuel, 2016; Slaper & Hall, 2011). People's livelihoods can also be improved as a consequence of the products or services that a company or supply chain will be able to provide as a result of economic sustainability (Henriques & Richardson, 2004). Economic growth can result in investments in the society, and also increase employment rates (Christopher, 2016; Henriques & Richardson, 2004). However, economic growth does not necessarily always "reduce poverty, provide a cleaner environment, or achieve greater equality or better quality of life" (Henriques & Richardson, 2004, p. 157).

The link between sustainability measures and economic performance can either have a negative or positive impact (Lankoski, 2017). This relation to economic performance is more clear with the success of the environmental dimension, than with the social dimension, perhaps as a result of greater research (Schaltegger & Wagner, 2017). Sustainability practices applied when pursuing the other dimensions of the TBL can influence economic growth negatively as it poses costs related to time and capital investments (Henriques & Richardson, 2004; Lankoski, 2017). In some cases, particularly in the short term, being responsible and acting

sustainably “imposes additional costs or redirects money away from shareholders and toward other stakeholders” (Savitz & Weber, 2014, p. 51). Also, “many of these actions require upfront investment that pays off in the long term” and not in the short term, which might scare companies away from acting sustainably (Chopra & Meindl, 2016, p. 505). However, costs can also be reduced as a consequence of improved sustainability performance as a result of value-enhancing innovation (Lankoski, 2017).

By applying sustainable practices such as considering environmental concerns, companies can improve their reputation and image, leading to increased sales and revenue opportunities (Ferro et al., 2019; Goddard, 2017; Lankoski, 2017). One of the reasons for this, is that customers are increasingly more informed and concerned with ethical and environmental issues, which has an effect on their purchasing decisions (Wilson, 2015). Therefore, companies can add a premium price to their products due to their sustainable practices (Lankoski, 2017). However, research shows that some customers are often unwilling to pay a premium price for sustainable goods and services (Chopra & Meindl, 2016; Savitz & Weber, 2014).

There are many different opinions on what type of economic activity that goes hand-in-hand with sustainable development (Henriques & Richardson, 2004). Therefore, it is important that companies analyze, understand and communicate the impact their activities might have within the social and environmental area (Henriques & Richardson, 2004). It is possible to adopt a business sustainability framework which aids businesses to analyze, evaluate and communicate their sustainability initiatives (Laurell et al., 2019). By having this approach and by reporting various economic indicators, the performance of efforts can be evaluated and measured in terms of sustainability (Lankoski, 2017; Laurell et al., 2019). If necessary, improvement efforts can be put in place to meet their aim and vision (Henriques & Richardson, 2004).

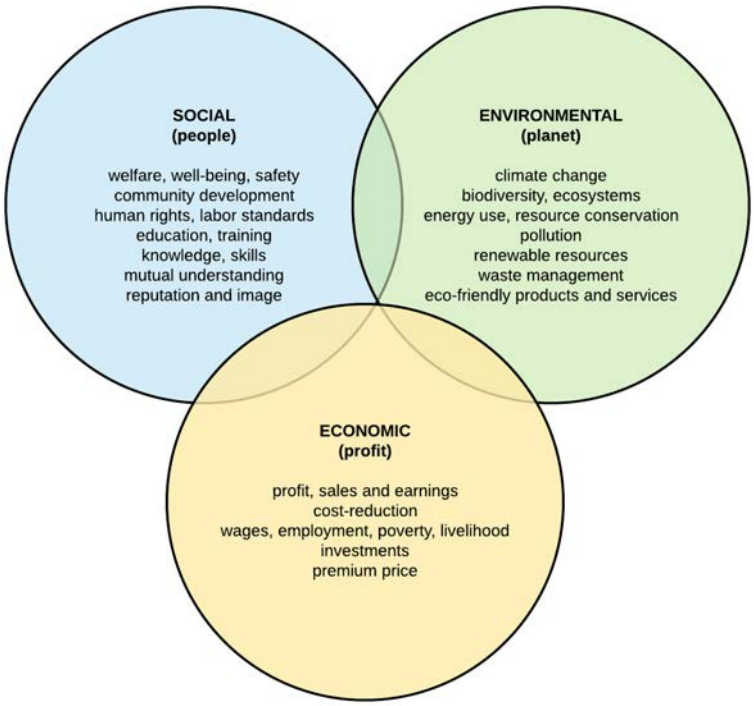


Figure 8: This figure provides a summary of some of the central aspects of the triple bottom line discussed in the segments above.

2.3 Sustainable Supply Chain Management

Before discussing sustainable supply chain management, we provide a definition of supply chain management, as this is the foundation of the topic.

2.3.1 Definition of Supply Chain Management

The term supply chain management (SCM) has evolved and shifted focus since its introduction in the 1980s (Ahi & Searcy, 2013; Carter & Rogers, 2008; Christopher, 2016). At first, the focus was mainly on the flow of materials, however the literature also emphasizes aspects such as information flows, risk, performance, integration and the management of wider network relationships (Ahi & Searcy, 2013). Mentzer et al. (2001) defined SCM as, the "systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance" of companies and their supply chains (Ahi & Searcy, 2013, p. 332). The term can also be defined as "the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole"

(Christopher, 2016, p. 3). Chopra and Meindl (2016, p. 16) further state that it is "the management of supply chain assets and product, information, and fund flows to grow the total supply chain surplus".

2.3.2 Definition of Sustainable Supply Chain Management

As SCM supports "the efficient and effective running of the business, it can provide a useful framework for exploring opportunities for improving sustainability" (Christopher, 2016, p. 271). According to Ahi and Searcy (2015, p. 2884), supply chain management has an important influence on "the economic, environmental, and social impacts of an organization" and it is therefore "vital to contemplate its relation to sustainability initiatives". Thus, SCM can be extended to sustainable supply chain management (SSCM), that is SCM that considers the triple bottom line "for long-term sustainable growth" (Dubey et al., 2017, p. 1120). Therefore, SSCM can be viewed as a combination of SCM and sustainable development concerns (Ahi & Searcy, 2013; Ansari & Kant, 2017; Lim et al., 2017). The concept has emerged the last decades as a response to market trends, with an aim to improve the practices of supply chains in terms of sustainability issues (Devika et al., 2014; Dubey et al., 2017; Koberg & Longoni, 2019; Prasad et al., 2018).

There are various terms relating to the concept of SSCM, such as green SCM, environmental SCM, sustainable supply chain governance, and closed loop supply chain (Ahi & Searcy, 2013; Ansari & Kant, 2017; Ashby, Leat, & Hudson-Smith, 2012; Christopher, 2016; Formentini & Taticchi, 2016; Rajeev, Pati, Padhi, & Govindan, 2017). Some state that SSCM is a broader term than green SCM (Ahi & Searcy, 2013; Formentini & Taticchi, 2016; Rajeev et al., 2017; Seuring & Müller, 2008). Therefore, we will use the term SSCM.

The concept of SSCM involves the triple bottom line as a tool to approach sustainability (Koberg & Longoni, 2019; Raut, Narkhede, & Gardas, 2017; Tseng, Lim, & Wong, 2015). There are different prioritizations and emphasis on the social, environmental and economic dimensions (Ahi & Searcy, 2013; Ansari & Kant, 2017; Lim et al., 2017; Tseng et al., 2015). Seuring and Müller (2008, p. 1700) define SSCM as "the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from

all three dimensions of sustainable development". While Carter and Rogers (2008, p. 368) define SSCM as "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains".

2.3.3 Sustainable Practices

SSCM encompasses "a firm's internal and external practices which are taken to make its supply chain more sustainable in terms of all three dimensions of sustainability" (Hong, Zhang, & Ding, 2018, p. 3509). Companies have different approaches and governance mechanisms towards SSCM and implement different sustainability practices (Ansari & Kant, 2017; Formentini & Taticchi, 2016; Prasad et al., 2018). Developing and increasing knowledge about different approaches is important to succeed with SSCM (Formentini & Taticchi, 2016). Some commonly adopted practices include the Three Rs of sustainability, circular economy, sustainable production, traceability and sustainable sourcing, and management of actors involved in the chain.

Three Rs of Sustainability

An approach to SSCM, is the concept of the Three Rs (3Rs), which is reduce, re-use and recycle (Beaty, 2013; Christopher, 2016). First, reduce highlights the importance of minimizing and limiting the input of new resources into the chain (Beaty, 2013; Christopher, 2016). By implementing SSCM practices, resource-efficiency can be enhanced, by for instance reducing the amount of packaging required for the end-product (Ansari & Kant, 2017; Carter & Rogers, 2008). Second, re-use aims at keeping the resources involved in the supply chain for a longer time period, preventing resources from being wasted (Beaty, 2013). Third, recycle involves the conversion of waste to resources (Beaty, 2013). The concept emphasizes the importance of having a holistic view, meaning that sustainability should be considered already at the start of the supply chain, during the design stages (Christopher, 2016; Genovese et al., 2017). The design at the first stages of the supply chain will have a large impact on the sustainability development of the entire chain (Christopher, 2016; Dubey et al., 2017). There is a large "impact on sustainability of everything we do from product design through to end-of-life

disposal" (Christopher, 2016, p. 271). Therefore, it is clear that the total life cycle of a product should be addressed in SSCM (Ashby et al., 2012).

Circular Economy

To achieve a sustainable supply chain, managers can have a circular economy (CE) approach, as the concept is closely connected to the 3Rs (Jaca, Prieto-Sandoval, Psomas, & Ormazabal, 2018; Winkler, 2011). A successfully implemented CE will impact the social, environmental and economic aspects of the TBL (Korhonen, Honkasalo, & Seppälä, 2018). The concept of CE emerged as a response to achieving sustainability, and represents a shift from systems solely focused on production and consumption, to more cyclical flows (Genovese et al., 2017; Korhonen et al., 2018; Lee, 2019). According to Genovese et al. (2017, p. 355), a CE can be described as "self-sustaining production systems in which materials are used over and over again". A CE can also be described as "a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops" (UN, 2019, para. 3). Among the advantages of circular supply chains is that they comprise better practices since they recognize the value that lays in used products, and reuse them in the production of new products, instead of simply discarding them as waste (Genovese et al., 2017; Lee, 2019; Winkler, 2011).

Sustainable Production

Sustainable production is an important part of SSCM (Carter & Rogers, 2008; Geissdoerfer et al., 2017; Pusavec, Krajnik, & Kopac, 2010; Seuring & Müller, 2008). Production methods are considered to be an important consideration to achieve sustainable products (Ansari & Kant, 2017). Due to the resource consumption, waste and pollution generated in production processes, it is imperative to incorporate sustainable production practices (Pusavec et al., 2010; Veleva & Ellenbecker, 2001). The Lowell Center for Sustainable Production defines sustainable production as "the creation of goods and services using processes and systems that are non-polluting; conserving of energy and natural resources; economically viable; safe and healthful for employees, communities and consumers; and socially and creatively rewarding for all working people" (Veleva & Ellenbecker, 2001, p. 520). By improving the sustainability production

processes, actors in the corresponding supply network can gain sustainability benefits (Geissdoerfer et al., 2017; Winkler, 2011).

Traceability and Sustainable Sourcing

According to the United Nation's Global Compact (2014, p. 6), traceability can be defined as the "ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption". To achieve complete traceability, the entire supply chain must be considered (Sun, Wang, & Zhang, 2017). A supply chain can develop its reputation and image if traceability is in place, as it can meet the demands of relevant stakeholders for more transparency in the chain (Sun et al., 2017; UNGCO, 2014). Traceability can enable sustainable sourcing practices, and can improve the overall sustainability of the supply chain (UNGCO, 2014).

An important aspect of SSCM is sustainable sourcing (Christopher, 2016). A large portion of the carbon footprint, and thereby the sustainability of the supply chain, is prevalent upstream in the chain (Christopher, 2016). This amount is estimated to be around 40-60% for manufacturers, and up to 80% for retailers (Christopher, 2016). Christopher (2016, p. 276) states that the carbon footprint depends on how "upstream materials and products are sourced and made" and the resource consumption can vary significantly between various suppliers in the same industry.

It is imperative that suppliers comply with the rules, regulations and expectations set by the focal company (Klassen & Vereecke, 2012). Suppliers should monitor and assess their processes in accordance with set criteria in relation to the TBL, and companies should base their supplier selection on them (Formentini & Taticchi, 2016; Klassen & Vereecke, 2012). For instance, suppliers "might be required to report the safety of all chemicals present in a component, or provide assurances that labor practices used in its operations meet SA8000" (Klassen & Vereecke, 2012, p. 105). Companies should encourage their suppliers to self-report data and conduct on-site inspections, and analyze the collected data to ensure that they are working in accordance with the company's expectations (Klassen & Vereecke, 2012). Further, companies can require suppliers to engage in sustainability oriented programs (Carter & Rogers, 2008).

Management of Actors

To manage a sustainable supply chain, it is vital to consider all actors involved, and manage the relationships among them (Formentini & Taticchi, 2016; Koberg & Longoni, 2019). Increased globalization can result in geographically dispersed supply chains, making communication, collaboration and thereby also the implementation of sustainability practices more challenging (Ahi & Searcy, 2014; Saberi et al., 2019). Cultural distance is a context dependent factor which reflects variations across cultures and the societies they have evolved in, and will have an impact on the chosen management approach (Awaysheh & Klassen, 2010; Koberg & Longoni, 2019). On the one hand, if cultures are similar, misunderstandings and problems are less likely, due to similarities in both expectations, laws and regulations (Awaysheh & Klassen, 2010). On the other hand, if cultures are less similar, the likelihood of these issues occuring is higher (Awaysheh & Klassen, 2010).

Contextual differences require understanding to be dealt with and handled in an appropriate manner (Ahi & Searcy, 2014). To succeed with SSCM companies must ensure that there are good collaboration practices in place among supply chain members, as cooperation will enable better coordination of the supply chain, and create grounds to jointly improve the potential outcomes (Klassen & Vereecke, 2012; Seuring & Müller, 2008). Putting in place good communication efforts throughout the chain to share insights on different strategies and on their effects is key (Formentini & Taticchi, 2016). One way of enhancing understanding and improving communication is to involve a third party with knowledge about local conditions of – for example – the supplier a company is dealing with (Koberg & Longoni, 2019). By handling contextual differences, all parties can gain a better understanding of supply chain objectives, thereby facilitating a positive implementation of sustainable practices and measures, and the process of obtaining sustainable results (Ahi & Searcy, 2014; Koberg & Longoni, 2019).

2.4 Conceptual Framework

In our literature review we have presented concepts that are relevant for our research question and sub-questions. The concepts have enabled us to see that our

research questions are interesting from a theoretical perspective, as they deal with serious and critical issues, that are also highly relevant in today's world. We have focused on some of the most general and key concepts that would be interesting to examine, but realize that the discussed theories, methods and concepts might be revised if applied in another industry or country, or in a context entirely different from the Ethiopian coffee supply chain. We also realize that additional theories, methods and concepts might be added to provide a more appropriate overview in other research applications.

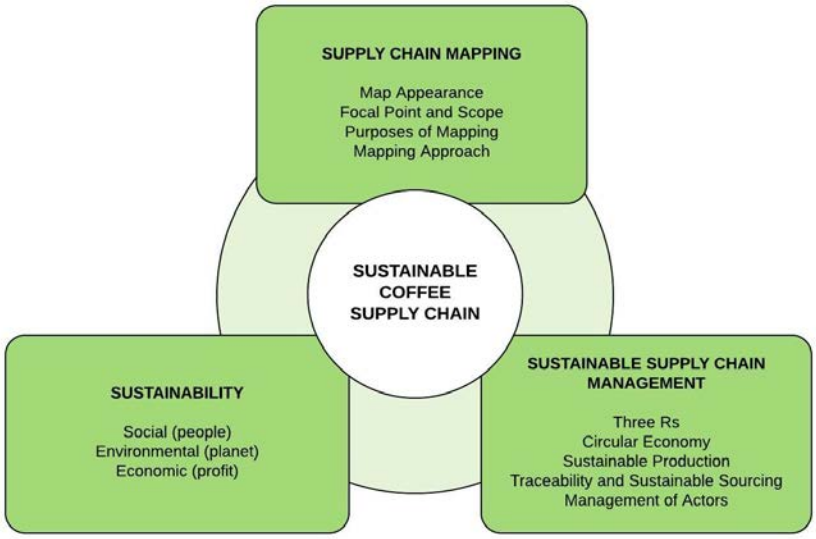


Figure 9: Conceptual Framework

Based on the literature review, we have developed a conceptual framework to aid us in our research (figure 9). The framework shows the main concepts reviewed in the literature review. It consists of three main concepts, namely supply chain mapping, sustainability and sustainable supply chain management. First, supply chain mapping encompasses different ways of making a visual representation of supply chains, purposes of mapping and different approaches to the mapping process. Second, sustainability is related to the triple bottom line, including the social, environmental and economic dimensions. Third, sustainable supply chain management concerns sustainable practices such as the Three Rs, circular economy, sustainable production, traceability and sustainable sourcing, and management of actors. All three concepts are important to consider to achieve the overall objective of our thesis, which is a more sustainable coffee supply chain.

3 Methodology

This chapter explains the research methodology applied to answer the research question and sub-questions. First, we discuss our research strategy and chosen design. Thereon, we elaborate on our data collection process. In the end, we summarize how quality and ethical considerations of the research were assured, and explain the challenges and limitations of our research.

3.1 Research Strategy

The overall objective of our thesis is to gain an overview of a general Ethiopian coffee supply chain, identify challenges and opportunities along the supply chain, and examine potential solutions for what can be done to improve the supply chain's sustainability. Therefore, we needed a research strategy that could assist us with this. We applied a qualitative research strategy, as we considered it most fitting to our research. Qualitative research "typically emphasizes words rather than quantification in the collection and analysis of data" (Bell, Bryman, & Harley, 2019, p. 595).

Among the advantages of having a qualitative approach is the flexibility it enables, especially when dealing with complex issues (Wheeldon & Åhlberg, 2012). A qualitative approach can provide an in-depth understanding of a topic, by allowing the researchers to for example conduct interviews with knowledgeable professionals in the field of study and obtain rich data (Bell et al., 2019). The qualitative strategy was fitting in our research, as we dealt with the complex topic of the coffee supply chain, involving many players. Additionally, the research strategy was useful, as it enabled us to explore a topic of which we had limited prior knowledge.

Further, we chose an abductive approach, as it can be applicable with a qualitative strategy (Bell et al., 2019; Wheeldon & Åhlberg, 2012). It provides a more pragmatic approach to research, as it aims to overcome the constraints associated with inductive and deductive reasoning (Bell et al., 2019; Wheeldon & Åhlberg, 2012). Abductive reasoning "starts with observation of phenomena and then seeks to develop explanations for them, often by working iteratively between theory and

data" (Bell et al., 2019, p. 589). In other words, researchers that apply this approach commonly go back-and-forth between their observations and own findings, and literature (Bell et al., 2019). This was done in our research, as it was imperative to first gain knowledge of appropriate theories and concepts in order to be able to understand and interpret real life observations and data collected. Further, the data we collected from interviews and observations influenced the relevance of our reviewed theories and models, made us add supplementary theories, and altered our research questions. This systematic combination of theory and data collection was useful in our case since we lacked a clear picture of the current state of the research matter, and had to reconfigure our approach to the problem. However, the challenge of having such an approach, is that it to a large degree relies on the knowledge and intuition of the researchers (Wheeldon & Åhlberg, 2012).

3.2 Research Design

Research design is defined by Bell, Bryman and Harley (2019, p. 596) as "a framework or structure within which the collection and analysis of data takes place". It is in turn influenced by the chosen research questions, literature review, conceptual framework and by the aim of the study (Bell et al., 2019). A case study design is compatible with our qualitative approach, as qualitative methods provide "an intensive, detailed examination of the case" (Bell et al., 2019, p. 63). The case study can enable us to combine different qualitative methods, thus decreasing our dependence on a particular one (Bell et al., 2019). We chose to do a case study where we examined the following specific case: the Ethiopian coffee supply chain. Our case can be categorized as an instrumental case, as we used a particular case to provide new understanding of a broad topic (Bell et al., 2019; Crowe et al., 2011).

Our case can also be described as exploratory, since we wish to gain better understanding of sustainability in the coffee supply chain, explore current practices, and discuss improvement areas in the supply chain (Bell et al., 2019; Gray, 2019). Exploratory cases are useful when there is a lack of information on a particular topic (Gray, 2019). Thus, the exploratory nature of the case was beneficial for us as there is a lack of information on our specific case. According to Bell et al. (2019) some researchers note that the exploratory case study is appropriate to serve as a starting

point for future research and analysis. Hence, our research could serve to identify future research topics.

3.2.1 Case Description and Case Boundaries

We mapped the stages of the Ethiopian coffee supply chain, and explored them in terms of sustainability by applying the triple bottom line. To simplify the mapping process, we chose to focus on the most central activities and the most important actors, as the chain is long and complex and involves an extensive amount of different activities and actors. We chose to restrict our area of research to the supply chain stages that take place within the country, and discuss export at a general level. We chose not to focus on the supply chain after the product is exported, as this would be too extensive for the aim of this thesis. We focused on the following stages in our 'Findings and Discussion': production, harvesting, primary processing, storage, handling and transport, the Ethiopian Commodity Exchange, secondary processing, export and domestic consumption. We also discussed cooperatives and unions, and coffee certifications, as this could aid us in answering our research questions. A more detailed description of our approach is provided in the section 'Our Research Approach'.

3.2.2 Level of analysis

According to Bell et al. (2019), there are different levels of analysis that should be accounted for when choosing an appropriate research design, namely: individuals, groups, organizations and societies. However, these levels of analysis were not fitting to our research. In the supply chain management literature, certain levels of analysis are commonly presented, including dyadic relationships, supply chains and networks (Wilding, Wagner, Miemczyk, Johnsen, & Macquet, 2012; Wolf, 2008). We consider these to be more appropriate to our particular research. According to Wilding et al. (2012), some researchers note that a high level of analysis is necessary to understand sustainability aspects, and therefore suggest applying networks as a more suitable level of analysis. This level of analysis includes stakeholders that are not directly linked to the production of the chain's goods or services, but that play an indirect role, for instance like the government (Wolf, 2008). Yet, Wolf (2008) argues that a network level of analysis is very complex and can result in a superficial analysis. As a consequence, we considered supply

chains to be the level of analysis most fitting for our purpose, as we intended to understand sustainability along the coffee supply chain.

The chosen level of analysis had a direct influence on the mapping scope and configuration. To reduce complexity, we focused on a particular part of the supply chain, as explained in the 'Case Description and Case Boundaries' and in 'Our Research Approach', and omitted certain supply chain actors, and included solely the most relevant ones for our analysis (Gardner & Cooper, 2003). The level of analysis is therefore clear in the supply chain map we developed as part of our research.

3.2.3 Unit of analysis

Literature suggests that there are two main approaches to the study and description of supply chains (Gripsrud, Jahre, & Persson, 2006). This is determined by the supply chain processes that are included and by the chosen unit of analysis (Gripsrud et al., 2006). One of the approaches looks at supply chain management as an extension of the concept of logistics, with a specific company and the management of the specific supply chain as unit of analysis (Gripsrud et al., 2006; Persson & Grønland, 2002). The other approach links supply chain management to process management practices, and identifies key processes with their corresponding key actors, which become the focus of the study (Gripsrud et al., 2006). The two approaches are limited by the focus on one specific company and its particular supply chain for the analysis (Gripsrud et al., 2006).

Due to the exploratory nature of our case study and the complexity of the coffee supply chain, we found that neither of these approaches were suitable in our research. Our aim is to map out a general Ethiopian coffee supply chain, including the main actors and activities. We decided not to focus on a specific company, as we wanted to identify general sustainability challenges and opportunities in the supply chain without being limited to one specific company's point of view. In other words, we have no specific unit of analysis in our research, as we focused on a general supply chain in Ethiopia. This is illustrated in the supply chain map that results from our research. It has an industry-centric rather than a firm-centric perspective.

3.3 Data Collection

In this section we cover our data collection process. This includes the collection of primary data through semi-structured interviews, informal conversations and on-site observations. We also explain our sampling and subject selection, field notes and visual data. As part of our case study design, we went on a two-week data collection trip to Ethiopia in February of 2020. In order to maximize our stay and primary data collection process, it was important for us to prepare and plan as much as possible ahead of the trip. The preparations included learning more about the culture and country, contacting interview subjects, ensuring that we had the necessary vaccines to travel, scheduling flights and accommodation, contacting Jimma University, etc. A detailed report of our trip can be found in appendix 1.

After discussing our primary data collection, we explain how we collected our secondary data. Our secondary sources were mainly grey literature, research reports, scientific literature, books and textbooks.

3.3.1 Primary Data

Primary data is the data researchers collect and is the fundamental aspect of research (Bell et al., 2019). An advantage of primary data is that the researchers can decide what data to collect based on their demands in order to answer their research questions (Bell et al., 2019; Curtis, 2008; IWH, 2015). We collected our primary data by conducting semi-structured interviews, having informal conversations, and by making on-site observations throughout our field trip to Ethiopia.

Part of the motivation for our trip to Ethiopia was to collect primary data that could not be obtained elsewhere, which is among the key reasons for collecting primary data (Curtis, 2008). Having the opportunity to travel to Ethiopia enabled us to interview and talk to our subjects in person, which was highly beneficial for our data collection process. If this had not been possible, we would not have been able to talk to the majority of our subjects, which would have had a severe impact on our data collection.

Primary Data Collection Instruments

Semi-structured interviews

We collected primary data through semi-structured interviews, as it was suitable for the exploratory nature of our research and our qualitative approach (Gray, 2019). One of the advantages of semi-structured interviews is not being constricted to a fixed set of questions, as there is room for adding questions that emerge in a specific interview context based on the interview subject's responses and knowledge (Bell et al., 2019; Gray, 2019; Qu & Dumay, 2011). The interviews varied based on the interview participant(s) and their prior knowledge. It is important to be flexible in during semi-structured interviews and be prepared to ask follow-up questions that might occur based on the interview subject's knowledge, reflections and responses (Bell et al., 2019; Coombes, Allen, Humphrey, & Neale, 2009; Jacob & Furgerson, 2012). This type of approach enabled us to gain new knowledge and ideas that we had not planned to specifically ask about or considered prior to the interviews.

During our interviews, we also altered the wording of some questions to fit the course of the interview and to respond to the direction in which interview participants took the interview. We also altered the order of the questions or omitted certain questions to fit better into the conversation with our interviewees. This was either because we were told by some subjects that they had no knowledge on certain areas, which then made it unnecessary to ask certain questions, as they would not be able to answer them. Or, because our interview subjects answered several questions while answering the one that was asked. This made it easier to get more information, as we could ask questions in varied ways and we had different questions that could clarify things. Thereby, the semi-structured interview enables reciprocity between the interviewer and the interviewee (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). As a consequence of this flexibility, the interview durations ranged from around 30 minutes, up to two hours.

Due to the flexible nature of semi-structured interviews, they can be applicable to use in both individual and group interviews (Kallio et al., 2016). In most cases, we were two interviewers and one interviewee. However, we also conducted group interviews when and where we found it appropriate. For instance, we interviewed subjects working in the same location and with similar positions, so they found it

convenient to do the interview together. We also chose this approach as it allowed us to get more data in a time-efficient manner, as we were limited by time constraints during our visit to Ethiopia. According to King et al. (2018), group interviews can be useful to apply in exploratory research.

In our case, we conducted interviews with up to two people. This is considered a suitable group size, as a large group can be challenging to handle (King et al., 2018). As our research topic is not perceived to be a sensitive topic, we believe that the interviewees felt comfortable to speak freely and not withhold their knowledge and opinions. Group interviews can be beneficial as they can facilitate discussions and elaborations (King et al., 2018). We found that this allowed the interview participants to complement each other's responses and points, and re-evaluate or defend their opinions. In some cases, group interviews can also promote recollection (King et al., 2018). The group interview setting could allow the participants to correct each other to avoid misunderstandings. It also allowed us to gain a richer understanding of the topic, as the subjects would formulate their responses differently.

It is recommended that interviews are held in a setting that is quiet and private, as this can limit the possibility of distractions (Bell et al., 2019; Jacob & Furgerson, 2012). Further, a private environment can make the interview subject more comfortable to speak freely because they are not overheard by anyone else (Bell et al., 2019; King et al., 2018). We were fortunate to conduct interviews in quiet facilities for a suitable period of time that allowed the interview subject to focus on answering our questions without any interferences. We also conducted them in our interviewees' offices, which is a familiar environment for them.

Interview Guide

To prepare for an interview, it is useful to determine a list of questions that can be used as guidelines during the interview process, called an interview guide (appendix 2) (Bell et al., 2019; Kallio et al., 2016; Qu & Dumay, 2011). The interview guide allows the researchers to gather similar data from their interview participants and adapt the questions based on what is relevant in different contexts, which is in accordance with our semi-structured interview approach (Bell et al., 2019; Kallio et al., 2016). A benefit of having some structure was that it simplified comparisons

across interviews, and made them easier to process, as they all had a similar structure and were based on the same interview guidelines.

There are many considerations that are essential to keep in mind when developing an interview guide (Kallio et al., 2016). An important aspect to consider is the extent and depth of information that is to be collected during the interview process (Kallio et al., 2016). Even though it is important to get a rich understanding of the research topic, it is important to only collect data that is necessary to answer the research questions (Gibbs et al., 2007). This is due to ethical considerations, but also to give a clear direction for the research, as more information can complicate and disorient the data analysis (Kallio et al., 2016). Therefore, we had to keep this in mind when developing our questions.

It is necessary to carefully consider the way questions are formulated and what type of questions are asked, as this can influence the type of information that is collected (Bell et al., 2019). It is highly beneficial to formulate the questions in a way that can aid the researchers in answering their research questions (Bell et al., 2019). The researchers must also use language and phrasing the interviewees understand in order to minimize misunderstandings and confusion that might occur (Bell et al., 2019; Rubin & Rubin, 2011). This was particularly important to consider in our case, as our interview subjects were from different backgrounds and countries, and thereby, had different perspectives on the topic and had varying language skills.

The interview guide should cover the main topics of the research (Bell et al., 2019; Kallio et al., 2016; King et al., 2018). After reading literature and collecting secondary data on the topic of coffee, sustainability, and supply chains, we created our questions based on this. We divided our questions into three main topics considering our research questions. First, we constructed questions related to the first part of our research question, that is, mapping out the coffee supply chain. Second, we developed questions related to sustainability in the coffee supply chain, further dividing the topic of sustainability into three parts, social, environmental and economic aspects. Lastly, as we wanted to gather information about challenges and opportunities in the industry, we developed questions related to this, as well as questions related to potential solutions.

It is advised to include introducing questions in the interview guide, so the interview topic is clear at the beginning of the discussions (Jacob & Furgerson, 2012; Qu & Dumay, 2011). We included introducing questions related to the work experience of the interview subject(s) and their current position(s). This was useful to get an understanding of the subject's knowledge on the topic, and could thereafter adapt our later questions based on their competence and background. Additionally, it is useful to avoid leading and closed questions, as these types of questions often alter and affect the response of the interview subject (Bell et al., 2019; Jacob & Furgerson, 2012; King et al., 2018). We decided to ask open questions to satisfy the exploratory nature of our research design. Moreover, we decided to add some concluding questions to our interview, as this to summed up the interview in a structured manner. Also, we found it beneficial as it gave the interview subjects the possibility to repeat the most important aspects of the discussion. This made it more clear for all parties what the interview subject wanted to convey.

Informal Conversations

Another method we applied for primary data collection were informal conversations. Informal conversations can be defined as asking concrete and clear questions to gain knowledge on a specific topic in an informal context (Curtis, 2008). As explained by Gray (2019), such conversations depend on the researcher's ability to come up with questions spontaneously through the duration of the talk. Consequently, this method can be considered to be a very "open-ended form of interview technique" (Gray, 2019, p. 217).

We had informal conversations multiple times throughout our field trip to Ethiopia, as we found it very useful and convenient. The length of these conversations varied. In some cases, they lasted solely a few minutes, while others lasted a couple of hours. We found this approach beneficial during our visit to the Ethiopian Commodity Exchange, as several subjects were hesitant to giving full interviews, and prefered this approach. In addition, we applied this approach when we had to ask questions on-the-go during our visits to the campus facilities at Jimma University and other coffee-related facilities in Ethiopia. We also had informal conversations during a private coffee ceremony we attended to gain more knowledge about the tradition and its significance. This method was particularly advantageous, as it offered a high degree of flexibility in terms of the development

of the conversation, and enabled us to walk around the facilities while talking with our subjects.

We often had to ask questions in a busy environment with less time to get the information we needed. Therefore, it was important for us to be flexible and open to changes of plans in our data collection process, so we could secure as much information as possible during our stay in the country. We were only able to take notes during some of our informal conversations, as we were often walking around uneven terrain, or were in such an informal setting that it did not feel appropriate to bring out a notepad. Even though we were satisfied with the results of the informal conversations, we are aware of some of the downsides of this approach. For instance, because we did not have a set of questions in front of us, the danger of forgetting to ask certain questions, or of influencing the subject and the direction of the conversation was present. Gray (2019) explained that these could be potential disadvantages of this particular method.

Observations

Bell et al. (2019, p. 594) define participant observations as "research in which the researcher immerses him- or herself in a social setting for an extended period of time, observing behaviour, listening to what is said in conversations both between others and with the fieldworker, and asking questions". It can also be described as observing subjects and noticing their actions (Curtis, 2008). We conducted participant observations, as this allowed us to be open-minded about what we wanted to observe, and ensured that we were able to collect all the data we could to answer our research questions. In addition to observing people, we also observed places, objects and other situations we considered useful for our research.

During our site visits we had a clear focus on what we wanted to observe and on who we wanted to talk to. This is an important factor when doing observations to obtain high-quality data (Bell et al., 2019). The timing of the observations should be considered very carefully (Bell et al., 2019). We visited both a coffee farm in the outskirts of Jimma, Ethiopia, and the Ethiopian Commodity Exchange in Jimma on a short notice. By doing so, we ensured that our observations were realistic, as the people working there could not make any changes to the way they normally operate.

This made our observations representative of their actual state, and we could therefore apply them in our research.

Moreover, we tried at all times to have an objective look on the things we gathered through our observations in order to not tint the data with our own opinions and ideas. We do however realize that being completely objective is impossible. In some cases, we conducted so-called simple observations, where we played a passive and non-intrusive role, and therefore had no control over the behavior of the people we were observing. This was recommended by Bell et al. (2019).

Sampling and Subject Selection

To get as broad a view on the topic of coffee supply chains and sustainability as possible, we decided to have a diverse subject base consisting of people differing in terms of knowledge and expertise area, education and profession, and allowing for all ages, genders, nationalities and backgrounds. In qualitative research sample sizes vary (Bell et al., 2019). Our sample size consisted of 5 different interviewees, some of which were interviewed multiple times, and completed 4 semi-structured interviews. We combined this with several informal conversations with locals and other knowledgeable people. This sample size can be considered adequate, as the focus in qualitative research should not be on the sample size, but rather on the quality, detail and depth of the data collected (Bell et al., 2019). We believe that our sample size is appropriate to accomplish a comprehensive understanding of the topic being studied.

We got our initial interview subjects through contacts we acquired through the SUSTAIN Project. They were first contacted by email, where we presented the topic and aim of our master thesis, and asked them if they would like to contribute with their knowledge and expertise. In terms of how we first got in touch with the people we had informal conversations with, this happened ad-hoc on-site or through other subjects.

Purposive Sampling

Since our research is of a qualitative nature, we have applied purposive sampling (Bell et al., 2019). This type of sampling entails having the goals of the research and answering the research question as main criteria when conducting the sampling

(Bell et al., 2019). Purposive sampling does not choose research participants on a random basis, but rather in a strategic way, so that the participants and their key characteristics are relevant for the research (Bell et al., 2019). In our case, we made an effort to mainly select subjects that were experts in the coffee industry. Our interview subjects included professors, doctors, researchers, lab technicians, Ethiopian Commodity Exchange professionals, and other coffee industry professionals. Our informal conversations were mainly with coffee farm workers, students at Jimma University and different people from the local community that we met throughout our stay in Ethiopia. In our 'Findings and Discussion' chapter, we will refer to our primary data sources as presented in table 1.

PRIMARY DATA SOURCE	COLLECTION DATE	REFERRED TO AS
Doctor 1 and Professor 1	Feb. 12, 2020	Interview 1
Professor 2 and Doctor 2	Feb. 12, 2020	Interview 2
Professor 2	Feb. 13, 2020	Interview 3
Professional 1	Feb. 18, 2020	Interview 4
Professionals at the ECX	Feb. 15, 2020	Site Visit 1
Professionals at coffee farm and primary processing station	Feb. 14, 2020	Site Visit 2
Professionals at the College of Agriculture and Veterinary Medicine	Feb. 15, 2020	Site Visit 3
Locals in Jimma and Students at Jimma University	Feb. 10-15, 2020	Site Visit 4
Observations in Jimma and Addis Abeba	Feb. 6-20, 2020	Field Trip

Table 1: Overview of our primary sources, collection date and how we refer to them in our thesis.

In terms of purposive sampling, there is a distinction between the non-sequential and the sequential sampling approaches (Bell et al., 2019). In our case, we have applied the sequential approach. This means that "sampling is an evolving process in that the researcher usually begins with an initial sample and gradually adds to the sample as benefits the research questions" (Bell et al., 2019, p. 391). There are several types of purposive sampling in qualitative research (Bell et al., 2019). One of these is snowball sampling, or simply snowballing (Bell et al., 2019). We applied this sampling technique in our research.

Snowballing

After the first contact via email with our interview subjects, we interviewed our subjects in person. We found it difficult to find enough relevant interviewees,

therefore, we applied the snowballing sampling technique. This technique is becoming increasingly applied in qualitative research (Bell et al., 2019). Snowballing consists of recruiting additional subjects from the original sample (Bell et al., 2019; Byrne, 2001; Encyclopedia.com, 2020; Gray, 2019; Ishak, Bakar, & Yazid, 2014). We did this by making the initial contact and using the interviewee's recommendation to acquire another interview subject. We also applied this method for our informal conversations.

We continued the snowballing process until we obtained what we considered to be the right amount of participants to interview and talk to in the short time span we had available while in Ethiopia. As Kalton and Anderson (1986) explain, the snowballing technique is best suited for exploratory and qualitative research. There are some disadvantages of applying this particular sampling technique, including biases (Dudovsky, 2016; Encyclopedia.com, 2020). However, there are also some benefits of snowballing, including gaining access to hidden populations, collecting primary data in a cost- and time-efficient manner, and that this method requires less planning than other methods (Dudovsky, 2016). Due to the potential biases, we considered the snowball sample with care. It should, however, be mentioned that we found this type of recruitment of interview and conversation subjects very useful, as we got the chance to meet people through our contacts that we would not have gotten in touch with otherwise.

Field Notes

According to Bell et al. (2019), it is very important to be detailed in the descriptions in qualitative research. Consequently, we made extensive notes throughout our data collection field trip. During our interviews, informal conversations, and site visits we wrote down notes of what we observed, heard or thought. Most times, we both took notes, to facilitate discussions and ensure that we understood everything that was said and observed in the same way. At the end of each day, we sat down and recapped what we had experienced. To make all the data more readable, understandable and easier to access, we wrote the notes in an extensive and rich form on the computer. This was in particular done to avoid confusion and misunderstandings when working on the data at a later stage of the process. According to Bell et al. (2019) there is a variety of methods of making notes. Among these are mental notes, quick and short jotted notes, and full field notes. We

made mental notes when it was inappropriate to use a notepad to write detailed notes. When under time-pressure, we wrote quick and short jotted notes. And, at the end of each day we wrote detailed field notes, which were later used as the main primary data source.

Visual Data

During our field trip, we tried to not neglect the importance of visual data. Visual images are "a way of observing and recording reality" and can be used to produce more and rich data (Bell et al., 2019, p. 425). As part of our trip, we took photographs whenever we could for our field notes. During some interviews we got our interview subjects to draw the actors and linkages in the coffee supply chain to simplify the discussion and limit misunderstandings. This visual addition to our interviews was very useful, as it ensured that all parties were on the same page and could understand each other.

Visual data enabled us to gain a richer understanding of what we observed, and made it possible for us to obtain data that would not have been possible to capture neither orally nor in written form. Moreover, visual data was essential to help us memorize as many details as possible at later stages of the data analysis. Photographs and other visuals provided useful insights into the different sites we visited, operations we oversaw and other relevant issues. The photographs we took throughout our field trip are used alongside other data sources, such as semi-structured interviews, informal conversations, observations and written secondary data sources as research material. In our thesis we use our photographs and other visual data, such as maps and tables, to illustrate points in our analysis and discussions. In some cases visual data can serve as data inputs in themselves (Bell et al., 2019).

3.3.2 Secondary data

In addition to primary data, we collected secondary data. This is data collected by someone else (Bell et al., 2019). Using secondary data is a great resource, as it is less time-consuming than collecting and analyzing primary data (Bell et al., 2019). We mostly gathered this type of information from literature and from our contacts gained through the SUSTAIN Project and from contacts at Yara International, and

used it together with self-collected primary data. By collecting data from different sources, it can be triangulated, leading to increased research quality (Bell et al., 2019). This will be further discussed in the 'Quality Assurance' section.

While analyzing secondary data, we performed so-called data-reduction, that is, we reduced the large amount of information collected to be able to interpret it (Bell et al., 2019). To get an insight into the topic dealt with in this research, we had to go through a significant number of secondary sources, which meant that we had to distinguish between the relevant and less relevant or irrelevant data. In other words, we performed data-reduction to obtain the most relevant data to answer our research questions and to use it together with our primary data.

Grey Literature

Grey literature was among our secondary data sources. This type of literature is typically not accessible through common bibliographic approaches, and has not been subject to the peer review processes that for example scientific journals publications undergo (Adams, Smart, & Huff, 2017; Enticott, Buck, & Shawyer, 2018; Gray, 2019). Therefore, the quality of grey literature may vary significantly (Enticott et al., 2018). The grey literature we obtained included websites, newspaper and magazine articles, academic theses and dissertations, working papers, as well as government and organizational reports, statistics and conference proceedings. According to Adams et al. (2017), many scholars state that grey literature can be particularly relevant when doing research. It can be used to gain a broader and more complete overview of available data (Enticott et al., 2018). And, thereby be used to "extend the scope of findings" and to expand the area of research (Adams et al., 2017, p. 433). We found this type of data particularly useful, and used it to support and add to our findings and analysis.

Other Secondary Data Sources

As part of our research, we also applied peer-reviewed journal articles as one of our secondary data sources. These articles are typically accessed through common bibliographic approaches (Gray, 2019). We accessed these articles by searching for keywords in our university's library services, as well as through Google Scholar. Some of our secondary literature was written by scientists, who provided both an overview of different topics, as well as in-depth information and discussions. In

addition, we applied different books and textbooks as secondary sources. We used books in several formats, for instance, in print and online versions. We found books and textbooks to be very useful as they provided a synthesization of information on different topics. A detailed overview of our search strategy is provided in appendix 3.

Primary data	Semi-structured interviews Informal conversations Observations Field notes Visual data
Secondary data	Grey literature (research reports, government reports, conference proceedings, theses, newspaper articles, websites etc.) Scientific literature Journal articles Books and textbooks

Table 2: Summary of primary and secondary data sources applied in the data collection.

3.4 Quality Assurance

In order for research to be of high quality, several measures must be taken. Throughout our research, we have focused on the quality measures we find most relevant namely trustworthiness, including credibility, transferability, dependability and confirmability. In addition, we have applied data triangulation as a technique to improve the overall quality of the research. We also discuss how we have ensured quality of our secondary data sources.

3.4.1 Trustworthiness

A central quality assurance criteria in qualitative research is trustworthiness (Bell et al., 2019). Trustworthiness consists of four different aspects, that is, credibility, transferability, dependability and confirmability (Bell et al., 2019). These criterias are connected, and the achievement of one can impact the others (Nowell, Norris, White, & Moules, 2017; Shenton, 2004).

Credibility

One of the main components of trustworthiness, is credibility (Shenton, 2004). Credibility is used in qualitative research, and can be described as the equivalent to

internal validity in quantitative research (Bell et al., 2019; Shenton, 2004). From Shenton (2004, p. 64), credibility seeks to answer the following question: "How congruent are the findings in reality?". In other words, credibility deals with whether or not the primary data collected by the researchers is portrayed truthfully and accurately (Nowell et al., 2017).

There are several things researchers can do to enhance the credibility of their work (Shenton, 2004). For instance, Shenton (2004) suggests that researchers apply research methods that have previously been used successfully in qualitative research. We used semi-structured interviews, informal conversations and observations. All these methods are commonly used in qualitative research, and have provided rewarding results to many researchers. Another way of enhancing credibility is by developing "an early familiarity with the culture of participating organizations before the first data collection dialogues take place" (Shenton, 2004, p. 65). To do this, we made an effort to familiarize ourselves with Ethiopia and the coffee industry by researching secondary data and talking with Ethiopians in Oslo before going on our data collection field trip. This ensured some trust with our subjects, as we were aware of certain cultural differences, and behaved accordingly.

To have credible data, it is important that the interview subjects respond as truthfully as possible. One way of ensuring this, is by clarifying that the study is voluntary, meaning that they can pull out from the study whenever they want or that they can refuse to participate in the study (Shenton, 2004). We did this by providing a contract (appendix 4) explaining all this to each interview subject before our semi-structured interviews.

Transferability

Transferability can be parallelled with external validity, which refers to how well the results of a study can be generalized to other settings than the specific research context (Bell et al., 2019; Nowell et al., 2017; Shenton, 2004). This can be a challenge for qualitative studies, as they often apply small sample sizes (Bell et al., 2019; Shenton, 2004). We have applied a small sample size to obtain an in depth understanding based on few individuals, so our research is highly context dependent. Therefore, we realize that transferability may be difficult to achieve. Another important aspect that should be considered in terms of transferability is the

geographical area in which the data collection took place (Shenton, 2004). Our primary data collection happened during our field trip to Ethiopia, which implies that our findings are affected by certain contextual characteristics. We realize that this may impact the transferability of our study, as the findings might not be equally relevant or applicable in other contexts or situations.

To overcome these challenges, it is beneficial to add a so-called thick description of the research (Bell et al., 2019; Shenton, 2004). This means that researchers include an extensive description of the context and culture of where the research is done, so that others can determine themselves whether the research can be transferable (Bell et al., 2019; Nowell et al., 2017; Shenton, 2004). To answer this, we have strived to make broad and detailed descriptions of our research. We have included information on sampling and subject selection criteria, on how many researchers were involved in the data collection process, data collection methods applied, and a description of the length of the data collection process, where the primary data collection took place over the course of our two week field trip to Ethiopia, and the secondary data collection is shown in the project plan in appendix 5.

Dependability

According to Bell et al. (2019), dependability can be parallelled with reliability, and refers to the degree of consistency and stability of the measures of the study (Bell et al., 2019; Shenton, 2004). This can pose a challenge in qualitative research, due to its evolving nature (Shenton, 2004). To approach this issue, researchers are advised to give a detailed description of the entire process of their work, so future researchers who wish to replicate the researcher, can do so (Bell et al., 2019; Nowell et al., 2017; Shenton, 2004). From this follows that to address dependability, a so-called auditing approach can be applied, where other researchers check the work, and can determine the quality and dependability of the research practices (Bell et al., 2019; Nowell et al., 2017; Shenton, 2004). To do this, we included a description of our research methodology, including our strategy, design, as well as primary and secondary data collection, and quality assurance approaches.

Confirmability

Confirmability can be parallelled with objectivity, and is concerned with whether the researchers have let their own personal beliefs and values distort their research process and findings (Bell et al., 2019; Nowell et al., 2017). According to Bell et al. (2019, p. 365) "complete objectivity is impossible in business research". We recognize this challenge, as it is natural to make judgements based on prior knowledge and experiences. To be objective, we tried to limit the researcher bias and subjectivity of our work. We did so by both being present and taking notes during most interviews and conversations. Thereby, we could increase the objectivity of our research by limiting the chances of findings and conclusions being influenced by the understanding of only one researcher. Some researchers advise that reasonings behind decisions during the study should be included to address confirmability issues (Nowell et al., 2017). We have aimed to do this by explaining our choices of our research methodology throughout this chapter.

3.4.2 Data Triangulation

Data triangulation is a technique that can enhance the overall quality of the research, by improving credibility and confirmability criterions (Nowell et al., 2017; Shenton, 2004). Triangulation is a quality assurance method that is appropriate to use in qualitative studies, as it can enhance understanding of phenomena (Bell et al., 2019; Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Literature identifies four different types of triangulation, namely method, investigator, theory and data source triangulation (Bell et al., 2019; Carter et al., 2014). We have focused on three of them in our research, that is, triangulation of methods, investigators, and data sources.

First, method triangulation consists of using different qualitative methods to collect data (Bell et al., 2019; Carter et al., 2014). We applied semi-structured interviews, informal conversations and observations to collect data. The chosen method was dependent on different contextual factors, such as the setting, the interview subject and time constraints, but was always driven by our research aim. Second, investigator triangulation involves two or more researchers in the data collection process to ensure that several perspectives and understandings are included and considered (Carter et al., 2014). During our data collection field trip, both

researchers were present during all interviews and conversations. This enabled us to discuss our experiences and findings, and use our combined knowledge for the analysis of our findings. It also allowed us to interpret the same data and see if we came to the same conclusions.

Lastly, source triangulation considers data collection from a diverse sample of people to obtain diverse opinions and views (Bell et al., 2019; Carter et al., 2014). We included different people in our research, in terms of, for instance, education, occupation, gender and age. By using multiple data sources, we were able to obtain rich data and gain insight that otherwise would have been excluded, and get as much of a neutral insight as possible.

3.4.3 Quality of Secondary Data Sources

We attempted to have secondary data sources of high quality. By including secondary sources written by professionals, professors, doctors, governments or highly acknowledged companies and organizations, researchers can provide "a richer and more comprehensive evidence base to inform our findings" (Enticott et al., 2018, p. 4). We did this to increase the quality of our research, particularly in terms of our credibility.

To ensure the quality of grey literature, we evaluated it based on several criteria. First, we considered the source of such data, and tried to limit it to established and well-known companies and organizations, as well as to professors, doctors and other experts. Some of the grey literature we obtained, for instance working papers and theses and dissertations, were provided by some of the professors and doctors we interviewed during our primary data collection field trip. Based on their expertise and background, we considered their work, and therefore also their grey literature, to be of high quality. Second, we looked at the structure, language, content and overall form of the data source. Third, we examined, if possible, the number of times the source had been cited by other people. If this number was high, we assumed that so was its quality. Among the advantages of using grey literature, is that it is usually more recent and more often updated that academic literature, books, textbooks and several other secondary data sources (Enticott et al., 2018).

This in turn, can affect its quality, as the likelihood of these sources being outdated is lower.

When using books and textbooks as secondary data sources, we tried to find their latest edition in order to ensure their relevance in terms of them containing updated information (CQ University, 2019). This is one way of ensuring quality in the usage of such secondary data sources, as books go through revisions and are thereon updated as a new edition. We also evaluated the relevance and quality of the books and textbooks by looking into the authors' backgrounds and the level of prestige of the publisher. In addition to considering the number of times grey literature had been cited by people, we did this for all our secondary sources, when and if possible. As Gray (2019, p. 51) explained, "by examining the scale to which an author has been cited, you can quickly see who the acknowledged authorities are in a particular field".

3.4.4 Ethical and Societal Considerations

A fundamental aspect of any research project is to have in mind ethical and societal considerations throughout the research process. According to Bell et al. (2019), there are four main ethical principles to consider in business research, namely avoidance of harm, informed consent, privacy and preventing deception. First, in relation to avoidance of harm, research that can be harmful to the participant is regarded as unacceptable (Bell et al., 2019). Thus, it is vital to impose no harm or minimize possibility of it when conducting research, so security must be valued and maintained through ethical guidelines (Qu & Dumay, 2011). Moreover, the no harm principle also relates to the safety of the researchers themselves (Bell et al., 2019). To ensure security throughout our data collection, we conducted interviews and conversations in safe environments, for example at Jimma University. In addition, we rescheduled our field trip to an earlier time due to safety concerns.

Second, in terms of informed consent, it is important to inform potential research participants of all relevant aspects of the study so they can make an informed decision about whether or not they want to partake in it (Bell et al., 2019). To do so, the researchers are required to disclose the research intent to all interviewees and get a written approval of participation (Qu & Dumay, 2011). We wrote an

information letter explaining our interviewees the purpose of the data collection and how we would use the data. Additionally, we provided a contract that they could sign if they agreed on participating in our research. In some settings it might be difficult to obtain this type of consent, as some data might be collected on-the-go. In such cases, it might not be practical to get informed consent if it is very likely that the collected data will have no impact on the participant. Much of our primary data collection happened on-the-go, therefore, we were not always able to get informed consent.

Third, it is vital that the privacy of the research participants is protected (Bell et al., 2019; Qu & Dumay, 2011). This point is highly linked to the principle of informed consent. If informed consent is secured, the researcher can use the information that the participant is willing and has agreed upon sharing (Bell et al., 2019). As privacy is highly valued and critical to protect, researchers should develop guidelines that can assure that personal information is protected and kept confidential (Qu & Dumay, 2011). To ensure the privacy of our interviewees, we refrained from collecting private data that was unnecessary for our research, and anonymized our primary data sources. To ensure the privacy of our subjects, we have applied their title or name of their workplace. This can be seen in table 2. All participants can inform us that they wish to delete the data collected from them at any time.

Fourth, the ethical principle of deception is important to consider throughout the research process (Bell et al., 2019). The researchers should not represent the nature of the research and the research intent as something other than it in reality is (Bell et al., 2019). In some cases, the research participants might be deceived undeliberately if the researchers fail disclose all relevant aspects. To handle this issue, we wrote an information letter to our interview participants explaining the nature and intent of our research.

GDPR

If laws and regulations are not withheld, the research will be of low quality (Bell et al., 2019). Therefore, we had to consider regulations such as the General Data Protection Regulation (GDPR). This regulation ensures that individuals' rights and privacy are considered when collecting data from them (European Commission, 2018). Based on this, we aimed to handle personal information in a lawful and

ethical manner and get consent from our respondents to use it in our research. We applied for conducting interviews at the data protection authority, Norsk Senter for Forskningsdata (NSD), to be able to include our interviewees and experts, as well as the information and data they provided, in our thesis.

The application to the NSD included a clear and extensive description of all personal information that we would collect throughout our data collection process. To get an approval, we also had to elaborate on why we wanted to obtain the data. We wanted to collect data regarding our interview subjects' education, occupation and gender. The reasoning for this, is that we want to ensure the credibility of our analysis, as the education and occupation of our participants can substantiate why they are trustworthy sources.

The application to the NSD was accompanied by an information letter that we handed out to all participants in our study (appendix 4). The information letter included a broad description of the purpose of the project and what a participation in the study would entail. Further, the letter informed the participant on how the data collected from their participation would be handled, both during the research and after the project's end. It also stated that participation is voluntary, and it is possible to withdraw consent at any time without providing a reason. The information letter was accompanied by a consent form, that had to be signed for us to proceed with interviews that included personal information. This ensured that we had informed consent without deception, and that the participant knew how we would secure their privacy.

The application to the NSD also included our interview guide (appendix 2). This was important to add to our application, as our questions had to be approved by the data protection authority. The NSD would only approve our project if it was clear that we would not collect any personal data that could be harmful to our participants. In other words, the principle of no harm can be strengthened by having our questions approved by high authorities. It is important to note that the NSD was informed that we would conduct semi-structured interviews, so follow-up questions that were not included in the interview guide would be asked. The NSD informed us that follow-up questions related to our master thesis topic were permitted.

Since July 2018, researchers in Norway are required to apply to the NSD regarding the collection of personal data throughout research projects (NSD, 2019). Due to the recency of this legislation, there are few students that have been through this application process, and we struggled to get guidance. We were informed that it would be time-consuming to prepare all forms and information that had to be included in the application. Therefore, we decided to start our application at the start of January 2020. In the beginning of February 2020, our application was granted and we could start to collect our data. This was just in time for our field trip to Ethiopia.

3.4.5 Challenges and Limitations

Primary Data Collection

Timing of Data Collection Field Trip

A significant limitation is the change of timing for the data collection field trip, which was first scheduled for mid-April and was changed to early-February. We changed the timing of the trip as a safety precaution considering the upcoming elections in Ethiopia, and the potential turmoil that could blossom as a consequence. The timing-change happened after talks with local contacts and with our thesis supervisor. It was the right decision to change the timing of the trip due to safety and security precautions, and seen in retrospective, due to the coronavirus pandemic that is currently ongoing, the trip would not have been possible at all in April.

Before the trip, the main challenges were planning and getting hold of contacts in Ethiopia. This challenge was emphasised by the change of timing of our trip leading to a considerable reduction in preparation time. Due to the short length of our trip, only two weeks, it was important for us to schedule as many meetings as possible ahead of time. There are many reasons why planning and getting hold of interview subjects was particularly challenging, for instance due to cultural differences, planning-preferences, misunderstandings, internet access/connection and so on. While some of the people we contacted were very positive, others were not interested in participating, or did not answer. During our time in Ethiopia, we learnt that people there are more comfortable with ad-hoc planning, and had to adapt and

adhere to this. We found that the snowballing technique to obtain a larger sample size was very valuable and convenient to overcome this limitation during our stay.

Recordings and Photographs

Qualitative interviews are often recommended to be recorded and later transcribed to ensure a detailed analysis of the discussion (Bell et al., 2019; King et al., 2018). Even though we had planned for the possibility of recording and transcribing our interviews in Ethiopia, and applied to do so at the NSD, we quickly found that this was not suitable in our contextual setting for a variety of reasons. Some of the reasons for this include that it was not always easy to record while interviewing. This was the case during on-the-go interviews, where we were walking around talking with different people simultaneously. Also, confidentiality constraints played an important role. During our visit to the ECX in Jimma, Ethiopia, we were told about the strict no-recording and no-photography policy we had to abide by due to the amount of confidential activities at the site. We felt that performing the interviews without recordings made the interviewees feel more comfortable and less nervous to talk and share information. We experienced that simply listening and taking notes was a way for us to build trust with our interview subjects.

Additionally, audio recording and transcribing is a difficult and time-consuming process (Bell et al., 2019). We believe it would have been especially challenging in our situation, as most of the interviews included the same questions and answers phrased in different ways to overcome language barriers. Further, many interview subjects used non-verbal communication, such as body language and gesticulation, to get across their point of view.

Cultural Differences and Language Barriers

As all of our interviews and conversations took place in Ethiopia, we had to keep in mind the cultural differences and language barriers that might occur. We had to plan and prepare for this when designing our case study. When doing research in an environment different from your own, it is essential to learn as much as possible about the customs and expectations in order to avoid misunderstandings, offending people and missing out on contextual nuances that could be vital for the research (King et al., 2018). We experienced misunderstandings and limitations due to language barriers and cultural differences.

To overcome language barriers, it was useful to conduct semi-structured interviews in person. The interviews took place in a setting where we felt that we could ask as many clarifying questions as we needed to overcome our barriers. To limit misunderstandings, we made sure to ask the same question with different formulations and phrasing when we believed it to be necessary. This ensured that the interview subject understood us, and thereby could provide us with the information we needed for our research. We realize that this could cause some variations in the responses we obtained, and therefore considered the data collected very carefully.

Sometimes we experienced that our interview subjects did not respond to our questions, and they rather started talking about other topics. Even though this made the interview process more challenging, it could also be seen as a benefit. Bell et al. (2019, p. 435) emphasize the importance of encouraging interviewees to deviate or drift away from the original question, as "it gives insight into what the interviewee sees as relevant and important".

Other language challenges are related to timing and place of meetings. In some cases we experienced that our interview subjects were not aware of when and where to meet us due to language barriers and cultural differences, which made the interview process somewhat more stressful and time-consuming. Since not all areas of Ethiopia have internet access, it was difficult to get in touch with our contacts. Despite the challenges, all parties were flexible and willing to adapt to one another, and we managed to solve the misunderstandings in a good manner.

We also experienced some challenges because we are students and not professional researchers. Some of our interview participants were considered to be of high-status, and therefore normally used to being the ones in control of the situation and interaction (King et al., 2018). As Bell et al. (2019, p. 438) express, in some cases issues such as "status and power held, particularly at senior level" can be a challenge when doing research and making interview appointments. We felt somewhat inferior to some of the experts we interviewed, which made the interview process more challenging. We attempted to handle this in the best way possible by being polite and persistent in our correspondence. To give credibility and endorse

the aim of our interviews and data collection trip, we used our home university as a so-called high profile sponsor, as recommended by Bell et al. (2019).

We experienced some challenges when visiting the ECX facilities in Jimma. This was both due to strict access restrictions and privacy concerns. We also struggled to find out who could provide approval for us entering the facilities. To overcome this challenge, we used our contacts at Jimma University as high profile sponsors in order to gain access to the facilities. They facilitated the process, by signing a letter confirming that we were working with the university, calling several people in the system, and providing us with one of the university's staff who could translate for us. This was a time-consuming process, which would not have been possible without our contacts at the university.

Secondary Data Collection

We struggled to some extent get a hold of relevant secondary data for our thesis. This was especially related to the secondary data that we wanted to obtain from companies and other professionals. Most of our correspondence with these parties happened via email, and we had to send many follow-up emails to get the information we needed. This challenge was influenced by the same factors as the challenges related to our primary data, such as the cultural barriers, misunderstandings, and lack of internet connection.

In terms of articles and supporting literature, we found it sometimes challenging to access relevant sources. Some of the sources were challenging to understand, mainly due to unclear language and formulations. Certain information was written in foreign languages that we could not understand. Fortunately, we had some contacts that were willing to translate for us so we could use it in our research. Another limitation related to our secondary data, was that many sources were not updated according to new information. This was even the case with newer sources, as they had applied outdated literature in their work. Additionally, we considered some of the data that we received from our contacts to have low quality, and therefore decided not to include it in our research. For example, we obtained a dataset which had no clear source, and lacked information, so we could not determine its quality.

As one of our aims is to map the coffee supply chain originating in Ethiopia, we needed to research literature on supply chain mapping techniques. We found that there is a lack of literature on the topic, and thereby also a limited amount of information relating to standardized mapping methods, leading to varying map appearances. This lack of standardization is confirmed in literature (Barroso et al., 2011; Gardner & Cooper, 2003; Hofstetter & Grimm, 2019; Lambert, 2008). This may be the reason why we found many different mapping approaches in terms of coffee supply chain mapping in our reviewed secondary data. The maps had nodes that represented both actors, activities and other aspects of the chain and of coffee itself, with no clear reasoning behind the mapping approach. Also, some maps included both legal and illegal market channels, which further enhanced our difficulties in identifying which supply chain aspects to include in our map. This made our mapping process challenging, as we had few guidelines, and resulted in us making our own decisions on how to approach and visualize our map.

The Coronavirus Pandemic

The Coronavirus pandemic has also represented some challenges during the data collection process at later stages of the master thesis, as it was more difficult to get in touch with companies to gain more data. Prior to the pandemic, we had plans of contacting companies to collect data, but this was difficult to achieve due to the circumstances. We were limited to information available online, and we were restricted to solely online communication, with each other and with our supervisor. Throughout this time, we found some interesting books that were available in libraries, but not accessible online, which was a limitation. We were not able to meet each other in person for a significant period of time, to discuss and work together in the ways we are used to. This made it more difficult to consolidate, analyze and work on the data collected. The pandemic has altered our, and everyone else's, way of working, and we have adapted to it as best we could.

3.5 Our Research Approach

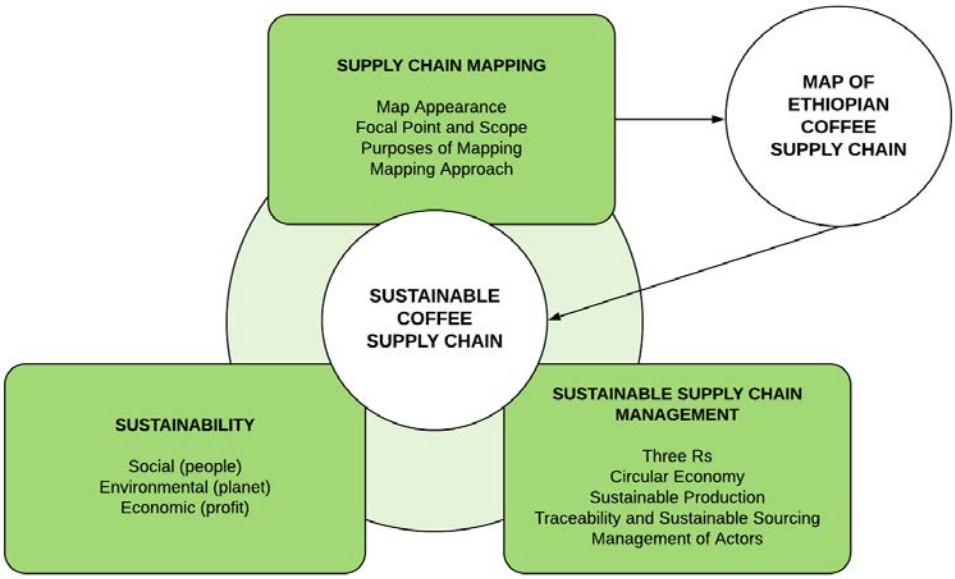


Figure 10: This figure illustrates the process we applied in our 'Findings and Discussion' to answer our research question and sub-questions.

Figure 10 shows how we have proceeded in our 'Findings and Discussion' chapter, by applying our conceptual framework. In order to answer our research question on how the Ethiopian coffee supply chain can become more sustainable, it was imperative to consider several aspects discussed in the literature review. Only by using the three main concepts – supply chain mapping, sustainability and sustainable supply chain management, were we able to answer our research question and sub-questions. First, we applied supply chain mapping theory, and our approach is explained in detail in the following section. After mapping the coffee supply chain, we could apply the remaining part of our conceptual framework. We applied sustainability and sustainable supply chain management theories throughout our 'Findings and Discussion' chapter.

3.5.1 Supply Chain Mapping Approach

To map the coffee supply chain, we applied some of the supply chain mapping theories from our literature review, and excluded certain aspects. The purposes of mapping mentioned in the literature review apply in our mapping as well, including to provide visibility and simplify communication among the actors involved, and manage sustainability. The main purpose in our case, is to use the map to identify

opportunities and challenges within the supply chain, in terms of sustainability, and explore potential solutions to them.

Based on the mapping approaches presented in our literature review, we found that one of them was fitting to our purpose. Our chosen approach includes the identification of activities and actors to map, primary and secondary data collection, discussion on the gathered data, and finally a visual representation in the form of a supply chain map. This type of approach is recommended by Andriani et al. (2019) and Lambert (2008).

Our main objective was to provide a simplified visual representation of the supply chain's structural elements, including the flow of coffee from production to end-consumer. This is in line with literature (Barroso et al., 2011; Craighead et al., 2007; Gardner & Cooper, 2003; Wichmann et al., 2018). We have chosen to depict our map as a representation of the current state of the coffee supply chain, as this enables us to present a deeper and common understanding of the chain's current activities, actors and structure. This is supported by literature (Barroso et al., 2011; Gardner & Cooper, 2003; Lambert, 2008). We have chosen not to include other time-related visual aspects, such as horizontal and vertical time, as this would overcomplicate our mapping, and also because we had limited access to primary and secondary data on time-related issues.

Busse et al. (2017) show that a generic approach is viable for detecting sustainability issues within a supply chain. Further, a generic map can provide an overview of the structure of the supply chain, and be a foundation for future research (Wichmann et al., 2018). Therefore, we consider a general and industry-centric perspective, as presented by Gardner and Cooper (2003), to fit with our overall objective of the mapping. We have focused on a specific section of the supply chain, on the stages that occur within Ethiopia. To narrow the scope, we have excluded remaining parts of the chain leading to the international end-consumer. The reasoning behind this is that a larger scope will imply a more complex representation and result in disadvantages (Barroso et al., 2011; Craighead et al., 2007; Falasca et al., 2008; Lambert, 2008; Mandal, 2014). In terms of the tiers included in the map, we have included the most central stages of the supply chain considering our case boundaries, as shown by Gardner & Cooper (2003).

Since we have no focal company, we have included both the upstream and downstream directions in our diagram, as presented by Gardner and Cooper (2003).

There are a number of simplification methods that can be applied in the mapping process (Barroso et al., 2011; Lambert, 2008). We have decided to exclude actors and activities that we consider non-critical in the coffee supply chain. This simplification method is in line with Barroso et al. (2011). We excluded supporting actors such as the Ethiopian government, and supporting activities such as marketing. We also decided to exclude activities such as transport, storage and other handling activities from our visual representation. However, we chose to discuss them in our 'Findings and Discussion' chapter, as these activities apply within most stages of the supply chain, and in between our discussed stages, thereby having an impact on the sustainability of the supply chain.

We chose to illustrate the supply chain in the form of a diagram, as recommended by Barroso et al. (2011). Our map uses standardized icons to enhance the understanding of the chain. This is in line with literature (Barroso et al., 2011; Basole et al., 2017; Farris, 2010; Gardner & Cooper, 2003; Park et al., 2016). We have applied nodes and links, where nodes represent stages of the supply chain, while the links represent the flow of coffee. This is in accordance with literature (Basole & Bellamy, 2014; Craighead et al., 2007; Gardner & Cooper, 2003). In our case, we found it most fitting to use unidirectional, solid and dashed arrows as links, and in terms of the nodes' shapes, we have chosen rectangles. These characteristics are suggested by several sources (Basole et al., 2017; Craighead et al., 2007; Farris, 2010; Gardner & Cooper, 2003). As presented in our literature review, maps can be geographically representative, yet, we have chosen to not apply this theory in our map, as it shows a general coffee supply chain originating in Ethiopia with no specific locations within the country.

4 Findings and Discussion

In this chapter, we look into the different stages of a general Ethiopian coffee supply chain, and discuss current practices, challenges and opportunities at each stage. It should be noted that throughout our 'Findings and Discussion' chapter, we apply both primary and secondary data to present our research.

4.1 The Ethiopian Coffee Supply Chain

Coffee is one of the most important commodities in Ethiopia (Beshah et al., 2013; Hirons et al., 2018; Minten et al., 2019). It has social, environmental and economic significance to the country (Interview 1, 2, 3, 4; Site Visit 1, 2, 3; Tefera & Tefera, 2014). In fact, "the standard of living depends on what the country produces, so it is important to produce commodities of high quality" (Interview 1). Since the coffee's quality is impacted by how it is handled along all the stages of the supply chain, it must be handled with care (Beshah et al., 2013; Garo et al., 2016; Wiersum et al., 2008).

According to Garo et al. (2016, p. 2158), the stages of the Ethiopian coffee supply chain include "growing, harvesting, processing, storage, export preparation and transport". The typical stages of the supply chain in Ethiopia can also be "input supply, production, primary marketing, primary processing, trading, green coffee exporting and secondary processing" (Beshah et al., 2013, p. 38). There are numerous players involved in the coffee supply chain, including "smallholder coffee farmers or state farms, primary collectors, suppliers, processors, service cooperatives, unions, exporters and various governmental institutions" (Beshah et al., 2013, p. 38). The actors involved can be direct or supporting actors (Gashaw et al., 2018; UNIDO, 2014). First, direct actors directly add value to the coffee product, and include farmers, processors, cooperatives, the Ethiopian Commodity Exchange, exporters, wholesalers, retailers and consumers (Gashaw et al., 2018; UNIDO, 2014). Second, supporting actors support in the value creation of the product, and can be governmental institutions, associations, research institutions, donors and NGOs (Gashaw et al., 2018; UNIDO, 2014).

Due to the high number of actors involved, the supply chain of coffee is long and complex, and therefore challenging to map (Interview 1, 2, 3, 4). The complexity is enhanced since farmers often play a role in several different supply chains (Interview 1). As a result, problems might arise along the chain (Candelo, Casalegno, Civera , & Mosca, 2018; Laderach et al., 2011; UNIDO, 2014). Further, companies are competing as supply chains rather than as single entities, which implies that a company's results and performance depends on the supply chain as a

whole (Basole & Bellamy, 2014; Chopra & Meindl, 2016; Christopher, 2016; Wichmann et al., 2018).

Because of this, we consider it relevant to have a holistic approach to the topic of sustainability within the coffee supply chain. The coffee supply chain is facing several sustainability challenges and opportunities, which we discuss in relation to our literature review throughout this chapter of the thesis.

Based on literature and our findings, we will discuss the following supply chain stages: production, harvesting, primary processing, storage, handling and transport, the Ethiopian Commodity Exchange, secondary processing, export, domestic consumption. We have also explored cooperatives and unions, as well as coffee certifications, as they have a significant impact on the coffee supply chain and its sustainability.

4.2 Production

According to Minten et al. (2019), it can be estimated that around 4 million people in Ethiopia cultivate coffee. The majority of it is produced by smallholder farmers with a stake of about 95% of total production, whereas 5% of production is done by commercial farms (Chauhan et al., 2015; Interview 1, 2, 3, 4; Minten et al., 2019; Mitiku, De Mey, Nyssen, & Maertens, 2017a; Tefera & Tefera, 2014; UNIDO, 2014). In the coffee supply chain, farmers are typically involved in the production stage, as well as harvesting and primary processing (Gashaw et al., 2018; Site Visit 2, 4).

4.2.1 Production systems

There are four main production systems of coffee in Ethiopia, namely forest, semi-forest, garden and plantation coffee (Chauhan et al., 2015; Garo et al., 2016; Interview 1, 2, 3, 4; Minten et al., 2019; Minten et al., 2014; Site Visit 2, 3; Tefera & Tefera, 2014; UNIDO, 2014; Woldesenbet et al., 2015). Shade is important for quality of the final product when growing coffee, as the plants are low-light sensitive (Interview 1, 3).

First, forest coffee constitutes about 10% of the total production (Minten et al., 2019; Minten et al., 2014; Woldesenbet et al., 2015). Forest coffee production means that the coffee grows in the natural shade of trees in the forest (Tefera & Tefera, 2014; UNIDO, 2014). This is normally in the wild, and there is no clear ownership of the coffee cherries (Tefera & Tefera, 2014; UNIDO, 2014). The cherries are gathered by farmers without much maintenance of the coffee trees, and without the use of agrochemicals (Hundera et al., 2013; Minten et al., 2014; Tefera & Tefera, 2014; UNIDO, 2014).

Second, semi-forest coffee constitutes about 30-35% of the total coffee production, and is similar to the forest coffee system (Minten et al., 2019; Minten et al., 2014; UNIDO, 2014; Woldesenbet et al., 2015). Farmers commonly thin forest areas for the coffee to grow in appropriate sunlight and shade, or choose to plant coffee trees in already adequate forests (Tefera & Tefera, 2014; UNIDO, 2014). Farmers who do this are considered the owners of the coffee cherries even though the coffee trees are usually not on their agricultural land areas (Minten et al., 2014; UNIDO, 2014). Semi-forest coffee is grown without agrochemicals (Tefera & Tefera, 2014; UNIDO, 2014). Picture 1, shows a picture from our visit to a coffee farm in the outskirts of Jimma, where we saw coffee plants growing in the shade of trees.

Picture 1: This is a picture of semi-forest coffee grown in the outskirts of Jimma, Ethiopia.

Third, garden coffee constitutes more than 50% of the total coffee production (Minten et al., 2019; Minten et al., 2014; UNIDO, 2014). Garden coffee is grown on trees planted by smallholder farmers on their land with more intensive management, mostly in small areas with an average between 0.5 and 2 hectares, and farmers typically produce other agricultural products as well (Minten et al.,

2014; Tefera, 2016; Tefera & Tefera, 2014; UNIDO, 2014; Wiersum et al., 2008). This type of production system is grown without agrochemicals (Tefera & Tefera, 2014; UNIDO, 2014).

Fourth, around 5% of coffee is produced as plantation coffee, also referred to as commercialized coffee production, and is grown by commercial farms or state-owned farms that commonly make use of agrochemicals (Minten et al., 2019; Minten et al., 2014; Tefera & Tefera, 2014; UNIDO, 2014). These facilities and production practices are commonly more modern than smallholder farmers' production systems and practices (Minten et al., 2014; Tefera & Tefera, 2014). The coffee is primarily grown for export (Tefera & Tefera, 2014; UNIDO, 2014).

4.2.2 Coffee Yields

The coffee yields increase from the first to the last mentioned production system, as forest cover is reduced, and the intensification of coffee trees increases (Hundera et al., 2013; Interview 1; Takahashi & Todo, 2017). This is mainly due to the management and interference of the coffee production system, as it can increase the productivity of coffee production (Wiersum et al., 2008). The productivity in the country has increased the last two decades, with an improvement of 20 kilos of coffee per hectare (Interview 1).

A key characteristic of Ethiopian coffee production systems is the traditional usage of organic fertilizers such as feces from cattle, leaves and fallen trees (Interview 3). Smallholder farmers do not achieve the same high yield as commercialized plantations, as they commonly use traditional farming methods rather than learn new ways of growing coffee plants (Interview 1, 3, 4). Producers prefer not to use chemicals, pesticides or other non-natural fertilizers, with only around 6% of coffee being grown with the help of agrochemicals (Interview 1).

4.2.3 Deforestation

To achieve intensification of production and higher yields by adopting production systems that include more interfering practices, deforestation and biodiversity loss can occur (Hundera et al., 2013; Interview 1; Mitiku et al. 2017b; Takahashi & Todo, 2017; Wiersum et al., 2008). Deforestation "is an easier mechanism to

enhance productivity" (Interview 1). This entails a loss of plants and wildlife, including loss of coffee plants and coffee quality, as they are dependent on shade from trees and a particular ecosystem (Interview 1, 2, 3, 4; Site Visit 3). Coffee production is one of the reasons why Ethiopia's forests are reduced (Interview 1; Takahashi & Todo, 2017). For instance, in Southwestern Ethiopia, it is estimated that the change from forest coffee to semi-forest coffee practices in the last four decades has decreased the forest woody biodiversity by 34% (Abdissa, 2017; Tadesse, Zavaleta, & Shennan, 2014). The change from semi-forest coffee to garden coffee practices has decreased the diversity by 37% (Abdissa, 2017; Tadesse et al., 2014).

Some believe that "the forest is there because of the coffee farm, so deforestation is not the issue" (Interview 4). Others agree with this, yet acknowledge that deforestation can be an issue, stating that "agriculture has expanded by removing forests, but also creating coffee forest" (Interview 1). As coffee is dependent on shade cover, trees can be planted, thereby creating additional forests for the growth of more coffee plants (Interview 1, 4). This will ensure that biodiversity is kept, and contributes to environmental sustainability (Interview 1, 4).

Some actors – such as private companies, non-profit and non-governmental organizations – are trying to reduce the impact of climate change and other socio-economic and environmental challenges that follow from it. They are doing so by planting more trees in coffee producing countries, helping and supporting farmers by building direct, long-term relationships with them, and increasing their resilience to the consequences of climate change (Duckett, 2019; Interview 3). For example, the Ethiopian Prime Minister, Abiy Ahmed, put in place an initiative with the aim of planting more than 350 million trees in 12 hours around the country, which was fulfilled in July 2019 (Interview 3; Paget & Regan, 2019; UN Environment Programme, 2019).

4.2.4 Coffee Price and its Impact on Production

Farmers do not determine the coffee price (Interview 1). The coffee price set in New York has a significant impact on the price obtained at the producer level in Ethiopia (Interview 1, 2, 3, 4). Coffee has been subject to high price volatility as a

result of variations in the coffee price (Interview 1). The global coffee price in 2019 was the lowest it has been in the last 15 years, as shown in figure 11 (ICO, 2019). In April 2020, the New York coffee price was estimated to be around 1.6 USD per pound (YCharts, 2020).

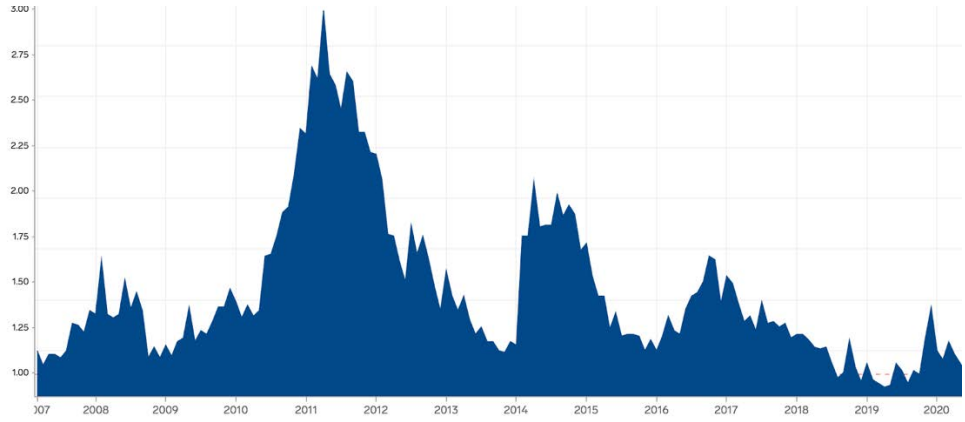


Figure 11: The x-axis represents the year, and the y-axis illustrates the price per pound in USD (Markets Insider, 2020).

The New York coffee price can "influence the production status and sustainability in Ethiopia" (Interview 1). A low coffee price in New York can lead to a low price obtained by Ethiopian coffee farmers (Interview 4). ICO (2019, p. 1) estimates that the "amount that farmers are paid for their crop yields is only around 1 cent (USD) per cup". For instance, in 2018, was is estimated that Ethiopian farmers received USD 70.68 cents per pound of coffee sold, while farmers got USD 145.46 cents in 2011 (ICO, 2020a). As a consequence of the low prices farmers obtain for their beans, smallholder farmers often lack incentives to focus on the production of their product (Interview 2, 3; Minten, Dereje, Engeda, & Tamru, 2015; Minten et al., 2019; UNIDO, 2014).

It is important to obtain a better price for farmers due to social and economic sustainability implications (Interview 1, 4). Some argue that a price of 2.2 USD per pound of coffee would be a more suitable price as it would allow for sustainable production (Interview 4). In addition to low prices, farmers have been struggling to meet the margins for profit as production costs have increased in the last years (ICO, 2019, 2020b; Interview 3).

The low price of coffee and high cost of living is forcing farmers to seek better and more profitable options (Interview 1). Coffee is competing with more profitable agricultural products for farming land (Interview 1, 4; Krishnan, 2017; UNIDO, 2014). The switch to other crops will impact the amount of coffee produced (Interview 1). For example, in the Jimma area, many farmers are switching to alternative crops (Interview 1). Among the alternative products farmers have turned to in order to diversify their portfolio are honey, different fruits and khat (Interview 4; Field Trip).

4.2.5 Smallholder Farmer Restrictions

UNIDO (2014) state that the high number of smallholder farmers involved in the production process can be a challenge, as they often lack competence, technical skills, and tools that are required to efficiently and effectively produce coffee. One of the factors that has an impact on understanding, knowledge-sharing, and on the level of awareness on sustainability issues is that the country has several languages (Field Trip; Interview 3; Site Visit 4). Additionally, illiteracy among workers is a significant issue which has an influence on access to information and new technologies (Interview 1; Site Visit 4). Many farmers are hesitant to adopt more modern methods that could potentially be more sustainable or productive, due to traditions or financial restrictions (Field Trip; Interview 1; Site Visit 3). Due to poverty, which is often a problem among smallholder farmers, some children are forced to work from young ages in order to support their families (Galdo, Dammert, & Abebaw, 2019; Interview 1).

4.2.6 Discussion

We have identified the following main challenges and potential opportunities: deforestation, coffee price and its impact on production, and smallholder farmer restrictions. We discuss these in terms of sustainability and the triple bottom line.

Deforestation

Our findings show that interfering production systems can result in deforestation and biodiversity loss. Environmental sustainability concerns the preservation of biodiversity in the ecosystem (Chopra & Meindl, 2016; Christopher, 2016; Junior

et al., 2018; Longoni & Cagliano, 2018). Thus, we see that the chosen production system will have a significant impact on the environmental dimension of the TBL.

We found that farmers thin forests to ensure higher yields. We assume that higher yields can result in higher sales revenue, as farmers have more coffee to sell. This can be directly linked to the economic dimension of sustainability, as it is concerned with financial performance and sales earnings (Braccini & Margherita, 2019; Shou et al., 2019). Therefore, we see that deforestation can impact the economic dimension positively if it results in higher revenues for farmers. In terms of the social aspects, higher yields can contribute to improving people's livelihoods and welfare, and reduce poverty. This is in accordance with Longoni and Cagliano (2018) who highlight welfare as a key aspect of social sustainability. It is also supported by Christopher's (2016) linkage between economic sustainability and poverty reduction.

Hence, there are both sustainability advantages and disadvantages in terms of deforestation and the three dimensions of the TBL. To overcome some of the negative impacts on the environmental dimension, efforts should be in place to improve this issue (Longoni & Cagliano, 2018). Our findings show that there are currently measures and initiatives aiming to reduce the negative impact of deforestation, such as the tree planting initiative.

Coffee Price and its Impact on Production

Our findings show that there is a high volatility in coffee prices, leading to varied income for farmers, overall having a negative impact on economic sustainability. This is supported in literature, as an important factor of economic sustainability is steady income (Longoni & Cagliano, 2018). In times of low coffee prices, farmers' wages will be reduced, and in some cases, their livelihood might be threatened, thus having an impact on poverty levels. The economic dimension draws the linkage between people's livelihood and poverty (Arowoshegbe & Emmanuel, 2016; Slaper & Hall, 2011). Thus, we find that reduced prices will have a negative impact on the economic sustainability of farmers. Since prices also have an effect on social aspects such as welfare and well-being, farmers' social sustainability will also be impacted. This is confirmed by literature (Braccini & Margherita, 2019; Kumar & Goswami, 2019; Laurell et al., 2019).

We found that low wages obtained by coffee farmers encourage them to switch to other crops that are potentially more profitable. While this change could improve the profitability of coffee farmers, making them more socially and economically sustainable, it would also imply a switch to another industry, and thus, it would not handle sustainability within the coffee industry.

Smallholder Farmer Restrictions

Another key point are challenges related to the large number of smallholder farmers in the country. This challenge is mainly related to the competence and skills level of farmers. These aspects are related to the social dimension of sustainability (Formentini & Taticchi, 2016; Henriques & Richardson, 2004). Additionally, we found that child labor is an issue especially among smallholder farmers, which violates human rights. This goes against the social dimension of sustainability, which promotes human rights and labor standards (Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Mani et al., 2016; Shou et al., 2019). Thus, we see that smallholder farmer restrictions have a negative effect on the social sustainability of the coffee supply chain.

To stimulate community development and innovation, social sustainability issues should be tackled (Henriques & Richardson, 2004; Junior et al., 2018). We discuss what is currently being done in the coffee supply chain in terms of farmers' competence and skills development in the 'Cooperatives and Unions' section.

4.3 Harvesting

In the harvesting stage of the supply chain, the main actors are smallholder farmers and commercial farms (Gashaw et al., 2018; Interview 4; Site Visit 2, 3). In most coffee-producing countries, coffee is harvested once per year (Scott, 2015). The harvesting season varies from year to year, but is typically between November and February (Field Trip; Nordic Approach, n.d.-a; Scott, 2015; Site Visit 2, 3). The harvesting timing affects the quality and taste of the coffee (Scott, 2015). Even though it is impossible to have a homogeneous level of ripeness in a harvest, farmers try to keep the level of over- and under-ripe cherries to a minimum to ensure

the highest possible quality (Scott, 2015). The picture below shows ripe and unripe coffee cherries (picture 2).

Picture 2: This picture taken during our field trip to Jimma, Ethiopia, shows a coffee plant with ripe (red) and unripe (green) coffee cherries.

Farmers are commonly dependent on additional labor during the harvesting season, which can be in shortage in this time period (Interview 1; UNIDO, 2014). This can result in the use of child labor, as children can lessen the workload of farmers by picking the coffee cherries (Galdo et al., 2019).

4.3.1 Harvesting Techniques

There are two ways of harvesting coffee, selective harvesting or non-selective harvesting, such as strip harvesting (Fufa, Etana, & Aga, 2019; Minten et al., 2019). Both the selective- and non-selective methods can be done by hand or using machines (Poltronieri & Rossi, 2016; Scott, 2015). As Garo, Shana and Mare (2016) explain, hand-picking is prefered over mechanical harvesting, as it results in higher coffee quality due to a lower number of defects and damages to the cherries in the process. However, mechanical harvesting has seen a development where vibrations and velocity parameters are set to pick only mature cherries that are more loosely attached to the coffee plant (Poltronieri & Rossi, 2016). Also, machines that screen coffee cherries based on their maturity color to select ripe cherries to harvest have been developed to improve harvest quality (Poltronieri & Rossi, 2016).

Selective Harvesting

Selective harvesting consists of only picking ripe red cherries, and leaving unripe green cherries for later harvesting (Minten et al., 2019). The advantage of this method is that the amount of unripe cherries in the harvested coffee is reduced, leading to a more homogeneous coffee with higher quality (Minten et al., 2019). Red cherries obtain higher prices than green cherries, or mixtures of both (Minten et al., 2019). The price difference is estimated to be around 10% (Minten et al., 2019). It is also an advantageous method in agricultural areas where machines cannot be applied due to the terrain/landscape, or because farmers cannot afford to invest in machinery (Scott, 2015). Among the disadvantages of selective harvesting is that it is a labor-intensive and time-consuming process (Scott, 2015).

Strip Harvesting

Strip harvesting consists of grabbing and pulling coffee branches and making all coffee cherries fall onto the ground to be picked (Garo et al., 2016; Minten et al., 2019). The benefit of strip harvesting is that it is less costly to perform and is quicker than selective harvesting as all cherries are collected at once (Garo et al., 2016; Minten et al., 2019; Scott, 2015). Some farmers prefer this harvesting method, as they do not have to harvest multiple times per season (Beshah et al., 2013).

The use of stripping harvest methods has become less frequent due to its disadvantages (Minten et al., 2019). The main disadvantage is that different maturity levels of coffee cherries are collected, leading to a lower quality product as unripe, ripe and overripe cherries are mixed (Beshah et al., 2013). Other materials such as leaves, stones and sticks can also be gathered with the cherries in this process (Fufa et al., 2019). In addition, this method can decrease future yields, as it can harm the coffee plant (Garo et al., 2016).

4.3.2 Discussion

We have identified the following main challenges and potential opportunities: coffee quality, as well as labor and time intensity. We discuss these in terms of sustainability and the triple bottom line.

Coffee Quality

From our findings, we see that the harvesting method applied will impact the quality of the coffee cherries. First, in terms of hand-picking versus mechanical picking, we found that hand-picking has been preferable, as it can lead to a more homogeneous, high-quality harvest. Yet, new machines can also provide this result. Additionally, selective harvesting is considered to provide more homogeneous coffee than strip harvesting. Our findings show that a higher quality harvest will result in higher prices, and thereby impact the economic sustainability of farmers. The economic dimension of sustainability considers financial performance and increased earnings (Braccini & Margherita, 2019; Shou et al., 2019).

Our findings show that selective harvesting also limits the harm done to the coffee plant, thereby increasing the commodity's quality and future yields. As Longoni and Cagliano (2018) explain, economic sustainability encompasses being profitable in the long term. We can thereby expect that applying harvesting techniques that lead to high quality coffee, will have a positive impact on the economic sustainability of farmers in the long term.

Second, the chosen harvesting techniques can result in varied amounts of waste, due to the defects and damages they may cause to the cherries in the process. Strip harvesting can potentially lead to more waste than selective harvesting. The usage of less modern machines to pick the cherries can potentially increase wastage. Waste can have a negative impact on environmental performance (Koberg & Longoni, 2019). From this, we see that the waste generated in the harvesting process can affect the environmental sustainability of this stage of the chain, if not managed correctly. Thus, waste management techniques should be considered. Such techniques are discussed in the 'Waste Management' segment in the 'Primary Processing' section. In relation to waste from harvesting, we can presume that it will also impact the economic dimension of sustainability, as it will lead to a loss of potential revenues. Waste is not consistent with the focus of economic sustainability, which is increased sales (Braccini & Margherita, 2019; Shou et al., 2019). By missing out on sales, it can impact the welfare of the seller and farmer, and thereby their social sustainability. The social dimension is concerned with the welfare and well-being of the workforce (Longoni & Cagliano, 2018; Nichols et al., 2019). With this we show that there is a linkage between the three dimensions

of sustainability. This is supported by literature (Braccini & Margherita, 2019; Christopher, 2016; Geissdoerfer et al., 2017).

Labor and Time Intensity

We found that it is common to employ additional labor during harvesting season, due to the high labor demand and the large amount of time involved in the process. As stated, this can result in child labor, having a negative impact on social sustainability. This is because the social dimension is concerned with human rights (Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Shou et al., 2019).

Another challenge is the costs that occur in the harvesting process. Thus, farmers can have additional costs related to wages and time spent doing the harvesting. The economic dimension of sustainability is concerned with cost reduction (Longoni & Cagliano, 2018). Hence, we see that additional costs in the harvesting process will have a negative impact on economic sustainability.

Longoni and Cagliano (2018) highlight the importance of community development in social sustainability. In light of this, additional labor demand can be positive, as it can lead to increased employment in the local community. Thus, we consider the labor and time intensity of harvesting to have a positive effect on social sustainability.

Another challenge is that a more time-consuming process could lead to overripe cherries, resulting in increased waste or lower product quality. We find that selective harvesting typically implies a larger demand for labor and time compared to strip harvesting. As mentioned in the segment ‘Coffee Quality’ in the ‘Harvesting’ section, waste can have a negative impact on environmental sustainability, and a lower quality will have a negative impact on economic sustainability.

4.4 Primary Processing

Once the coffee cherries are harvested, they undergo primary processing (Interview 1; UNIDO, 2014). This can be done by cooperatives, farmers or other private actors

(Gashaw et al., 2018). The time that elapses from coffee cherries are harvested until the primary processing starts can have a significant impact on the final coffee quality, therefore, it is important that this process happens as fast as possible (Poltronieri & Rossi, 2016). In the primary processing stage, the outer layers of the coffee cherry are removed, leaving the coffee bean wrapped into a silver skin and parchment layer, known as green coffee (Site Visit 2, 3; UNIDO, 2014). The fresh coffee bean and its outer layers are shown in picture 3 below.

Picture 3: This picture taken during our field trip to Jimma, Ethiopia, shows a fresh coffee bean and its outer layers.

4.4.1 Primary Processing Methods

There are several post-harvest processes that can be applied, the most common ones are wet and dry processing (Beshah et al., 2013; Interview 1, 2, 3, 4; Minten et al., 2019; Poltronieri & Rossi, 2016; Scholz, Prudencio, Kitzberger, & Silva, 2019; Site Visit 1, 2, 3; Woldesenbet et al., 2015). The two processes have distinct effects on the taste and aroma of the finished product (Scholz et al., 2019; Site Visit 1; UNIDO, 2014). The choice of processing method depends on the structures available, climatic conditions, economic incentives or profits to improve the coffee quality, and other incentives, such as becoming more environmentally friendly and sustainable (Scholz et al., 2019; Site Visit 2). Primary processing is dependent on skilled and knowledgeable personnel, so problems may arise when the workforce mainly consists of unskilled laborers (Interview 1, 2, 3, 4; Kasso & Bekele, 2018; UNIDO, 2014). Minten et al. (2019) explain that there have been improvements in primary processing methods in recent years, impacting the overall quality of the coffee.

Wet Processing

In wet processing, the cherries are transferred to washing stations, so-called wet mills (Nure, 2008; Site Visit 2; UNIDO, 2014). These washing stations consist of specialized equipment that wash and remove the outer layers of the cherry, and requires a large amount of water and high capital investments (Interview 1, 4; Poltronieri & Rossi, 2016; Scholz et al., 2019; Site Visit 2; UNIDO, 2014). The images below show part of a washing station that we visited during our trip to Ethiopia (picture 4 & 5).

Picture 4 & 5: These two pictures taken during our field trip to a coffee processing plant in the outskirts of Jimma, Ethiopia, show part of the machinery and infrastructure used in the washing process.

The advantage of removing the outer layers is to "speed up the drying process and reduce the risk of excessive fermentation or mould growth" (Poltronieri & Rossi, 2016, p. 4). This process is only applicable for red coffee cherries (Beshah et al., 2013; Fufa et al., 2019; Site Visit 2; UNIDO, 2014; Woldesenbet et al., 2015). In the wet method, cherries go through a de-pulping process, are then fermented in tanks, washed and soaked in clean water to remove the mucilage, thus removing layers of the cherry in the process (Beshah et al., 2013; Minten et al., 2019; Site Visit 2; UNIDO, 2014; Woldesenbet et al., 2015). Picture 6 shows coffee in the intermediate stage of wet processing, at this stage the coffee is known as parchment coffee, as the parchment layer is still attached to the bean (Interview 4).

Picture 6: Picture of parchment coffee taken during our field trip to Addis Abeba, Ethiopia.

Thereon, the wet coffee is sun-dried, a process that takes between three to five weeks, depending on the thickness of the cherry layer (Beshah et al., 2013). This process preserves the quality of the coffee bean better than unwashed coffee does, and results in more homogenous coffee with fewer defective beans (Minten et al., 2014; Nure, 2008; Woldesenbet et al., 2015). Some of the downsides of this method include the inclusion of impurities throughout the process and the moisture content, which can lead to several challenges (Beshah et al., 2013).

Washed coffee is typically believed to be of high quality, has a desirable flavor, and there is a demand for this type of coffee in the international market (Garo et al., 2016; Interview 1, 4). Coffee processed applying the wet method is sold at significant premiums over dry-method coffee (Garo et al., 2016; Interview 4; Minten et al., 2014; UNIDO, 2014). The premiums can range from 10-65% above the market prices for coffee cherries that have undergone dry processing (Minten et al., 2014; UNIDO, 2014). Due to these premiums, many cooperatives and unions recommend farmers to process their beans through wet mills, and seek to achieve an increased development of wet processing facilities (Minten et al., 2014; UNIDO, 2014). Minten et al. (2019) have observed an increased use of the wet method as premiums can be obtained. Between 2004 and 2014, it was recorded that Ethiopians invested in large number of new wet mills (Tamru & Minten, 2018). The amount of coffee that undergoes wet processing is relatively small compared to the dry method, with a share of around 20-30% (Tamru & Minten, 2018; Tefera & Tefera, 2014; UNIDO, 2014).

As wet processing is dependent on specific infrastructure, the stations are more difficult to obtain, and are commonly more distant to the locations of smallholder farmers (Minten et al., 2019; Site Visit 2; UNIDO, 2014). The distance between

washing facilities and farmers is also a great challenge due to poor road infrastructure and networks, thus, raising the cost of transportation (Field Trip; Minten et al., 2019; UNIDO, 2014). Moreover, it can take a long time before the coffee cherries arrive at the wet processing facilities, potentially reducing the quality of the cherries along the way (Interview 1). This can in turn decrease the likelihood of farmers selling their red coffee cherries (Minten et al., 2019). However, the increase in constructions of wet mills has decreased these distances, and thereby limited these challenges (Tamru & Minten, 2018).

A key concern related to the processing method is the significant water footprint of the wet process (Beyene et al., 2012; Interview 1, 4). The footprint consists of an average of 140 liters per coffee cup, meaning it has a negative impact on both economic, social and environmental costs (Hoekstra, 2008; Interview 1, 4; Woldesenbet, Woldeyes, & Chandravanshi, 2014). The process also generates a large amount of waste, which in turn represents a serious environmental and health problem in coffee producing countries (Beyene et al., 2012; ICO, n.d.; Interview 1, 4; Murthy & Madhava Naidu, 2012; Mussatto, Machado, Martins, & Teixeira, 2011; Woldesenbet et al., 2015).

Waste from coffee production can be hazardous and may be highly pollutive (Haddis & Devi, 2008; Interview 1, 4; Padmapriya, Tharian, & Thirunalasundari, 2013; Woldesenbet et al., 2015). One of the main by-products of wet coffee processing is coffee pulp, which makes up 40% of the weight of the fresh coffee cherry (Interview 1; Woldesenbet et al., 2015). The coffee pulp is difficult to dispose of due to its high water content (Woldesenbet et al., 2015). Unsatisfactory waste disposal practices – such as the use of landfills and waste incineration, as well as dumping waste in nearby water or land – can lead to severe environmental and health consequences (Interview 1, 4; Murthy & Madhava Naidu, 2012; Woldesenbet et al., 2015). The wet processing process can be a great social and environmental challenge due to the effluent and wastewater that can go into the water system (Beyene et al., 2012; Interview 1; Woldesenbet et al., 2015). The picture below shows a load of coffee waste (picture 7).

Picture 7: This picture from our visit to a coffee farm in the outskirts of Jimma, Ethiopia, shows a load of coffee waste.

However, countries such as Ethiopia, are adapting to more sustainable ways of performing their practices (Interview 1, 4; Site Visit 2). One way of handling waste water is using tanks that can hold the contaminated water to avoid it being leaked into nature or natural water sources (Site Visit 2). Another common practice is the increased use of water purification systems that clean the contaminated water and is used for irrigation of crops, thereby promoting a more circular approach to the system (Interview 1; Site Visit 2;). Initiatives and projects such as the Water Wise Coffee Project by the international non-profit organization, TechnoServe, and the customer solutions provider, Mother Parkers Tea & Coffee, aim at reducing and solving the waste issue (Interview 4). This particular project aims at improving sustainable water management practices by working with wet mills on "reducing water usage, separating the coffee pulp from the wastewater, and planting vetiver grass wetlands" (TechnoServe, n.d., para. 1).

Some do not consider coffee waste as a resource (Beyene et al., 2012). Actors must identify opportunities that can drive value from coffee residual waste in order to improve their practices and increase their sustainability (Beyene et al., 2012; Interview 1, 4). Coffee residual waste can be reused and recycled in many ways, and thus, become raw materials for new processes (Beyene et al., 2012; Interview 1; Woldesenbet, Woldeyes, & Chandravanshi, 2016). Coffee waste can be used as fuel, animal feed and organic fertilizer (Interview 1). For example, coffee waste in Japan and Korea goes through certain chemical processes and is then used to make car parts (Interview 1).

Dry Processing

Dry processing is commonly used after non-selective harvesting techniques, such as strip harvesting (Fufa et al., 2019). In dry processing, unwashed coffee cherries are sun-dried on the ground, mats, raised drying beds, or on concrete floors (Garo et al., 2016; Minten et al., 2019; National Geographic, n.d.; Scholz et al., 2019; UNIDO, 2014). Further, Garo, Shana & Mare (2016) show with their study that many farmers lay coffee cherries to dry on mud and cow dung. This can have a negative impact on the coffee quality (Beshah et al., 2013; UNIDO, 2014). It is therefore important to use appropriate materials, including clean and dry surfaces, when laying coffee to dry (Garo et al., 2016; Minten et al., 2019). Also the use of elevated platforms will ensure that the coffee cherries dry more evenly, and thus improve the quality of the commodity (National Geographic, n.d.). Some smallholder farmers may fail to construct appropriate drying ground due to lack of knowledge or simply because they have no financial incentives or means to increase the quality of their coffee beans (UNIDO, 2014).

Picture 8: Picture of dried natural coffee cherries taken during our field trip to Addis Abeba, Ethiopia.

After the drying process is finalized, the outer layer of the cherries is removed in so-called dry mills (Minten et al., 2019). Commercial farms use mechanical driers (Poltronieri & Rossi, 2016; UNIDO, 2014). Coffee processed using the dry method is known as natural coffee (Interview 4; Poltronieri & Rossi, 2016; Scholz et al., 2019). The image above shows dried natural coffee cherries (picture 8). The dry method is the “easiest way to transform coffee cherries into green beans, yet it is also one of the most difficult ways to produce high quality coffee” (Poltronieri & Rossi, 2016, p. 4). Among the positive sides of this approach is its low-cost, as it simply requires flat ground and sunlight to be achieved (Interview 4; Poltronieri & Rossi, 2016).

Some suggest moving towards dry processing instead of performing wet processing (Interview 4). The reason behind this is that dry processing is more environmentally friendly than the wet process due to the small amount of waste generated with this method, and is therefore considered more sustainable (Interview 4). To make this shift possible, all actors in the chain must be onboard, encouraged and conscious (Interview 4).

4.4.2 Discussion

We have identified the following main challenges and potential opportunities: waste management, coffee quality and smallholder farmer restrictions. We discuss these in terms of sustainability and the triple bottom line.

Waste Management

Our findings show that there are significant challenges related to the wet processing method, due to its high water usage and the magnitude of waste it generates. The waste generation and its disposal in water and land can pose environmental and health problems for people living in surrounding areas. The environmental dimension of the TBL concerns waste reduction, as well as water and land pollution (Christopher, 2016; Koberg & Longoni, 2019; Lankoski, 2017; Shou et al., 2019). Additionally, the social dimension involves a focus on safety, welfare and the protection of the community (Chopra & Meindl, 2016; Christopher, 2016; Longoni & Cagliano, 2018; Mani et al., 2016; Nichols et al., 2019). Thus, the high water usage and waste generated in the wet processing method can be considered to impact the environmental and social dimensions in a negative way.

We found that there are several practices and initiatives to improve the environmental footprint during primary processing activities, mainly by reducing, re-using and recycling waste. This approach to sustainability is recommended (Chopra & Meindl, 2016; Longoni & Cagliano, 2018; Wilson, 2015). Some examples from our findings include the use of water tanks and purification systems, and using waste as fuel, animal feed and organic fertilizer. These practices are in line with the 3Rs of sustainability, which are reduce, re-use and recycle (Beaty, 2013; Christopher, 2016).

Our interview subjects stated that the concept of circular economy (CE) is highly related to the initiatives, and we found that some actors are moving towards a more circular approach by using waste as input in their processes. This is in line with circular economy which aims at re-using waste as input in future processes, and the 3Rs of sustainability (Genovese et al., 2017; Jaca et al., 2018; Lee, 2019; UN, 2019; Winkler, 2011). Circular economy can have a positive impact on all three dimensions of the TBL (Korhonen et al., 2018). Therefore, we can establish that the improved practices for handling and using waste generated in primary processing, will have a positive sustainability impact.

Coffee Quality

We found that the chosen primary processing method and practices will have a significant impact on the quality of the coffee. Coffee that has undergone the wet method is considered to be of higher quality than dry coffee. A higher quality will in turn lead to premium prices for the commodity, and will have an impact on economic sustainability. This is in line with the economic dimension, which is concerned with growth in earnings (Braccini & Margherita, 2019; Shou et al., 2019). From our findings, we also see that there is a potential to increase the share of coffee that undergoes wet processing. If this share increases, it can impact both the economic and social dimension in a positive way. The economic dimension and the social dimension of sustainability are highly connected, and an improvement in the economic dimension has the potential to enhance social performance (Henriques & Richardson, 2004).

Customers are often willing to pay premium prices for commodities that are proven to have sustainable practices (Lankoski, 2017). Thus, we assume that if coffee buyers are more aware of the possible negative impacts of washed coffee, and more conscious of the lesser impact of natural coffee, premiums should be possible to attain for coffee that has undergone the dry method. We found that dry processing should become more desirable due to its overall quality in terms of sustainability during the primary processing stage.

Smallholder Farmer Restrictions

We found that smallholder farmers are among the main actors involved in the primary processing stage, and their lack of skills and knowledge on how to perform primary processing activities in sustainable ways can be a challenge. This is related to the social dimension of sustainability, as it concerns skills and knowledge of the workforce (Formentini & Taticchi, 2016; Henriques & Richardson, 2004). A lack of skills and knowledge will impact the coffee quality negatively, impacting the social and economic dimensions of sustainability described in the 'Coffee Quality' segment in the 'Primary Processing' section. We discuss what is currently being done in the coffee supply chain in terms of skills and knowledge development of farmers in the 'Cooperatives and Unions' section of the thesis.

We also found that smallholder farmers often lack the means to improve their primary processing practices. A more detailed discussion on the reason behind this issue is provided in the discussion on 'Coffee Price and its Impact on Production' in the 'Production' section. Smallholders' lack of financial means is a linkage to the economic dimension of the TBL, as this highlights poverty as one of the main issues of economic sustainability (Christopher, 2016). We found that it is more economically viable for smallholder farmers to engage in dry processing, as this results in lower costs than wet processing. This resonates with the economic dimension of sustainability, which includes cost-reduction as a key element (Longoni & Cagliano, 2018).

4.5 Storage, Handling and Transport

Coffee undergoes storage, handling and transport within each stage of the supply chain, and in between them. Therefore, there are several actors that can be involved in these activities, including farmers, collectors and cooperatives (Gashaw et al., 2018). The actor involved depends on whether the coffee is targeted towards local consumption or export, and on the particular case itself.

The coffee quality is highly affected by storage, handling and transport processes throughout the supply chain (Fufa et al., 2019; Garo et al., 2016; Interview 1; National Geographic, n.d.; Site Visit 1). This is because coffee is a hygroscopic good, meaning it absorbs foreign materials and moisture from its environments, and

can easily become contaminated and change its flavor (Beshah et al., 2013; Garo et al., 2016; Interview 1; National Geographic, n.d.; Site Visit 1; UNIDO, 2014). One way of properly bagging coffee to conserve the quality and obtain the best price is by utilizing jute bags (Site Visit 1).

Storage facilities should be "clean, cool, shaded, leak proof, dry (...), well ventilated" in order to avoid "undesirable smell" and "moisture [and] re-absorption" (Beshah et al., 2013, p. 37). Appropriate storage facilities are difficult to achieve in small scale coffee producing countries such as Ethiopia, where there are many smallholder farmers who cannot afford to build such storage facilities, or lack the knowledge on how to properly handle the coffee (Beshah et al., 2013; Gashaw et al., 2018; UNIDO, 2014). Poverty can challenge access to and adoption of appropriate facilities and infrastructure (Interview 1, 3). As a result, storage facilities and infrastructure at farm level are commonly inadequate or non-existent, which can compromise the quality of the coffee (UNIDO, 2014). The lack of adequate storage of the coffee can result in high post-harvest losses (UNIDO, 2014).

The treatment of coffee during the transport stage – between facilities, from farmer to processors, to stores or to international markets – and the distances it has to travel can deteriorate the quality of the coffee (Beshah et al., 2013; Site Visit 1; UNIDO, 2014). Another challenge is the quality of the roads, which can lead to lower quality beans and increase transportation costs (Field Trip; Interview 1; Site Visit 4; UNIDO, 2014). Also, animals, such as goats, can be a challenge as they mount trucks and ruin full truckloads of coffee (Interview 1).

4.5.1 Discussion

We have identified the following main challenges and potential opportunities: coffee quality and smallholder farmer restrictions. We discuss these in terms of sustainability and the triple bottom line.

Coffee Quality

Our findings show that the quality of coffee is impacted by storage, handling and transportation practices along all steps of the supply chain. In our previous

discussions, we explain the linkage between coffee quality and the price the coffee can obtain. The connection with economic and social sustainability is also discussed.

We found that these activities in the supply chain are vital, meaning that if they are not properly done, they can significantly reduce the quality of the commodity leading to waste generation. Waste can have a negative impact on environmental performance (Koberg & Longoni, 2019). From this, waste generated from these activities can affect the environmental sustainability of the supply chain. We can link this to the economic dimension of sustainability, as it will lead to a loss of potential revenues. Hence, we can see that waste will impact the economic sustainability negatively. This is because economic sustainability is concerned with increased sales and revenues (Braccini & Margherita, 2019; Shou et al., 2019).

Smallholder Farmer Restrictions

A key point is that storage, handling and transport activities are often performed by smallholder farmers. This entails certain restrictions, such as lack of knowledge and skills on how to perform these activities in the most sustainable way, and limited financial means to invest in appropriate infrastructure, vehicles and tools. Knowledge and skills can be linked to the social dimension of sustainability, as it concerns these particular aspects (Formentini & Taticchi, 2016; Henriques & Richardson, 2004). Limited financial means of smallholder farmers is related to poverty, discussed in the economic dimension of the TBL (Slaper & Hall, 2011). We discuss what is currently being done in the coffee supply chain in terms of skills and knowledge development of farmers in the ‘Cooperatives and Unions’ section of the thesis.

4.6 Ethiopian Commodity Exchange

Another important step in the Ethiopian coffee supply chain is the Ethiopian Commodity Exchange (ECX). The ECX is a public-private enterprise established in 2008 with the aim of creating a modern marketplace that connects buyers and sellers of valuable commodities in Ethiopia (ECX, 2020; Site Visit 1; UNIDO, 2014). Prior to the establishment, there was no organized market for quality assurance in the country (Site Visit 1).

The main commodities handled at the ECX are coffee, sesame, haricot beans, maize and wheat (Site Visit 1; UNIDO, 2014). In some parts of the country, the institution focuses on only one commodity that is widely traded in the region, as in Jimma, where they only handle coffee (Site Visit 1). We focus on the ECX operations in the coffee industry.

All coffee should be traded through an official marketplace, the ECX, according to a national legislation (Abdissa, 2017; Site Visit 1; Tefera & Tefera, 2014; UNIDO, 2014). The exception is coffee that is directly exported by private-producer-exporters and cooperative unions, if this is the case, the ECX solely performs the coffee grading (Abdissa, 2017; Interview 1; Minten et al., 2019; Mitiku et al., 2017a; Nordic Approach, n.d.-b; Site Visit 1; Tefera & Tefera, 2014; Tröster, 2015; UNIDO, 2014). Some farmers can also bypass the ECX trading floor and directly sell and export, depending on their land size (FAS, 2019; Interview 1, 2, 3; Kornman, 2019; Nordic Approach, n.d.-b; Site Visit 1). In addition, private processors can also bypass the ECX (Nordic Approach, n.d.-b).

4.6.1 Reasons for the Establishment of the ECX

The ECX enables a partnership among different actors involved in a variety of commodity supply chains, mainly "market actors, the Members of the Exchange, and its main promoter, the Government of Ethiopia" (ECX, 2020, p. 1). This partnership brings "integrity, security, and efficiency to the market" (ECX, 2020, p. 1). The ECX has a variety of functions and operations to handle coffee (Gashaw et al., 2018; Site Visit 1; UNIDO, 2014). A simplified representation of the ECX and its activities is shown in diagram 2. The ECX assures the quality of the commodity, and that delivery and payment conditions are fulfilled (ECX, 2020; Mitiku et al., 2017a; Site Visit 1). Further, it provides "standard coffee contracts, based on a warehouse receipt system, with standard parameters for coffee grades, transaction size, payment, and delivery" (Minten et al., 2014, p. 3).

The organization was put in place to mitigate risks, such as exploitation of farmers and inequality between actors (Site Visit 1). The ECX eliminates the many middlemen that prevailed in the coffee industry, so that farmers could financially

benefit from the market value of their coffee (Interview 2; Site Visit 1; Tefera & Tefera, 2014; UNIDO, 2014). Since the ECX can directly link smallholder farmers to buyers upstream in the chain without the need of intermediaries, the trading and transaction costs have lowered, significantly impacting farmers' livelihoods (Interview 3; Site Visit 1; UNIDO, 2014; World Bank, 2019).

Moreover, the ECX was established to "reduce price volatility and incentivize farmers to plant coffee" (FAS, 2019, p. 4). The issue of price volatility is discussed in the 'Production' section. The institution has a price information system to ensure market transparency (Site Visit 1; Tröster, 2015). The ECX uses technology to provide farmers with a platform where they can receive information and updates on the coffee sector, thereby enhancing their knowledge on market conditions, and creating a better understanding of how their practices and sales can be improved (Interview 1; Site Visit 1; World Bank, 2019). These information platforms typically show the ECX price and the NY coffee price (Interview 1; Site Visit 1). Farmers can more easily predict their future incomes by accessing information, which can possibly create more stability in their personal economy, as they can plan accordingly, so, "information is the key to power and money" (Site Visit 1).

4.6.2 Coffee Grading

One of the main tasks of the ECX is to control the quality of coffee beans (Interview 3, 4; Site Visit 1; UNIDO, 2014). This quality function is done at a decentralized level, in the regions of large production areas (Minten et al., 2014; Site Visit 1). It is important that the quality assessment is done for all truckloads that arrive at the ECX facilities (Site Visit 1; UNIDO, 2014). The coffee undergoes a sampling process to ensure and document its quality (Site Visit 1). Samplers at the ECX manually sample 8 kg of coffee beans per truck, taking 3 samples from each bag of coffee, from the top, middle and bottom sections (Site Visit 1). Uniformity of bags and trucks is crucial to maintain quality (Site Visit 1). Bags have to be of the same material, jute, of the same size, and all trucks have to contain the same number of bags (Site Visit 1). The sampling is followed by a coding process through an application on a mobile device (Site Visit 1).

After sampling and coding, coffee beans are graded based on a predetermined set of standardized criteria depending on the used processing method (Site Visit 1). Women are involved in the grading processes, and in manually sorting coffee beans from impurities (Interview 1; Site Visit 1). The grading consists of two stages, a raw evaluation and cupping (Abdissa, 2017; Site Visit 1; Tefera & Tefera, 2014; UNIDO, 2014). The raw evaluation determines around 40% of the final grade (Site Visit 1). Aspects such as the size of the bean, color, coffee maturity, and contamination are examined (Site Visit 1). Cupping consists of evaluating prepared coffee cups on for example their flavor, acidity and aftertaste, and constitutes the remaining 60% of the final grade (Site Visit 1). It is common practice to taste 5 cups of coffee per batch, and the process typically requires 3 people to cross-check their cupping results (Site Visit 1).

The final grade rates the quality of the coffee from high to low, where the lowest quality is rejected for export and is sold domestically (Abdissa, 2017; Garo et al., 2016; Interview 1; Minten, Assefa, & Hirvonen, 2017; Mitiku et al., 2017a; Site Visit 1). If the coffee has export quality, it must be sold to the international market, and will be prohibited from being sold domestically (Interview 1; Minten et al., 2017; Minten et al., 2014; Mitiku et al., 2017a). The highest quality is given to washed coffee beans, whereas, the lowest grades are given to unwashed beans and beans that do not fulfill the preset requirements (Abdissa, 2017; Mitiku et al., 2017a; Site Visit 1). The best grades should be “hard to obtain, as grades should be earned” (Site Visit 1). Grading can incentivize and stimulate farmers to produce higher quality coffee, as farmers with high quality beans can better their livelihoods by improving their profitability and value-creation (Site Visit 1).

4.6.3 Traceability

The international market demands that coffee is traceable, as this will increase its attractiveness, marketability and price (FAS, 2019). In the past, the ECX faced challenges related to traceability (CCS, 2018; FAS, 2019; Kornman, 2019). However, there have been improvements in this area, as coffee traded through the ECX can be traced back to the local cooperative or processor (CCS, 2018; Kornman, 2019; Site Visit 1) This is mainly due to better data collection and improved storage systems (CCS, 2018). The graded coffee receives a certificate,

which works as a guarantee for buyers, and ensures transparency and quality of the system (Site Visit 1). To enable quality checks and ensure traceability, the samples and codes are stored for 90 days (Site Visit 1).

4.6.4 Storage and Warehousing

After the coffee has been graded, the ECX can store and place the coffee in their warehouses (Site Visit 1; UNIDO, 2014). Around 98% of cooperative unions in the Jimma area use the ECX for grading purposes only, and do not use the warehouses (Site Visit 1). Storage at ECX warehouses enables proximity to the market and buyers (Andersson, Bezabih, & Mannberg, 2017; Site Visit 1). The ECX is the regulatory actor of these warehouses, and must ensure that "warehouses are both credible and capable of providing fair and secure services" (Andersson et al., 2017, p. 3). Furthermore, these warehouses "are required to ensure against loss or damage of those goods stored within them at maximum coverage", thereby ensuring quality of the commodity (Andersson et al., 2017, p. 3). The ECX weighs the coffee and assigns a specific location in its warehouses, so the location and quality of the beans is evident at all times (Site Visit 1).

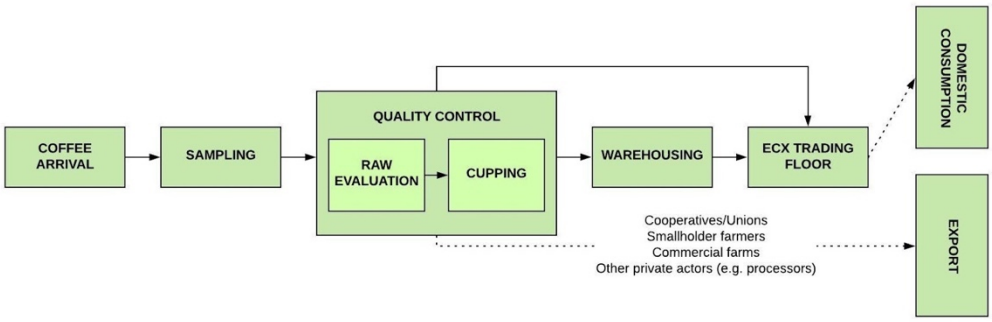


Figure 12: This diagram is based on our findings, and shows a simplified illustration of the ECX and its main activities. The solid arrows represent direct linkages between activities, while the dashed arrows illustrate that there are omitted activities. The actors included on the dashed arrow can bypass the ECX trading floor, and export directly.

4.6.5 Discussion

We have identified several advantages related to the ECX, among them are the price premiums and price stability that can be obtained, as well as the traceability that can be ensured. We discuss them in terms of sustainability and the triple bottom line.

Price Premiums and Stability

Our findings show that the ECX can measure and ensure coffee quality to buyers. Hence, coffee sellers can obtain premium prices for high quality beans. By gaining higher prices, it can impact the economic sustainability of farmers. This is confirmed in literature, as the economic dimension is concerned with profit and growth in earnings (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019). Another key point is that the ECX can remove the need for middlemen in the coffee supply chain, thereby reducing trading and transaction costs. According to Nichols et al. (2019), economic sustainability aims at reducing costs within a supply chain. Thus, we assume that farmers can benefit from trading through the ECX, and thereby improve their economic sustainability. Improved sales can impact the welfare and well-being of the seller, and thus, their social sustainability. This link between welfare, well-being and social sustainability is confirmed in literature (Longoni & Cagliano, 2018; Nichols et al., 2019).

Further, our findings show that farmers can be incentivized to improve their coffee quality as a result of the benefits they can obtain. We assume that this will impact the overall sustainability of the coffee supply chain, as it can impact the economic and social dimension of the TBL for more farmers. This is in line with sustainable supply chain management practices to improve overall supply chain performance (Hong et al., 2018).

We also found that the ECX can reduce the price volatility in the coffee market. The challenge of price volatility is further discussed in the 'Production' section. The economic dimension of sustainability relates to consistency in profits (Longoni & Cagliano, 2018). Hence, the ECX can have a positive impact on economic sustainability.

Traceability

Our findings show that traceability can be secured through the ECX. Traceability can improve the reputation and image of supply chains (Sun et al., 2017; UNGCO, 2014). Since sustainable practices can become visible and transparent through the ECX, it is reasonable to assume that price premiums can be obtained by buyers that

value sustainable practices, thereby improving economic sustainability. This is supported in literature (Ferro et al., 2019; Goddard, 2017; Lankoski, 2017).

According to the UNGCO (2014), traceability can lead to sustainable sourcing practices as it enables visibility, and thereby enhances overall supply chain sustainability. Christopher (2016) presented that a large share of the sustainability of the supply chain is determined in its first stages. Thus, transparency through the ECX can impact sustainability in the coffee supply chain in a positive way.

4.7 Secondary Processing

It is estimated that around 1% of the total coffee production in Ethiopia undergoes secondary processing within the country (Haaij, 2015; Interview 3; UNIDO, 2014). After green coffee is purchased by international buyers, most of them process the coffee further (UNIDO, 2014). Secondary processing includes all aspects that need to be in place before the final consumer can brew and consume the coffee (UNIDO, 2014). It involves a variety of processes, including blending, roasting, grinding and packaging of coffee for retail and commercialization purposes (UNIDO, 2014). In most cases, the stages of the coffee supply chain in Ethiopia do not include the secondary processing step (Field Trip; Site Visit 4).

4.7.1 Value Capture

It is estimated that around 70% of the final value of coffee sales is captured in the final steps of the supply chain, including secondary processing (UNIDO, 2014). This mostly benefits large, international companies abroad (Haaij, 2015; UNIDO, 2014). For example, Germany earns high values from the export of coffee, even though it is not a coffee producing country (Beshah et al., 2013). Instead, the country adds value to imported green beans by secondary processing them (Beshah et al., 2013). A share of around 30% of the sales value is obtained in Ethiopia (UNIDO, 2014). Some sources state that this share is lower, around 15% (Interview 1). Further, Beshah et al. (2013) estimate that less than 10% of the profit obtained by exporting green beans is transferred to coffee farmers.

Some Ethiopian secondary processors have decided to enter the market of locally roasting their beans, with the aim of ensuring that additional value is added to the beans, and capturing the value within the country of origin (Haaij, 2015). The motivation behind this is that the retail price of roasted beans "is about seven times higher than that of a green coffee bean" (Haaij, 2015, p. 62). Farmers and producers are increasingly being encouraged to do these type of activities, for example roasting, to stimulate value adding activities to create room for exporting of so-called value-added coffee, thus stimulating the market (Interview 3).

4.7.2 Reasons for Low Adoption

There are several reasons why the share of secondary processing of coffee in Ethiopia is low. First, in terms of local consumption, there is a lack of demand within Ethiopia for coffee that has undergone secondary processing (Field Trip; Site Visit 4). This is further discussed in the 'Domestic Consumption' section. Second, due to the limited secondary processing in Ethiopia, it is assumed that there is a lack of skilled and experienced personnel that can execute secondary processing (UNIDO, 2014).

Third, Ethiopia is a large exporter of coffee, and the country sells to large international companies that often want to buy green beans as they wish to do the secondary processing themselves (UNIDO, 2014). It is required that actors performing secondary processing know the different preferences of end-consumers in the international market (UNIDO, 2014). Companies wish to alter characteristics of the coffee to fit the specific market they will be operating in (UNIDO, 2014). Further, in many cases, consumers wish to buy blends of coffee beans from different countries (UNIDO, 2014).

Not all Ethiopian coffee is exported to markets that require significant and sophisticated secondary processing. Around 20-30% of coffee is exported to countries that are less demanding, such as Saudi Arabia, Sudan, Korea and China (Minten et al., 2014; UNIDO, 2014). It is believed that there is a potential for Ethiopian roasters to do the secondary processing in these markets, as the markets have fewer specific requirements that demand advanced skills (UNIDO, 2014).

There are sustainability challenges from secondary processing activities such as roasting, grinding and brewing (Interview 1). The waste generated from such activities contains heavy metals and can therefore cause severe environmental and social problems if not handled correctly (Interview 1). An inappropriate disposal method includes dumping waste into drainage systems, contaminating the water (Interview 1). To handle this challenge and improve the sustainability of secondary processing, there are alternative usages of the waste (Barbero & Toso, 2010; Interview 1). Among the alternatives are using waste – or so-called byproduct of coffee – as compost, organic fertilizer, to recycle and create new coffee, and to slow down and avoid the growth of weeds – which is a process that requires significant costs (Barbero & Toso, 2010; Interview 1).

4.7.3 Discussion

We have identified the following main challenges and potential opportunities: lack of secondary processing in Ethiopia and waste management. We discuss these in terms of sustainability and the triple bottom line.

Lack of Secondary Processing in Ethiopia

Our findings show that there is a lack of secondary processing in Ethiopia, and that Ethiopian coffee producers could potentially capture a larger share of the final value if they considered doing secondary processing. We found that there is especially a potential in markets that demand less sophisticated secondary processing, as Ethiopians may lack the skills and knowledge to enter other markets. Since this would impact people's profits and value added to the country, it would have an effect on economic sustainability. This is in line with the economic dimension, as it focuses on profits, sales and growth in earnings (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019).

Capturing more value locally can also be related to the social dimension, as it gives the potential of redistributing wealth throughout the supply chain, and thereby influences local communities by providing more opportunities for people, by improving their wealth and well-being. This is in accordance with the social dimension, as it considers redistribution of wealth and providing more opportunities

for people in local communities, as well as poverty reduction (Castka & Balzarova, 2008; Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Vachon & Mao, 2008). Social sustainability also relates to welfare and well-being (Longoni & Cagliano, 2018; Nichols et al., 2019). Thus, social sustainability can be improved if more value is captured locally.

Waste Management

Our findings show that the secondary processing stage can result in a large amount of waste. The initiatives mentioned to handle this are similar to the ones mentioned in the 'Primary Processing' section, and are related to the 3Rs of sustainability and the circular economy approach. The relation between waste management, sustainability and the TBL is discussed in detail in the segment 'Waste Management' in the 'Primary Processing' section.

4.8 Export

The demand for Ethiopian coffee is high in international markets due to the famous Arabica coffee type, which has its origin in the country (Minten et al., 2019; Minten et al., 2014; Site Visit 3; Tefera & Tefera, 2014). Ethiopia has a broader assortment than any other coffee producing country, with 24 official varieties of the Arabica coffee, which differ in terms of taste, size, color and quality (Garo et al., 2016; Site Visit 2, 3; UNIDO, 2014). Moreover, the country has a reputation for producing high quality coffee, which has the potential to boost sales (UNIDO, 2014). Since the majority of coffee producers do not use any agrochemicals on their land most Ethiopian coffee is organic (Interview 1, 3; Minten et al., 2019; Site Visit 2, 3; Tefera & Tefera, 2014; UNIDO, 2014). This increases the attractiveness and competitive advantage of Ethiopian coffee in the international market, especially in terms of speciality coffee (Interview 3; Tefera & Tefera, 2014; UNIDO, 2014).

4.8.1 Export Channels

There are several actors that export coffee from Ethiopia, as shown in figure 13. The first are private export companies operating in a private sector supply chain, the second is a chain including cooperatives and unions, and the third consists of commercial farmers (Abdissa, 2017; Mitiku et al., 2017a; Tröster, 2015). Unions

sell the commodity on behalf of the cooperatives (Gashaw et al., 2018; Nordic Approach, n.d.-b). It is estimated that cooperatives represented around 5-10% of the coffee exports between 2006 and 2013 (Abdissa, 2017; Minten et al., 2014; Tröster, 2015). The majority, about 90%, of all coffee export is done through private exporting companies (Abdissa, 2017; Minten et al., 2014; Tefera & Tefera, 2014; Tröster, 2015). Recently, some smallholder farmers and processors are also encouraged to export directly (FAS, 2019; Interview 1, 2, 3; Kornman, 2019; Nordic Approach, n.d.-b; Site Visit 1).

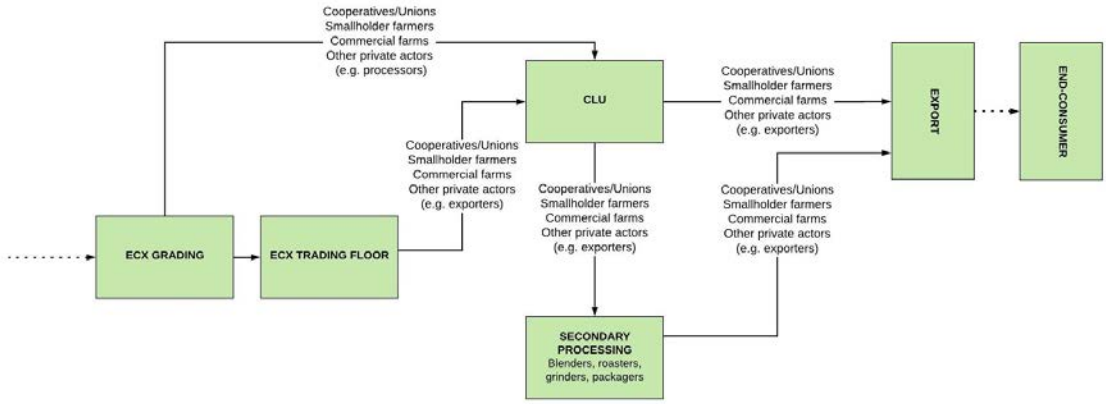


Figure 13: This map is based on our findings. The nodes show the main activities of the coffee chain targeted towards the international market. The solid arrows represent direct linkages between activities, while the dashed arrows illustrate that there are omitted activities. The actors included on the solid arrows are involved in the processes between activities.

In 2012, 175 companies were registered as licensed exporters in the country, the majority of them private actors (Minten et al., 2014). Yet, only 14 of the companies handled the export of 50% of the total volume (Tröster, 2015). Only 23 companies exported a volume of more than 1% of the total (Abdissa, 2017). In other words, there has been a high market concentration among exporting companies operating in the coffee sector in Ethiopia, and big multinational organizations have dominated the market (Interview 1; Minten et al., 2014; UNIDO, 2014). It is challenging for small actors to compete with large multinational organizations (Interview 1).

The share of export directly from coffee producers was previously low, so transaction costs incurred as middlemen were involved in the export process (UNIDO, 2014). In some cases, intermediaries are necessary to ensure sustainable business, for example, if actors are illiterate and lack business skills (Interview 1). In 2019, Ethiopia had “more than 400 coffee exporters, 395 coffee farmers who

directly export coffee, and over 30 import-export companies who export coffee" (FAS, 2019, p. 4).

4.8.2 Export Coffee

Ethiopia mostly exports green coffee, which is neither roasted nor decaffeinated (Beshah et al., 2013; Tefera & Tefera, 2014; UNIDO, 2014). In 2008, the country started exporting other types of coffee, which had undergone secondary processing such as roasting and decaffeination (Beshah et al., 2013). As presented in the 'Secondary Processing' sector, the share of exported secondary processed coffee is low, which means that the value captured in Ethiopia is low.

Only around 30% of the exported coffee beans have undergone primary processing using the wet method (Minten et al., 2014; Mitiku et al., 2017a; Tamru & Minten, 2018; UNIDO, 2014). Cooperatives, commercial farms and Fairtrade coffee are more likely to export washed coffee compared to private traders (Minten et al., 2014). As washed coffee commonly obtains higher prices than unwashed coffee, value-adding is considered low amongst the exported coffee (Garo et al., 2016; Minten et al., 2014; Tefera & Tefera, 2014; UNIDO, 2014).

The demand for washed and unwashed coffee varies across markets (Interview 4; Minten et al., 2014). For instance, in the US and European countries, there is a higher demand for washed coffee, as it is considered to be clean and have a desirable flavor (Interview 4; Minten et al., 2014; Tefera & Tefera, 2014). However, in Japan and countries in the Middle East, consumers prefer unwashed coffee beans, as it is considered to be more natural and have a better taste (Interview 4; Minten et al., 2014; Tefera & Tefera, 2014).

Ethiopia has an interest for securing the ownership of speciality coffee, with names such as Harar, Yirgacheffe, and Sidama (Garo et al., 2016; Interview 3; Minten et al., 2014). The main reason is a desire to increase the value of branded Ethiopian coffee in the international market (Garo et al., 2016; Interview 3; Minten et al., 2014). There are significant premiums that can be obtained and thus, increased revenues can be reached from the export sector (Garo et al., 2016; Minten et al., 2014). The demand in the international market is changing, and "there is a growing

willigness-to-pay for premium, high quality coffee by rich consumers and the demand for speciality and certified coffee is on the rise" (Minten et al., 2014, p. 1).

4.8.3 Quality Inspection

To ensure the quality of exported coffee, all coffee destined for export has to undergo two stages of quality inspection to determine whether the coffee is fit for export, that is, at regional ECX facilities and at the Control and Liquoring Unit (CLU) (Garo et al., 2016; Minten et al., 2017; Minten et al., 2014; Tamru, Minten, & Swinnen, 2019; Tröster, 2015). At both stages, the coffee undergoes visual raw evaluation and cupping (Abdissa, 2017; Minten et al., 2014; Site Visit 1; Tefera & Tefera, 2014; UNIDO, 2014). The ECX process has been previously discussed in the 'Ethiopian Commodity Exchange' section. After the initial grading at the ECX, only coffee that is considered fit for export is sent to the CLU to go through the second quality inspection (Tamru et al., 2019). However, some of the coffee sent to the CLU may be regarded as unfit by CLU standards (Tamru et al., 2019). It is estimated that of all the coffee given export quality by the ECX, 86% of the coffee is qualified for export after the inspection at the CLU (Tamru et al., 2019). This means that 14% of the coffee is rejected for export. Further, it is estimated that 93% of the rejected coffee can be re-sold at the ECX, to be sold domestically, whereas the rest is estimated to be wasted (Tamru et al., 2019).

The coffee that is re-sold at the ECX obtains on average a 20% reduction in price than what it was initially traded for (Tamru et al., 2019). This means that coffee exporters on average face an additional cost related to quality inspections, as they are not allowed to export the rejected coffee (Tamru et al., 2019). As follows, many exporters chose to clean their coffee again after their first quality inspection, to ensure that it is considered fit for export by the CLU (Tamru et al., 2019).

Despite the competitive advantages of Ethiopian coffee, it is measured that Ethiopian coffee farmers obtain a lower share of the coffee export value compared to other large coffee producing countries (Minten et al., 2019). Ethiopian coffee farmers get a share of about 60% of the exporting price of coffee, while the shares are estimated to be 70% in Kenya, and 90% in Brazil (Minten et al., 2019).

Therefore, it is believed that the Ethiopian coffee sector is not performing to its full potential (Minten et al., 2019).

4.8.4 Discussion

We have identified the following main challenges and potential opportunities: premium price potential in terms of the coffee's quality, and cost of quality inspection. We discuss these in terms of sustainability and the triple bottom line.

Coffee Quality and Price Premiums

Our findings show that there is a potential price premium that can be obtained in the international market. We also found that speciality coffees can gain a price premium, so we assume that there is a potential within the Ethiopian coffee export sector within this segment. Depending on the export market the coffee is marketed towards, we found that price premiums can be obtained depending on the processing method. This can be linked to the economic dimension of sustainability as it is concerned with increased revenues and profits (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019). So, if exporting actors have coffee of the demanded quality, and apply the method that is desired at the particular market, they will potentially be able to improve their economic sustainability. Also, by enhancing their particular economic sustainability, they can improve the overall sustainability of the supply chain. This is confirmed in literature (Nichols et al., 2019). From this, we can find that increased supply chain value can impact the welfare and well-being of the actors involved in the chain, thereby positively impacting the social dimension of sustainability. The relation between welfare, well-being and social sustainability is supported in literature (Longoni & Cagliano, 2018; Nichols et al., 2019).

Since coffee quality is often determined by its origin, traceability has the potential to further increase the price premium that can be obtained for the good. This is confirmed in literature (FAS, 2019). Opportunities for increased traceability are further discussed in the 'Ethiopian Commodity Exchange' and 'Coffee Certifications' sections.

Cost of Quality Inspection

Our findings show that there are additional costs related to the quality inspection of coffee. These costs are both in terms of re-work that aims at increasing the quality of the beans before the last quality inspection, and the price reduction for coffee that fails the second quality inspection. Thus, we see that the quality inspections that coffee go through before potential export can impact the economic dimension negatively. Literature emphasizes the importance of cost reductions to achieve economic sustainability, both for specific actors and their activities, and for the overall supply chain (Longoni & Cagliano, 2018; Nichols et al., 2019). Therefore, these quality inspections can challenge economic sustainability of the coffee supply chain.

We also found that waste generation from the quality inspection stages can occur. According to the literature, waste generation is not in line with the environmental dimension of sustainability (Christopher, 2016; Koberg & Longoni, 2019; Shou et al., 2019). Thus, the waste generated in the coffee supply chain at the stages leading up to export can harm the environmental sustainability of the chain. Waste can lead to potential revenue losses. Thus, not conforming with the economic dimension of the TBL (Braccini & Margherita, 2019; Shou et al., 2019).

The literature emphasizes the relationship and interconnection between the three dimensions of the TBL (Braccini & Margherita, 2019; Kumar & Goswami, 2019; Laurell et al., 2019). Hence, we find that re-work and waste generation can impact the overall sustainability of the coffee supply chain.

4.9 Domestic Consumption

It is estimated that around 50% of the coffee production in the country is consumed in Ethiopian households, which makes the country one of the largest consumers of the beverage (ICO, 2020a; Interview 1, 3; Minten et al., 2019; Mitiku et al., 2017a; Tröster, 2015).

4.9.1 Cultural Value

There is a long tradition of coffee drinking in Ethiopia, as coffee is an important part of social life and has significant cultural value (Chauhan et al., 2015; Interview

1, 3; National Geographic, n.d.; UNIDO, 2014). Traditionally, Ethiopians consume coffee "during social events such as family gatherings, spiritual celebrations, and at times of mourning" (UNIDO, 2014, p. 6). The coffee ceremony is highly valued, and a crucial step of the ceremony involves coffee bean roasting and grinding (Chauhan et al., 2015; Field Trip; National Geographic, n.d.; Site Visit 4; UNIDO, 2014; Wiersum et al., 2008). Picture 9 shows a coffee ceremony we attended with locals. A more detailed description of this experience can be found in appendix 1.

Picture 9: This picture taken during our field trip to Jimma, Ethiopia, shows the private coffee ceremony we attended. The woman in the picture is shown roasting the coffee beans.

Most of the coffee sold domestically is sold as green beans without packaging as Ethiopians prefer to roast and grind their coffee in their own homes, mainly due to cultural aspects and traditions (Field Trip; Gashaw et al., 2018; Site Visit 4; UNIDO, 2014). Yet, coffee shops have become increasingly popular in large cities in the country (Chauhan et al., 2015; Field Trip; UNIDO, 2014). This can be because it is common practice for Ethiopian people to drink on average 3 cups of coffee per day, and they never drink coffee alone (Field Trip; Interview 3; Site Visit 4). Picture 10 shows unpacked and unroasted coffee.

Picture 10: This picture shows unpacked and unroasted coffee that we purchased during our field trip from a local store in Jimma, Ethiopia.

4.9.2 Illegal Market

Due to the importance and high demand of coffee in Ethiopia, some local consumers demand high quality beans that have obtained export quality grades from the ECX (UNIDO, 2014). However, as the government wants to increase the attractiveness and thereby the price of Ethiopian coffee in the international market, export quality beans are sold to exporters, and are not allowed to be sold domestically (Minten et al., 2017; Minten et al., 2014). This has created an illegal market in the country, where export quality beans are sold to local consumers (Minten et al., 2017; UNIDO, 2014). Some farmers choose to grade their coffee badly, to sell their coffee locally (Interview 1). Another way farmers are engaging in the illegal market is by selling their goods directly to retailers or consumers, instead of going through the ECX and legal channels (Gashaw et al., 2018).

According to Minten et al. (2017), a lot of coffee sold at the semi-wholesale and retail level in Addis Abeba is of export quality. There have also been findings of export quality beans in traditional local markets, yet the share is low (Minten et al., 2017). Thus, it is assumed that export quality coffee sold from semi-wholesalers is sold "to modern local retail outlets, as well as to coffeehouses, cafés, and some hotels" (Minten et al., 2017, p. 80). Local consumers pay higher prices for these quality beans, and sellers can obtain higher profits than than they would have gained from exporting them (UNIDO, 2014).

4.9.3 Distribution to Local Market

To get coffee to the final consumer in Ethiopia, there are several actors involved. According to Gashaw et al. (2018), the main actors involved in the process between the ECX to the domestic consumption include wholesalers and retailers. Minten et al. (2017) have mapped out the coffee supply chain and the distribution of coffee in Addis Abeba (figure 14). After the coffee has undergone quality inspection at the ECX, the coffee is bought by wholesalers, who further sell the good to roasters, coffee shops and other retailers (Minten et al., 2017). This process involves several middlemen, such as distributors, collectors and semi-wholesalers (Minten et al., 2017). The final step of the process is the local end-consumer (Minten et al., 2017).

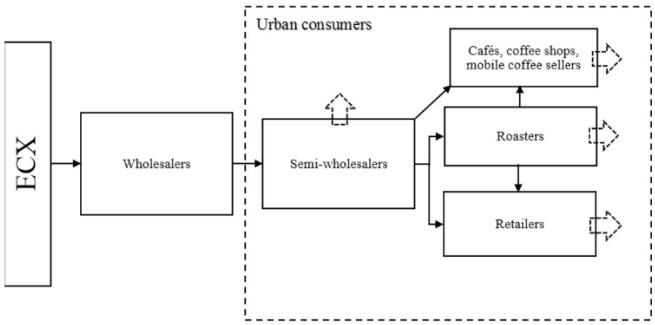


Figure 1. *Formal coffee distribution system in Addis Ababa. Note: Solid lines mark transactions between traders, dashed arrows mark transactions from traders to consumers. ECX refers to Ethiopian Commodity Exchange. Source: Based on authors' discussions with different stakeholders.*

Figure 14: This map illustrates the distribution of coffee from ECX to final consumer in Addis Abeba (Minten et al., 2017, p. 78).

4.9.4 Discussion

We have identified one main challenge and potential opportunity, that is, the illegal market. We discuss this in terms of sustainability and the triple bottom line.

Illegal Market

Our findings show that a reason for the illegal market, might be that local consumers are demanding high quality coffee due to the cultural importance of the commodity. This can be linked to the social dimension of sustainability, as it concerns collective values and behaviour (Dubey et al., 2017). However, this illegal market is not in line with social sustainability, as it is not in accordance with ethical business operations. This relation between social sustainability and ethics is confirmed by literature (Dubey et al., 2017; Mani et al., 2016).

We found that another reason for having an illegal coffee market in the country, is that locals demand high quality coffee that is destined for export. As explained, one of the reasons for this, is that coffee sellers have an opportunity to get higher prices for their export quality coffee if sold locally. The economic dimension of sustainability is concerned with increased revenues and sales (Braccini & Margherita, 2019; Shou et al., 2019). Thus, this illegal market could impact the economic sustainability of coffee sellers in a positive manner.

Based on our findings, we assume that the illegal market can harm the reputation, image and end-consumer trust of coffee originating in Ethiopia, as grading can be forged. An important aspect of the economic dimension of the TBL is the reputation and image of businesses and actors (Ferro et al., 2019; Goddard, 2017). Hence, we assume that the illegal market could potentially harm the economic sustainability of the coffee industry originating in Ethiopia, since it can impact the consumers' attitude towards Ethiopian coffee. The dimensions of the TBL are related to each other (Braccini & Margherita, 2019; Christopher, 2016; Geissdoerfer et al., 2017). Thus, an impact on the economic dimension can influence the sustainability of the entire coffee supply chain. We therefore conclude that if overall supply chain sustainability is to be achieved, the illegal market should be addressed.

4.10 Cooperatives and Unions

Cooperatives and unions are actors that participate in and between several stages of the supply chain (Gashaw et al., 2018; Interview 1, 2, 3, 4). To provide clarity and avoid repetition, we have chosen to dedicate a section of our thesis to them.

Bijman, Muradian and Chechin (2011, p. 83) define cooperatives as "formal forms of farmer collective action for the marketing and processing of farm products and/or for the purchase and production of farm inputs". There is an increasing share of smallholder farmers organized in cooperatives in Ethiopia, as the number of cooperatives have increased (Abdissa, 2017). In 2006, 120 cooperatives were registered in the country, while 465 were registered in 2015 (Abdissa, 2017; Interview 1; Minten et al., 2015). Cooperatives are subsequently part of 10 Coffee Farmers Cooperative Unions, who sell coffee to the international market on behalf of the cooperatives and their members (Abdissa, 2017; Gashaw et al., 2018; Minten et al., 2014; Tröster, 2015). Even though the number of Ethiopian farmers organized in cooperatives has increased, the percentage of total coffee production being processed in cooperatives was only 20% between 2006 and 2013 (Abdissa, 2017; Tröster, 2015).

4.10.1 Reasons for the Establishment of Cooperatives and Unions

There are multiple reasons why cooperatives are established (Bijman et al., 2011; Shumeta & D'Haese, 2018). For instance, "cooperatives provide services such as input supply and technical support, but they are also dedicated to coffee marketing and certification of coffee production (fair trade, organic, and others)" (Shumeta & D'Haese, 2018, p. 269). For example, "by means of pooling supply purchases and sales, coffee cooperatives can help to decrease price risks and enhance bargaining power and market access to members" (Shumeta & D'Haese, 2018, p. 268).

It is estimated that farmers can obtain higher prices for their coffee when it is sold at cooperative sites (Minten et al., 2019). Cooperatives and unions can enhance the traceability of coffee to international markets, which is highly valued (Abdissa, 2017; Tröster, 2015). It is estimated that unions can achieve a premium of 16% in the export market compared to private actors (Abdissa, 2017; Tröster, 2015). For instance, farmers can obtain price increases on both red cherries and dried cherries by selling them at cooperative sites, with premiums of 6% and 14% respectively (Minten et al., 2019). Thereby, cooperative members can secure sales and obtain higher revenues (Shumeta & D'Haese, 2018). By enhancing the value of coffee, cooperatives can better the livelihood of farmers (Chambo, 2009; Fisher & Lewin, 2013; Nugusse, Van Huylenbroeck, & Buysse, 2013; Shumeta & D'Haese, 2018; Vuthy, Socheat, Keosothea, Sreymom, & Pirom, 2014).

Cooperatives can improve farmers' practices by sharing insights on modern agricultural methods and new technologies (Chambo, 2009; Shumeta & D'Haese, 2018). They do so by providing training and giving farmers relevant information to enable them to comply with certification requirements (Abdissa, 2017; Chambo, 2009; Nugusse et al., 2013). Thus, cooperatives can act as a platform for information-sharing that can improve the efficiency and effectiveness of the farmers' livelihood (Fisher & Lewin, 2013; Nugusse et al., 2013; Shumeta & D'Haese, 2018). Another important aspect of cooperatives is their dual nature, that is, they are both a formal organization and a community for their members (Bijman et al., 2011; Chambo, 2009; Nugusse et al., 2013). Therefore, the success of a cooperative is highly dependent on the members involved (Bijman et al., 2011).

Another reason for the establishment of cooperatives, is that, due to their size and power, they can typically access more support and funds from a variety of institutions, including the government and other non-governmental donors (Abdissa, 2017; Nugusse et al., 2013; Shumeta & D'Haese, 2018). As most of the coffee producers are smallholder farmers, their individual bargaining power is weak (Interview 1). There is a risk that farmers obtain low prices for their crops due to a lack of business skills and knowledge of fair prices in the market (Interview 1; UNIDO, 2014). Cooperatives contribute to "rural development in general and for strengthening smallholder's access to markets in particular" (Bijman et al., 2011, p. 83).

Cooperatives can also be inefficient, possibly impacting the economic dimension of the TBL negatively (Interview 1). This is mainly due to social aspects such as their bargaining abilities and overall quality of practices, and because some cooperatives have illiteracy challenges (Interview 1).

4.10.2 Discussion

We have identified several potential advantages of cooperatives and unions. We will focus on three of the most central ones, that is, financial advantages, and knowledge and training, as well as the potential to increase the use of cooperatives and unions. To discuss these, we apply the concepts of sustainability and the triple bottom line.

Financial Advantages

From our findings, we see that cooperatives and unions can enhance the price farmers can obtain for their coffee. By enhancing prices, farmers can obtain increased profits and revenues, thereby enhancing their economic sustainability. Economic sustainability is related to these aspects (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019). Improved economic sustainability can potentially reduce poverty (Slaper & Hall, 2011). From this, we can assume that the livelihood, welfare and well-being of farmers can be improved by joining cooperatives and unions, overall improving the social sustainability of the actors involved in the coffee supply chain. The social dimension acknowledges these aspects (Longoni & Cagliano, 2018).

Knowledge and Training

Our findings show that cooperatives and unions can contribute with training, information- and knowledge-sharing, and can provide useful insights to improve farmers' practices. This is in line with some of the most central aspects of social sustainability, which include the development of skills, knowledge and abilities (Formentini & Taticchi, 2016; Henriques & Richardson, 2004). It is also in accordance with education and training of the workforce, as these are important aspects within social sustainability (Chopra & Meindl, 2016; Christopher, 2016; Shou et al., 2019). According to Shou et al., (2019), training can also help improve the environmental practices of the workforce. Hence, we see that training can have an impact on the environmental dimension.

Knowledge management is a part of social sustainability, as it can provide workers with a common arena to share knowledge and information (Lim et al., 2017). This can be compared with the function of cooperatives and unions, meaning that they assist in enhancing social sustainability. Providing opportunities for local communities is also important for social sustainability (Castka & Balzarova, 2008; Chopra & Meindl, 2016; Christopher, 2016; Koberg & Longoni, 2019; Vachon & Mao, 2008). As cooperatives and unions facilitate this, it can be implied that they work in line with social sustainability objectives.

We found that cooperatives and unions can contribute to improve farmers' lives by making their practices more effective and efficient. This can be related to the social dimension of sustainability, as it considers how actors can work collectively to improve people's well-being (Shou et al., 2019). It can also be linked to the economic dimension, as farmers can improve their practices, which can potentially lead to economic gains by reducing costs, improving sales or enhancing price premiums. This is in line with economic sustainability, as it concerns cost reductions, as well as improved profits, sales and increased earnings (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019).

Potential to Increase the use of Cooperatives and Unions

From our discussion and findings, we find that there are a number of advantages of cooperatives and unions, as they can help farmers overcome the challenges in the coffee sector. We found that the share of Ethiopian farmers organized in cooperatives is low. Therefore, we see that there is a large improvement potential in terms of sustainability that can be gained from an increase in the use of cooperatives and unions. Our findings show that the benefits of these institutions span across several stages of the chain. Thus, we see that a larger use of cooperatives and unions could have a positive impact on the overall sustainability of the Ethiopian coffee supply chain.

4.11 Coffee Certifications

As a result of growing sustainability awareness in the international market, and thereby more demanding consumers, coffee certifications have become increasingly important in Ethiopia (Abdissa, 2017; Minten et al., 2015; Minten, Dereje, Engida, & Tamru, 2018; Minten et al., 2014; Wiersum et al., 2008). The majority of smallholder farmers that are certified, are certified through cooperatives (Abdissa, 2017). Around one-third of Ethiopian cooperatives are accredited a Voluntary Sustainability Standard certification (Interview 1; Minten et al., 2015). These certifications are "standards developed at local, national or international level by organizations from the public and private sectors on environmental and social improvements" (FAO, 2020).

There are different types of certification schemes in Ethiopia, among these are the Fairtrade, Organic, Utz, and Rainforest Alliance (RA) certifications (Abdissa, 2017; Minten et al., 2015; Minten et al., 2014; Mitiku et al., 2017b). Only a small portion of the exported coffee from Ethiopia is certified (Minten et al., 2015; Minten et al., 2018; Minten et al., 2014). In 2005, the share was estimated to be 2%, while in 2015, the share grew to 5% (Abdissa, 2017; Minten et al., 2018). The majority of the certified coffee that is exported, is exported by cooperatives (Minten et al., 2015; Minten et al., 2018). There are also some private actors that export certified coffee, mostly accredited the Organic certification (Minten et al., 2015; Minten et al., 2018).

Some certification schemes are dependent on specific criteria, while others have context specific requirements (Abdissa, 2017; FAO, 2020). These aspects are often determined based on important sustainability standards, including social, environmental and economical factors (FAO, 2020; Interview 1; Wiersum et al., 2008). All of these criteria are important aspects that international consumers are increasingly demanding from their products, and thus, consumers have an enhanced willingness to pay when they are met (Durevall, 2020; Minten et al., 2015; Minten et al., 2019; Minten et al., 2018; Minten et al., 2014; UNIDO, 2014).

4.11.1 Organic Certification

One of the most important and dominant certifications in Ethiopia is the Organic certification scheme (Interview 1; Minten et al., 2015; Mitiku et al., 2017b). Minten et al. (2015) disclose in their research that around 29% of all cooperatives dealing mainly with coffee were registered to have this specific certification. The Organic certification ensures that coffee is produced in accordance to organic standards, free from inorganic substances (Interview 1; Minten et al., 2018; Wiersum et al., 2008). This certification promotes "agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity" (Minten et al., 2018, p. 5). So, there is "a correlation between being organic and environmental sustainability" (Interview 3).

4.11.2 Fairtrade Certification

Another important certification in the country, is Fairtrade (Minten et al., 2015). As presented by Minten et al. (2015), 27% of the cooperatives in Ethiopia were accredited this certification. The aim of Fairtrade is to promote ethical sourcing, and "is also a strategy to improve the equitable insertion of smallholder cooperatives into international agricultural trade" (Bijman et al., 2011, p. 68). The Fairtrade certificate connects coffee producers with consumers who have a willingness to pay for sustainability accredited products, and thereby aims at improving farmers' lives and reducing poverty (Awaysheh & Klassen, 2010; Durevall, 2020; Fairtrade, 2020; Vanderhaegen et al., 2018). Further, this certification advocates for "mainly social service provision (education, health care, water and sanitation)" (Bijman et al., 2011, p. 68). The scheme also includes a concern for child labor (Galdo et al., 2019). Additionally, Fairtrade aims at

improving agricultural practices to become more environmentally friendly (Fairtrade, 2020).

4.11.3 Utz and Rainforest Alliance Certifications

Other certification schemes, such as the Utz certification and the RA are not as widely adopted, jointly having a share of only 2% of cooperatives (Minten et al., 2015). It should be noted that the Utz and the RA are developing a collective certification scheme that will be launched in June 2020 (RA, 2020a; Utz, 2019). First, the Utz scheme promotes better farming and agronomic practices, better working conditions and business practices, with the aim of obtaining improved production systems and contribute to a positive environmental development (Minten et al., 2018; Utz, 2020a, 2020b; Vanderhaegen et al., 2018).

Second, the RA certification aims at improving sustainable farming practices to for example protect biodiversity, conserve water, land, and forests (Abdissa, 2017; Minten et al., 2018; Mitiku et al., 2017b; RA, 2020b; Takahashi & Todo, 2017; Vanderhaegen et al., 2018). In addition, the RA scheme includes criteria such as labor conditions and workers' health, well-being and livelihood (Minten et al., 2018; Mitiku et al., 2017b; RA, 2020b; Vanderhaegen et al., 2018). So, this certification works as an incentive for coffee farmers to continue producing coffee with shaded systems rather than more modern systems, to make their business practices more sustainable, and to change the consumer behavior in the coffee industry and market (Minten et al., 2018; Takahashi & Todo, 2017). The RA certification is given to coffee that is grown under forest or semi-forest production systems, and not garden and plantation coffee (Abdissa, 2017; Mitiku et al., 2017b). Such schemes will incentivize farmers to protect the forest and conserve biodiversity, decreasing the issue of deforestation and ecosystem depletion (Interview 1, 3).

4.11.4 Financial Benefits

There are potential financial benefits of certification schemes that can affect the marketability of coffee, and thus, the sales and prices that can be achieved (Minten et al., 2019; Minten et al., 2014; UNIDO, 2014). For instance, it is estimated that there is a premium of 9% that can be gained by having a Fairtrade or Organic

certification when exporting to the international market (Abdissa, 2017; Mitiku et al., 2017a). The premium that can be obtained through certification schemes is confirmed by several sources (Interview 1, 2, 3).

4.11.5 Traceability Benefits

Some certifications can ensure traceability of the coffee by identifying the origin of the commodity (Interview 1; Minten et al., 2018; Minten et al., 2014). Traceability can satisfy customers' wish to know where the coffee originates from and its journey along the chain (Interview 1). So, "traceability adds value" to the end product (Interview 1). From this follows that Ethiopia can create a competitive advantage in the international market if they can ensure its origin, as they are the sole producers of natural forest Arabica coffee (Kufa & Burkhardt, 2011; UNIDO, 2014).

4.11.6 Challenges

Objective Fulfillment

A challenge of certifications is that it is still unclear whether or not the coffee certification systems truly achieve their purpose (Interview 4; Mitiku et al., 2017a). It is not certain that the schemes better the livelihood of farmers (Haight, 2011; Mitiku et al., 2017a). To justify price premiums, it is highly important that the schemes fulfill their objectives (Mitiku et al., 2017a). On one hand, some state that farmers can obtain higher prices and economic security by selling certified products, for instance through the Fairtrade scheme (Dragusanu, Giovannucci, & Nunn, 2014; Raynolds, 2009).

On the other hand, some believe that schemes such as Fairtrade can be unsustainable as they give farmers incentives to continue the production of crops that are not economically sustainable in the long run (Dragusanu et al., 2014). According to Jena, Chichaibelu, Stellmacher, and Grote (2012), coffee certification schemes through cooperatives in Jimma, have low productivity, an irrelevant price premium and give smallholder farmers low access to information and funds. The largest share of the premium of certified products is obtained by consumer countries, and is commonly not benefitting enough at the farmer level (Haight, 2011; Interview 1, 2; Johannessen & Wilhite, 2010). Minten et al. (2015; 2018)

state that only one-third of the price premiums related to certification schemes that is obtained by exporters in Ethiopia, reaches the producer level. Most certification schemes "bring some change, yet they do not provide farmers enough incentives to be more sustainable" (Interview 4). Other sources confirm this (Interview 2).

Costs

In order for certification schemes to achieve their purpose, it is important that the benefits are higher than the corresponding costs (Durevall, 2020; Minten et al., 2015; Minten et al., 2018; Mitiku et al., 2017a). Certification schemes can be costly for farmers, as they have to fulfill certain requirements (Interview 1; Minten et al., 2015; Minten et al., 2018; Minten et al., 2014; Mitiku et al., 2017a). These costs may limit farmers' participation in certification schemes, leading to a smaller occurence of certified farmers (Interview 1; Minten et al., 2018).

Lack of Uptake

There is an increasing concern for the "lack of rewards for quality at the producer level and limited uptake of certification of voluntary sustainability standards" (Minten et al., 2019, p. 371). The lack of certification schemes is enhancing the issue of rewards, as farmers and other actors in the coffee supply chain forego the higher prices and additional advantages that can be obtained through such schemes (Minten et al., 2015; Minten et al., 2019; Minten et al., 2014). The share of smallholder farmers in Ethiopia organized in cooperatives and certification schemes has the potential to increase, as the share in the country is low (Minten et al., 2014; UNIDO, 2014).

4.11.7 Discussion

We have identified several potential advantages of certifications, as well as challenges. The most central advantages are related to the potential impact certifications can have on the triple bottom line by securing sustainable production, sourcing and improved prices. We also identified a potential for increased adoption of certification schemes. Some of the main challenges are whether or not certifications fulfil their objectives, in terms of the potential costs certifications imply, and the limited certification uptake in Ethiopia.

Opportunities

We found that certification schemes can have a positive impact on all three dimensions of the TBL, as they are targeted towards both social, environmental and economic aspects. These three dimensions are interlinked, and all should be considered to achieve long-term sustainability (Braccini & Margherita, 2019; Chopra & Meindl, 2016; Christopher, 2016; Geissdoerfer et al., 2017; Junior et al., 2018; Zhang et al., 2018). Thus, we assume that the potential benefits of these schemes can enhance overall sustainability in the coffee supply chain.

A key point is that certification schemes and their corresponding objectives can secure more sustainable production practices, such as organic practices, and practices that ensure protection of biodiversity. Sustainable production is vital for a sustainable supply chain, and can provide benefits to several actors involved in the chain (Carter & Rogers, 2008; Geissdoerfer et al., 2017; Pusavec et al., 2010; Seuring & Müller, 2008; Veleva & Ellenbecker, 2001; Winkler, 2011). For example, schemes such as the Utz and the RA aim at mitigating and solving the challenges discussed in the 'Deforestation' segment in the 'Production' section. Hence, certifications schemes have the potential to impact the sustainability of the coffee supply chain.

As we find that certification schemes can secure sustainable practices, we assume it can impact the reputation and image of the coffee supply chain. Improved sustainability practices have the potential to enhance the image and reputation of the actors involved (Ansari & Kant, 2017; Ferro et al., 2019; Goddard, 2017; Lankoski, 2017). Some actors adopt sustainable practices as a marketing strategy to satisfy the demand from relevant stakeholders (Christopher, 2016; Devika et al., 2014; Dubey et al., 2017; Prasad et al., 2018; Shou et al., 2019; Swanson & Orlitzky, 2018; Woldesenbet et al., 2015). Hence, we find that sustainable practices through certification schemes can enhance the price of coffee. The price premium obtained from sustainable practices is confirmed in literature (Lankoski, 2017). The economic dimension of sustainability is concerned with increased revenues, profit and sales (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019). Thus, since certification schemes can secure sustainable practices, we find it can improve economic sustainability.

We found that some certification schemes can ensure the traceability of coffee back to its origin. Buyers should be aware of whether or not their suppliers are complying with sustainability principles, as a large portion of the sustainability of the entire supply chain is determined in the first stages of the chain (Christopher, 2016; Formentini & Taticchi, 2016; Klassen & Vereecke, 2012). Traceability through certification schemes can provide an overview of the movement of coffee through the chain. Thus, some certifications can ensure that sustainable practices can more easily be put in place and assured. This is confirmed by literature (UNGCO, 2014). Hence, certifications have the potential to enhance the overall sustainability of the chain.

Our findings show that the traceability secured through some certification schemes can add value to the coffee, as it satisfies the buyers' demand to know the origin of the coffee. Traceability can improve the reputation and image of the supply chain (Sun et al., 2017; UNGCO, 2014). Thus, we assume that traceability can have a positive impact on the supply chain's reputation, and price premiums can be obtained. Literature confirms that price premiums can be added as a result of sustainable practices (Lankoski, 2017). Increased revenues, profits and sales are central within the economic dimension of sustainability (Braccini & Margherita, 2019; Christopher, 2016; Junior et al., 2018; Longoni & Cagliano, 2018; Shou et al., 2019). Thus, we see that traceability can impact the economic sustainability of the coffee supply chain.

Based on our discussion and findings, we see that there are significant sustainability gains that can be accomplished by the use of certification schemes. Our findings show that the share of certified coffee in Ethiopia is very low. Thus, we see that there is a large improvement potential in terms of sustainability within the country. Our findings show that the benefits of certifications span across the entire supply chain. Hence, we see that a higher adoption rate of certification schemes could have a positive impact on the overall sustainability of the Ethiopian coffee supply chain.

Challenges

Our findings show that the fulfilment of certification objectives can be considered a challenge. It is important to manage all actors involved in the chain to achieve a sustainable supply chain (Formentini & Taticchi, 2016; Koberg & Longoni, 2019).

Since the coffee supply chain includes many actors and is widely dispersed, implementing sustainable practices can be challenging. The challenge of managing disperse and complex supply chains is confirmed by literature (Ahi & Searcy, 2014; Saberi et al., 2019). Since the coffee supply chain expands across countries and cultures, we can assume that cultural distance can be a challenge. Cultural distance is related to variations in expectations across cultures (Awaysheh & Klassen, 2010; Koberg & Longoni, 2019). If the cultural distance is significant and misunderstandings arise, we can assume that the social dimension of sustainability can be affected. Social sustainability values mutual understanding of actors and collective behavior (Awan et al., 2018; Foot & Ross, 2017). Therefore, if cultural distance is not overcome, it can impact social sustainability. In turn, these challenges can make the management of actors involved difficult, harming the overall purpose of certification schemes, which is to reach sustainable objectives.

Altering actors' practices towards sustainability is often challenging, due to its complex and time-consuming nature (Savitz & Weber, 2014). We can assume that this applies to the adoption of certificates too. If actors manage to overcome cultural distance, in terms of contextual understanding and shared views on objectives, they can positively impact the implementation of sustainable practices. This is in line with literature (Ahi & Searcy, 2014; Koberg & Longoni, 2019). From this, we can deduct that it is crucial to manage the actors in the chain, and create a common understanding of objectives to make certification schemes successful, and have the potential to improve the sustainability of the supply chain.

We found that the potential costs that may incur when obtaining certifications can outweigh the benefits of being certified. If actors find the costs of certifications higher than the potential benefits, they might be hesitant to incorporate them into their practices. This is not in line with some of the key elements of economic sustainability, which are cost-reduction and profitability (Braccini & Margherita, 2019; Christopher, 2016; Longoni & Cagliano, 2018). Since all the dimensions of the TBL are interlinked, we can gather that a negative impact on one of them will impact the rest, thereby having an overall negative impact on the chain's sustainability. This linkage is confirmed by literature (Braccini & Margherita, 2019; Christopher, 2016; Geissdoerfer et al., 2017).

Our discussion shows that a failure to accomplish objectives and the high costs that may incur can be reasons why the uptake of certification schemes is low. If the challenges are overcome, the objectives of certifications can be reached. Thus, it can impact the sustainability of the entire coffee supply chain.

5 Conclusion

The aim of our thesis was to discuss how the Ethiopian coffee supply chain can become more sustainable. Our goal was to identify improvement potential with a focus on sustainability. We have used two sub-questions to help us answer our main research question. We will provide an answer to each sub-question, and then answer our main research question.

Sub-question 1: ***What does a general Ethiopian coffee supply chain look like?***
Based on our findings and discussions, we have mapped a general coffee supply chain originating in Ethiopia (figure 15). Our mapping approach is described in the 'Methodology' chapter, in the 'Our Research Approach' section. In our diagram, we have included the actors and activities we identified as most relevant to illustrate a general coffee supply chain.

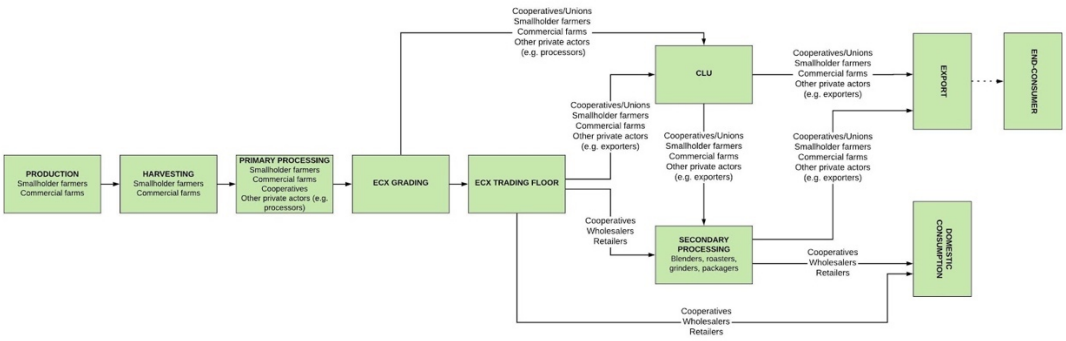


Figure 15: This figure shows the map we developed of a general Ethiopian coffee supply chain. A larger sized and more clear diagram can be found in appendix 6.

As shown in the diagram and described in 'Our Research Approach', we have applied nodes and links to represent stages of the supply chain and the flow of coffee throughout the chain. Our nodes are rectangles, and represent the main activities in the coffee supply chain, that is, production, harvesting, primary processing, ECX grading, the ECX trading floor, the CLU, secondary processing, domestic consumption, export, and end-consumer. We have included the Control

and Liquoring Unit (CLU) in our map. Even though we have no section on this specific stage of the supply chain, we have presented it the 'Export' section, as all coffee that is exported must go through this activity. Within some of the nodes, we have included the most central actors that are involved in the respective activities. In the 'Primary Processing' section, we have included the term "other private actors" to represent actors such as processors.

Our links show the flow of coffee between the stages, and are illustrated with a combination of solid and dashed arrows. The solid arrows represent the linkage between the different nodes. On some of the solid arrows, we have included actors that play an important role in between the stages of the chain. We have included the term "other private actors" on some of the solid arrows to show actors such as private exporters and processors, who are also involved in the process in between the stages of the chain. Due to our case boundaries, we have omitted stages before the coffee arrives to the end-consumer outside of Ethiopia, which is illustrated by a dashed arrow.

To simplify our map, we have done several things, as can be read in more detail in the 'Our Research Approach' section. An example of this, is that we have excluded certain activities and actors from our diagram, such as transport, storage and handling, as well as supporting activities and actors such as marketing and the Ethiopian government. Throughout our findings and discussion, we have seen the importance of such actors and activities. However, the visual representation would be too complicated if they were included in the map, as they are involved in, and between, several stages of the chain. To further simplify our visualization of the coffee supply chain, we have chosen to divide the ECX activities into two primary ones, namely "ECX Grading" and "ECX Trading Floor". We have developed a more detailed description and illustration of the other activities at the ECX in the 'Ethiopian Commodity Exchange' section of the thesis. We have also included more detailed illustrations in both the 'Export' and 'Domestic Consumption' sections to explain these activities in more detail.

With this, we have answered the first sub-question of our research, namely: *What does a general Ethiopian coffee supply chain look like?*

Sub-question 2: ***What are the sustainability challenges and opportunities in the Ethiopian coffee supply chain?***

By applying mapping techniques we were able to identify the main actors and stages of the Ethiopian coffee supply chain. Only after acquiring knowledge on the supply chain's configuration, we were able to detect the main sustainability challenges and opportunities across the chain. Our findings and discussions show that the Ethiopian coffee supply chain is facing several challenges at the different stages. We also detected some opportunities, based on current practices and initiatives put in place to mitigate and solve the identified issues within the chain. Some of the challenges and opportunities span over multiple supply chain stages, and include smallholder farmer restrictions, coffee quality, waste management, and aspects related to the coffee price. A summary of the identified challenges and opportunities can be found in table 3. Our 'Findings and Discussion' chapter provides a detailed deliberation of these aspects.

With this, we have answered the second sub-question of our research, namely: *What are the sustainability challenges and opportunities in the Ethiopian coffee supply chain?*

Research question: ***How can the Ethiopian coffee supply chain become more sustainable?***

Throughout our findings and discussion we have identified areas in which the Ethiopian coffee supply chain can become more sustainable (table 3). We found that the main improvement potential lies within cooperatives and unions, certification schemes, the ECX, secondary processing and waste management.

We found that some of the most significant potentials for improvement can be gained by increasing the use of cooperatives and unions. First, our findings show that these institutions can facilitate skills and knowledge development of farmers. This is highly beneficial, as we found that one of the main challenges to sustainability improvement is smallholder farmer restrictions. Second, we found that cooperatives and unions can help farmers and other coffee sellers to get a higher price for their commodities. As detected in our findings and discussion, price has a large impact on the sustainability of the chain, as it for instance can incentivize farmers to improve their practices and enhance the quality of their goods.

There are also sustainability benefits that can result from an increased adoption of certification schemes. We found that certifications can impact all aspects of the triple bottom line, and that such schemes can impact the sustainability of the coffee supply chain in a variety of ways. Our findings show that certifications can incentivize actors to implement more sustainable practices by providing price premiums. The practices can improve some of the detected challenges of the coffee supply chain, and include deforestation reduction, adoption of labor standards, and enhancement of the use of appropriate waste management practices along the chain. Additionally, we found that certification schemes can be useful as they can enable traceability, which is an opportunity for actors in the chain, as it can satisfy the demand for transparency in the market, thereby leading to price premiums. Our findings show that all of these aspects can impact the sustainability of the coffee supply chain positively.

We found that the ECX can provide sustainability benefits for actors that chose to go through the institution, thus, we see that some farmers and coffee sellers can benefit from it. Therefore, we suggest that these farmers and sellers go through it. The advantages include price premiums and traceability. Hence, we see that the ECX can improve the sustainability of the coffee supply chain for some actors that go through it.

Our findings show that there is a large potential within the secondary processing stage of the chain, as the share of secondary processing is still low in the country. We found that by doing secondary processing within Ethiopia, a larger share of the final coffee value chain be captured within the country. From this, we see that the sustainability of the Ethiopian coffee supply chain can be improved by doing more secondary processing.

From our findings, we see that there is a potential within improved waste management practices, particularly in the primary and secondary processing stages. We found that sustainable practices such as the 3Rs and the circular economy approach have to some degree been implemented through for example the adoption of water tanks, water purification systems, and use of waste as fuel, fertilizer and

animal feed. By adopting these practices, we found that the Ethiopian coffee supply chain can improve its sustainability.

Based on our findings, we see that to improve the sustainability of the Ethiopian coffee supply chain all actors across the supply chain stages should incorporate sustainability practices into their operations. By enhancing the sustainability at several stages, the overall sustainability of the supply chain will be impacted.

With this, we have answered our research question, namely: *How can the coffee supply chain in Ethiopia become more sustainable?*

SUPPLY CHAIN STAGE	MAIN CHALLENGES/OPPORTUNITIES	POTENTIAL SOLUTION
Production	1. Deforestation 2. Coffee price and its impact on production 3. Smallholder farmer restrictions	1.1. Certification schemes 1.2. Initiatives (e.g. tree planting) 1.3. Avoid intensified production system 2.1. Price premiums (e.g. certification schemes, ECX, cooperatives and unions) 3.1. Skills and knowledge development (e.g. cooperatives and unions)
Harvesting	1. Coffee quality 2. Labor and time intensity	1.1. Avoid low quality harvesting methods (e.g. use of less modern machines, strip harvesting) 1.2. Waste management practices (e.g. 3Rs, CE, waste as fuel, fertilizer) 2.1. Avoid labor and time-consuming harvesting methods (e.g. selective harvesting) 2.2. Labor standards (e.g. certifications) 2.3. Additional labor
Primary Processing	1. Waste management 2. Coffee quality 3. Smallholder farmer restrictions	1.1. Waste management practices (e.g. 3Rs, CE, water tanks, water purification, waste as fuel, fertilizer) 1.2. Initiatives (e.g. Water Wise Coffee Project) 1.3. Certifications 2.1. Avoid low quality primary processing methods 3.1. Skills and knowledge development (e.g. cooperatives and unions)
Storage, Handling and Transport	1. Coffee quality 2. Smallholder farmer restrictions	1.1. Avoid low quality storage, handling and transportation practices 1.2. Improved infrastructure (e.g. roads, trucks, storage facilities) 2.1. Skills and knowledge development (e.g. cooperatives and unions) 2.2. Price premiums (e.g. certification schemes, ECX, cooperatives and unions)
Ethiopian Commodity Exchange	1. Price premiums and stability 2. Traceability	
Secondary Processing	1. Lack of secondary processing in Ethiopia 2. Waste management	1.1. Do more secondary processing in Ethiopia 2.1. Waste management practices (e.g. 3Rs, CE, waste as fuel, fertilizer) 2.2. Certifications
Export	1. Coffee quality and price premiums 2. Cost of quality inspection	1.1. Apply quality measures and processing mehods depending on export market 1.2. Traceability (e.g. ECX, certifications) 2.1. Avoid re-work 2.2. Avoid waste generation (e.g. waste management)
Domestic Consumption	1. Illegal market	1.1. Avoid illegal market 1.2. Go through legal channels

Table 3: This table provides a summary of the main challenges, opportunities and potential solutions that we found in our research. We have not identified any potential solutions related to the ECX, as our findings mainly suggest advantages of using this institution. A larger sized and more clear table can be found in appendix 7.

5.1 Contribution and Future Research

Our contribution to the field is a visualization of a general Ethiopian coffee supply chain, and an overview of some of the main sustainability challenges and opportunities along the chain. In addition, our research has detected areas in which the coffee supply chain can become more sustainable. Our research was subject to

several challenges and limitations. We chose to have a holistic approach to our research, considering many stages of the supply chain.

Since our aim was to get an overview of the supply chain and its main sustainability challenges and opportunities, our research can be considered a starting point for future research. We recommend going more in-depth into a particular stage of the supply chain, and going more thoroughly into each challenge and opportunity. We did not go in-depth into the potential challenges of the ECX, so this could be interesting to explore further. We also suggest broadening the scope, having a focal company, examining supporting actors' roles, and including supply chain stages beyond Ethiopia. Besides, our chosen mapping approach did not consider time and geographical aspects. We suggest that future researchers consider these to gain a different overview and perspective on the topic.

6 Bibliography

Abdissa, F. M. (2017). Coffee Certification and Sustainable Smallholder Intensification in Southwestern Ethiopia (PhD Thesis). KU LEUVEN, Arenberg Doctoral School, Leuven, Belgium.

Acquaye, A., Genovese, A., Barret, J., & Koh, S. L. (2014). Benchmarking carbon emissions performance in supply chains. *Supply Chain Management: An International Journal, 19*(3), 306–321. doi:10.1108/SCM-11-2013-0419

Adams, R. J., Smart, P., & Huff, A. S. (2017). Shades of Grey: Guidelines for Working with the Grey Literature in Systematic Reviews for Management and Organizational Studies. *International Journal of Management Reviews, 19*(4), 432–454. doi:10.1111/ijmr.12102

Ahi, P., & Searcy, C. (2013). A comparative literature analysis of definitions for green and sustainable supply chain management. *Journal of Cleaner Production, 52*, 329–341. doi:10.1016/j.jclepro.2013.02.018

Ahi, P., & Searcy, C. (2014). A stochastic approach for sustainability analysis under the green economics paradigm. *Stochastic environmental research and risk assessment, 28*(7), 1743–1753. doi:10.1007/s00477-013-0836-5

Ahi, P., & Searcy, C. (2015). Assessing sustainability in the supply chain: A triple bottom line approach. *Applied Mathematical Modelling, 39*(10-11), 2882–2896. doi:10.1016/j.apm.2014.10.055

Andersson, C., Bezabih, M., & Mannberg, A. (2017). The Ethiopian Commodity Exchange and spatial price dispersion. *Food Policy, 66*, 1–11. doi:10.1016/j.foodpol.2016.11.003

Andriani, M., Aisha, A., Pranita, M., Siswanto, J., & Suryadi, K. (2019). *Business Process Mapping in Software Development Company.* Paper presented at the 2018 International Conference on Industrial Enterprise and System Engineering (ICoIESE 2018).

Ansari, Z. N., & Kant, R. (2017). A state-of-art literature review reflecting 15 years of focus on sustainable supply chain management. *Journal of Cleaner Production, 142*, 2524–2543. doi:10.1016/j.jclepro.2016.11.023

Arowoshegbe, A. O., & Emmanuel, U. (2016). Sustainability and triple bottom line: An overview of two interrelated concepts. *Igbinedion University Journal of Accounting, 2*(16), 88–126.

Ashby, A., Leat, M., & Hudson-Smith, M. (2012). Making connections: a review of supply chain management and sustainability literature. *Supply Chain Management: An International Journal, 17*(5), 497–516. doi:10.1108/13598541211258573

Awan, U., Kraslawski, A., & Huiskonen, J. (2018). Buyer-supplier relationship on social sustainability: Moderation analysis of cultural intelligence. *Cogent Business & Management, 5*(1), 1–20. doi:10.1080/23311975.2018.1429346

Awaysheh, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. *International Journal of Operations & Production Management, 30*(12), 1246–1268. doi:10.1108/01443571011094253

Barbero, S., & Toso, D. (2010). Systemic design of a productive chain: Reusing coffee waste as an input to agricultural production. *Environmental Quality Management, 19*(3), 67–77. doi:10.1002/tqem.20254

Barbrow, S., & Hartline, M. (2015). Process mapping as organizational assessment in academic libraries. *Performance Measurement and Metrics, 16*(1), 34–47. doi:10.1108/PMM-11-2014-0040

Barroso, A., Machado, V., & Machado, V. C. (2011). Supply chain resilience using the mapping approach. *Supply chain management*, 161–184.

Basole, R. C., & Bellamy, M. A. (2014). Supply Network Structure, Visibility, and Risk Diffusion: A Computational Approach. *Decision Sciences, 45*(4), 753–789. doi:10.1111/deci.12099

Basole, R. C., Bellamy, M. A., & Park, H. (2017). Visualization of Innovation in Global Supply Chain Networks. *Decision Sciences, 48*(2), 288–306. doi:10.1111/deci.12213

Beaty, C. (2013). An Introduction to the Three R's of Sustainability. Retrieved May 30, 2020 from https://www.wildlifehc.org/an-introduction-to-the-three-rs-of-sustainability/

Bell, E., Bryman, A., & Harley, B. (2019). *Business Research Methods* (5 ed.). New York, NY: Oxford University Press.

Beshah, B., Kitaw, D., & Dejene, T. (2013). Quality and value chain analyses of Ethiopian coffee. *Journal of Agriculture and Social Research, 13*(2), 35–41.

Beyene, A., Kassahun, Y., Addis, T., Assefa, F., Amsalu, A., Legesse, W., Kloos, H., & Triest, L. (2012). The impact of traditional coffee processing on river water quality in Ethiopia and the urgency of adopting sound environmental practices. *Environmental Monitoring and Assessment, 184*(11), 7053–7063. doi:10.1007/s10661-011-2479-7

Bijman, J., Muradian, R., & Cechin, A. (2011). Agricultural cooperatives and value chain coordination. In A. H. J. B. Helmsing, & S. Vellema (Eds.), *Value chains, social inclusion and economic development: Contrasting theories and realities* (pp. 82–101). Retrieved from https://books.google.no/books?hl=en&lr=&id=f7HUCl51wyoC&oi=fnd&pg=PA82&dq=Bijman,+J.,+Muradian,+R.,+%26+Cechin,+A.+(2011).+Agricultural+cooperatives+and+value+chain+coordination.+Value+chains,+social+inclusion+and+economic+development:+Contrasting+theories+and+realities,+82-101.&ots=l71CfC2cpE&sig=BqR3mlT0VROqyFPYm-Aao-Or7pk&redir_esc=y#v=onepage&q&f=false

Braccini, A. M., & Margherita, E. G. (2019). Exploring organizational sustainability of industry 4.0 under the triple bottom line: The case of a manufacturing company. *Sustainability, 11*(1), 1–17. doi:10.3390/su11010036

Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. *European Journal of Operational Research, 233*(2), 299–312. doi:10.1016/j.ejor.2013.09.032

Busse, C., Schleper, M. C., Weilenmann, J., & Wagner, S. M. (2017). Extending the supply chain visibility boundary. *International Journal of Physical Distribution & Logistics Management, 47*(1), 18–40. doi:10.1108/IJPDLM-02-2015-0043

Byrne, M. (2001). Sampling for qualitative research. *AORN journal, 73*(2), 494–494.

Candelo, E., Casalegno, C., Civera , C., & Mosca, F. (2018). Turning Farmers into Business Partners through Value Co-Creation Projects. Insights from the Coffee Supply Chain. *Sustainability, 10*(4), 1018. doi:10.3390/su10041018

Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. *nternational Journal of Physical Distribution & Logistics Management, 38*(5), 360–387. doi:10.1108/09600030810882816

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The Use of Triangulation in Qualitative Research. *Oncology Nursing Forum, 41*(5), 545–547.

Castka, P., & Balzarova, M. A. (2008). ISO 26000 and supply chains—On the diffusion of the social responsibility standard. *International Journal of Production Economics, 111*(2), 274–286. doi:10.1016/j.ijpe.2006.10.017

CCS. (2018). CHANGES TO THE ETHIOPIAN COMMODITIES EXCHANGE. Retrieved June 23, 2020 from https://www.collaborativecoffeesource.com/the-collaborative-blog/2018/4/10/changes-to-the-ethiopian-commodities-exchange

Chambo, S. A. (2009). *Agricultural co-operatives: role in food security and rural development*. Paper presented at the UN expert group meeting on cooperatives. April. NY.

Chandra, C., & Kumar, S. (2001). Enterprise architectural framework for supply-chain integration. *Industrial Management & Data Systems, 101*(6), 290–304. doi:10.1108/EUM0000000005578

Chauhan, R., Hooda, M., & Tanga, A. A. (2015). Coffee: the backbone of Ethiopian economy. *International Journal of Economic Plants, 1*(2), 82–86.

Chopra, S., & Meindl, P. (2016). *Supply chain management : strategy, planning, and operation* (6th ed., Global ed.). Harlow: Pearson.

Christopher, M. (2016). *Logistics & supply chain management* (5th ed.). London: FT Publishing International.

Christopher, M., & Peck, H. (2004). Building the Resilient Supply Chain. *The International Journal of Logistics Management, 15*(2), 1–14. doi:10.1108/09574090410700275

Coombes, L., Allen, D., Humphrey, D., & Neale, J. (2009). In-depth interviews. In J. Neale (Ed.), *Research Methods for Health and Social Care* (pp. 197–210): Palgrave MacMillan.

CQ University. (2019). Evaluating Books, Journals, Journal Articles and Websites. Retrieved June 17, 2020 from https://libguides.library.cqu.edu.au/c.php?g=760902&p=5456702

Craighead, C. W., Blackhurst, J., Rungtusanatham, M. J., & Handfield, R. B. (2007). The Severity of Supply Chain Disruptions: Design Characteristics and Mitigation Capabilities. *Decision Sciences, 38*(1), 131–156. doi:10.1111/j.1540-5915.2007.00151.x

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology, 11*(1), 1–9. doi:10.1186/1471-2288-11-100

Curtis, K. R. (2008). *Conducting Market Research Using Primary Data*. Department of Resource Economics. University of Nevada. Reno. Retrieved June 5, 2020 from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.533.765&rep=rep1&type=pdf

Devika, K., Jafarian, A., & Nourbakhsh, V. (2014). Designing a sustainable closed-loop supply chain network based on triple bottom line approach: A comparison of metaheuristics hybridization techniques. *European Journal of Operational Research, 235*(3), 594–615. doi:10.1016/j.ejor.2013.12.032

Dragusanu, R., Giovannucci, D., & Nunn, N. (2014). The Economics of Fair Trade. *Journal of Economic Perspectives, 28*(3), 217–236. doi:10.1257/jep.28.3.217

Dubey, R., Gunasekaran, A., Papadopoulos, T., Childe, S. J., Shibin, K., & Wamba, S. F. (2017). Sustainable supply chain management: framework and further research directions. *Journal of Cleaner Production, 142*, 1119–1130.

Duckett, M. K. (2019). Growing a sustainable coffee future. Retrieved April 22, 2020 from https://www.nationalgeographic.com/environment/2019/07/partner-content-growing-a-sustainable-coffee-future/

Dudovskiy, J. (2016). The Ultimate Guide to Writing a Dissertation in Business Studies: A Step-by-Step Assistance (1 ed.). ebook.

Durevall, D. (2020). Fairtrade and Market Efficiency: Fairtrade-Labeled Coffee in the Swedish Coffee Market. *Economies, 8*(2), 30. doi:10.3390/economies8020030

Dyck, B., Walker, K., & Caza, A. (2019). Antecedents of sustainable organizing: A look at the relationship between organizational culture and the triple bottom line. *Journal of Cleaner Production, 231*, 1235–1247. doi:10.1016/j.jclepro.2019.05.287

ECX. (2020). How ECX Work. Retrieved April 6, 2020 from http://www.ecx.com.et/Pages/AboutUs.aspx

Encyclopedia.com. (2020). Snowballing technique. In *Encyclopedia.com*.

Enticott, J., Buck, K., & Shawyer, F. (2018). Finding "hard to find" literature on hard to find groups: A novel technique to search grey literature on refugees and asylum seekers. *International Journal of Methods in Psychiatric Research, 27*(1), 1–7. doi:10.1002/mpr.1580

European Commission. (2018). Data protection in the EU. Retrieved January 20, 2020 from https://ec.europa.eu/info/law/law-topic/data-protection/data-protection-eu_en

Fairtrade. (2020). AIMS OF THE FAIRTRADE STANDARDS. Retrieved June 15, 2020 from https://www.fairtrade.net/standard/aims

Falasca, M., Zobel, C. W., & Cook, D. (2008). *A decision support framework to assess supply chain resilience.* Paper presented at the Proceedings of the 5th International ISCRAM Conference. (pp. 596-605)

FAO. (2020). Voluntary sustainability standards for bananas. Retrieved June 23, 2020 from http://www.fao.org/world-banana-forum/projects/good-practices/voluntary-sustainability-standards/en/

Farris, M. T. (2010). Solutions to strategic supply chain mapping issues. *International Journal of Physical Distribution & Logistics Management, 40*(3). doi:10.1108/09600031011035074

FAS. (2019). *Ethiopia: Coffee Annual, Coffee Annual Report* (ET1904). Retrieved April 13, 2020 from https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Coffee%20Annual_Addis%20Ababa_Ethiopia_5-29-2019.pdf

Ferro, C., Padin, C., Høgevold, N., Svensson, G., & Varela, J. C. S. (2019). Validating and expanding a framework of a triple bottom line dominant logic for business sustainability through time and across contexts. *Journal of Business & Industrial Marketing, 34*(1), 95–116. doi:10.1108/JBIM-07-2017-0181

Fisher, M., & Lewin, P. A. (2013). Household, community, and policy determinants of food insecurity in rural Malawi. *Development Southern Africa, 30*(4-5), 451–467. doi:10.1080/0376835X.2013.830966

Foot, D. K., & Ross, S. (2017). Social Sustainability. In C. Galea (Ed.), *Teaching Business Sustainability: From Theory to Practice*. Retrieved from https://books.google.no/books?id=3J1ADwAAQBAJ&pg=PT167&lpg=PT167&dq=social+sustainability+mutual+understanding&source=bl&ots=vS_2nr4x3v&sig=ACfU3U105IwaGGadBUgIQzEKKUmuPQMcAg&hl=no&sa=X&ved=2ahUKEwjTooqv4ZfqAhXLw6YKHa7RDHsQ6AEwAXoECA0QAQ#v=onepage&q=social%20sustainability%20mutual%20understanding&f=false

Formentini, M., & Taticchi, P. (2016). Corporate sustainability approaches and governance mechanisms in sustainable supply chain management. *Journal of Cleaner Production, 112*, 1920–1933. doi:10.1016/j.jclepro.2014.12.072

Francisco, K., & Swanson, D. (2018). The Supply Chain Has No Clothes: Technology Adoption of Blockchain for Supply Chain Transparency. *Logistics, 2*(1), 1–13. doi:10.3390/logistics2010002

Fufa, B. O., Etana, M. B., & Aga, M. C. (2019). Review on Post-Harvest and Green Bean Coffee Processing in Ethiopia. *Acta Scientific Agriculture, 3*(7), 157–162. doi:10.31080/asag.2019.03.0536

Galdo, J., Dammert, A. C., & Abebaw, D. (2019). Child Labor Measurement in Agricultural Households: Seasonality, Proxy Respondent and Gender Information Gaps in Ethiopia. *Growth and Labour Markets in Low Income Countries Programme*, 1–38.

Gardner, J. T., & Cooper, M. C. (2003). STRATEGIC SUPPLY CHAIN MAPPING APPROACHES. *Journal of Business Logistics, 24*(2), 37–64. doi:10.1002/j.2158-1592.2003.tb00045.x

Garo, G., Shara, S., & Mare, Y. (2016). Assessment of harvest and post-harvest factors affecting quality of Arabica coffee in Gamo Gofa Zone, Southern Ethiopia. *African Journal of Agricultural Research, 11*(24), 2157–2165. doi:10.5897/AJAR2015.10449

Gashaw, B. A., Habteyesus, D. G., & Nedjo, Z. S. (2018). Value Chain Analysis of Coffee in Jimma Zone of Oromia Regional State, Ethiopia. *American Based Research Journal, 7*(11), 8–17.

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy? A new sustainability paradigm? *Journal of Cleaner Production, 143*(C), 757–768. doi:10.1016/j.jclepro.2016.12.048

Genovese, A., Acquaye, A. A., Figueroa, A., & Koh, S. L. (2017). Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. *Omega, 66*, 344–357. doi:10.1016/j.omega.2015.05.015

Gibbs, L., Kealy, M., Willis, K., Green, J., Welch, N., & Daly, J. (2007). What have sampling and data collection got to do with good qualitative research? *Australian and New Zealand Journal of Public Health, 31*(6), 540–544. doi:10.1111/j.1753-6405.2007.00140.x

Goddard, T. (2017). Do Social Objectives Integrate with Core Corporate Objectives? – The Future of Social Auditing. In S. Schaltegger & M. Wagner (Eds.), *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance*. Retrieved from https://books.google.no/books?id=Gqo0DwAAQBAJ&lpg=PT9&ots=wd

BSKe1ifW&dq=Schaltegger%20%26%20Wagner%2C%202017&lr&pg=PT63#v=onepage&q&f=false

Goh, C. S., Chong, H.-Y., Jack, L., & Faris, A. F. M. (2020). Revisiting triple bottom line within the context of sustainable construction: A systematic review. *Journal of Cleaner Production, 252*, 1–10. doi:10.1016/j.jclepro.2019.119884

Golicic, S. L., & Smith, C. D. (2013). A meta-analysis of environmentally sustainable supply chain management practices and firm performance. *Journal of Supply Chain Management, 49*(2), 78–95. doi:10.1111/jscm.12006

Goodarzi, S., Fahimnia, B., & Sarkis, J. (2019). Sustainable supply chain Management and carbon emissions. In J. Sarkis (Ed.), *Handbook of the Sustainable Supply Chain* (pp. 377–388). Retrieved from https://books.google.no/books?id=9ZGODwAAQBAJ&lpg=PA538&dq=supply%20chain%20mapping%20no%20focal%20company&hl=no&pg=PP1#v=onepage&q&f=false

Gray, D. E. (2019). *Doing Research in the Business World*. Los Angeles, USA: Sage Publications Limited.

Gripsrud, G., Jahre, M., & Persson, G. (2006). Supply chain management - back to the future? *International Journal of Physical Distribution & Logistics Management, 36*(8), 643–659. doi:10.1108/09600030610702907

Haaij, S. (2015). Coffee revolution: farmers roast their own beans. *AgriProFocus*, 62–63. Retrieved April 24, 2020 from https://agriprofocus.com/upload/Coffee_Revolution1435235808.pdf

Haddis, A., & Devi, R. (2008). Effect of effluent generated from coffee processing plant on the water bodies and human health in its vicinity. *Journal of Hazardous Materials, 152*(1), 259–262. doi:10.1016/j.jhazmat.2007.06.094

Haight, C. (2011). The Problem with Fair Trade Coffee. *Stanford Social Innovation Review, 9*(3), 74–79.

Henriques, A., & Richardson, J. (2004). *The triple bottom line: does it all add up? : assessing the sustainability of business and CSR*. London: Earthscan.

Hirons, M., Mehrabi, Z., Gonfa, T. A., Morel, A., Gole, T. W., McDermott, C., Boyd, E., Robinson, E., Sheleme, D., Malhi, Y., Mason, J., & Norris, K. (2018). Pursuing climate resilient coffee in Ethiopia – A critical review. *Geoforum, 91*, 108–116. doi:10.1016/j.geoforum.2018.02.032

Hoekstra, A. Y. (2008). The water footprint of food. In J. Förare (Ed.), *Water for food*. Stockholm: The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas).

Hofstetter, J. S., & Grimm, J. H. (2019). Multi-tier sustainable supply chain management. In J. Sarkis (Ed.), *Handbook of the Sustainable Supply Chain* (pp. 526–541). Retrieved from https://books.google.no/books?id=9ZGODwAAQBAJ&lpg=PA526&dq=supply%20chain%20mapping%20no%20focal%20company&hl=no&pg=PA538#v=onepage&q=supply%20chain%20mapping%20no%20focal%20company&f=false

Hong, J., Zhang, Y., & Ding, M. (2018). Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of Cleaner Production, 172*, 3508–3519. doi:10.1016/j.jclepro.2017.06.093

Hundera, K., Aerts, R., Fontaine, A., Mechelen, M., Gijbels, P., Honnay, O., & Muys, B. (2013). Effects of Coffee Management Intensity on

Composition, Structure, and Regeneration Status of Ethiopian Moist Evergreen Afromontane Forests. *Environmental Management, 51*(3), 801–809. doi:10.1007/s00267-012-9976-5

ICO. (2019). WELCOME TO INTERNATIONAL COFFEE DAY 2019. Retrieved April 23, 2020 from https://www.internationalcoffeeday.org/?section=Meetings_and_Documents

ICO. (2020a). Historical Data on the Global Coffee Trade. Retrieved April 14, 2020 from http://www.ico.org/new_historical.asp

ICO. (2020b). *Impact of Covid-19 on the Global Coffee Sector: The Demand Side*. Retrieved April 20, 2020 from http://www.ico.org/documents/cy2019-20/coffee-break-series-1e.pdf

ICO. (n.d.). Developing a sustainable coffee economy. Retrieved June 13, 2020 from http://www.ico.org/sustaindev_e.asp?section=What_We_Do

Ishak, N. M., Bakar, A., & Yazid, A. (2014). Developing Sampling Frame for Case Study: Challenges and Conditions. *World Journal of Education, 4*(3), 29–35. doi:10.5430/wje.v4n3p29

IWH. (2015). What researchers mean by…Primary and secondary data. *At Work(82),* 1–8. Retrieved June 15, 2020 from https://www.iwh.on.ca/sites/iwh/files/iwh/at-work/at_work_82.pdf

Jaca, C., Prieto-Sandoval, V., Psomas, E. L., & Ormazabal, M. (2018). What should consumer organizations do to drive environmental sustainability? *Journal of Cleaner Production, 181*, 201–208. doi:10.1016/j.jclepro.2018.01.182

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. *Qualitative Report, 17*, 6.

Jena, P. R., Chichaibelu, B. B., Stellmacher, T., & Grote, U. (2012). The impact of coffee certification on small-scale producers' livelihoods: a case study from the Jimma Zone, Ethiopia. *Agricultural economics, 43*(4), 429–440.

Johannessen, S., & Wilhite, H. (2010). Who really benefits from fairtrade? An analysis of value distribution in fairtrade coffee. *Globalizations, 7*(4), 525–544. doi:10.1080/14747731.2010.505018

Junior, A. N., de Oliveira, M. C., & Helleno, A. L. (2018). Sustainability evaluation model for manufacturing systems based on the correlation between triple bottom line dimensions and balanced scorecard perspectives. *Journal of Cleaner Production, 190*, 84–93. doi:10.1016/j.jclepro.2018.04.136

Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of advanced nursing, 72*(12), 2954–2965. doi:10.1111/jan.13031

Kalton, G., & Anderson, D. W. (1986). Sampling rare populations. *Journal of the Royal Statistical Society: Series A (General), 149*(1), 65–82.

Kasso, M., & Bekele, A. (2018). Post-harvest loss and quality deterioration of horticultural crops in Dire Dawa Region, Ethiopia. *Journal of the Saudi Society of Agricultural Sciences, 17*(1), 88–96. doi:10.1016/j.jssas.2016.01.005

Kim, J., & Rhee, J. (2012). An empirical study on the impact of critical success factors on the balanced scorecard performance in Korean green supply chain management enterprises. *International Journal of Production Research, 50*(9), 2465–2483. doi:10.1080/00207543.2011.581009

King, N., Horrocks, C., & Brooks, J. (2018). *Interviews in qualitative research*: SAGE Publications Limited.

Klassen, R. D., & Vereecke, A. (2012). Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance. *International Journal of Production Economics, 140*(1), 103–115. doi:10.1016/j.ijpe.2012.01.021

Koberg, E., & Longoni, A. (2019). A systematic review of sustainable supply chain management in global supply chains. *Journal of Cleaner Production, 207*, 1084–1098. doi:10.1016/j.jclepro.2018.10.033

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The Concept and its Limitations. *Ecological Economics, 143*, 37–46. doi:10.1016/j.ecolecon.2017.06.041

Kornman, C. (2019). Exchange is the Only Constant: The Evolution of Ethiopia's Commodity Marketplace. *Roast Magazine*. Retrieved June 22, 2020 from https://drive.google.com/file/d/1vt8MMBtZgJvJlTM7ZjTZYEGPM8r83y_Q/view

Krishnan, S. (2017). Sustainable coffee production. In *Oxford Research Encyclopedia of Environmental Science* (pp. 1–32). doi:10.1093/acrefore/9780199389414.013.224

Kufa, T., & Burkhardt, M. J. (2011). Plant composition and growth of wild Coffea arabica: Implications for management and conservation of natural forest resources. *International Journal of Biodiversity and Conservation, 3*(4), 131–141.

Kumar, G., & Goswami, M. (2019). Sustainable supply chain performance, its practice and impact on barriers to collaboration. *International Journal of Productivity and Performance Management, 68*(8), 1434–1456. doi:10.1108/IJPPM-12-2018-0425

Kuzeljevich, J. (2016). THE TRIPLE BOTTOM LINE. *Canadian Shipper, 119*(1), 37.

Laderach, P., Lundy, M., Jarvis, A., Ramirez, J., Portilla, E. P., Schepp, K., & Eitzinger, A. (2011). Predicted impact of climate change on coffee supply chains. In *The economic, social and political elements of climate change* (pp. 703–723): Springer.

Lambert, D. M. (2008). *Supply chain management: processes, partnerships, performance*: Supply Chain Management Institute.

Lambert, D. M., & Enz, M. G. (2017). Issues in supply chain management: Progress and potential. *Industrial Marketing Management, 62*, 1–16. doi:10.1016/j.indmarman.2016.12.002

Lankoski, L. (2017). Environmental and Economic Performance – The Basic Links. In S. Schaltegger & M. Wagner (Eds.), *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance.* Retrieved from https://books.google.no/books?id=Gqo0DwAAQBAJ&lpg=PT9&ots=wdBSKe1ifW&dq=Schaltegger%20%26%20Wagner%2C%202017&lr&pg=PT63#v=onepage&q&f=false

Laurell, H., Karlsson, N. P., Lindgren, J., Andersson, S., & Svensson, G. (2019). Re-testing and validating a triple bottom line dominant logic for business sustainability. *Management of Environmental Quality: An International Journal, 30*(3), 1477–7835. doi:10.1108/MEQ-02-2018-0024

Lee, D.-H. (2019). Building evaluation model of biohydrogen industry with circular economy in Asian countries. *International Journal of Hydrogen Energy, 44*(6), 3278–3289. doi:10.1016/j.ijhydene.2018.09.069

Leppelt, T., Foerstl, K., Reuter, C., & Hartmann, E. (2013). Sustainability management beyond organizational boundaries–sustainable supplier relationship management in the chemical industry. *Journal of Cleaner Production, 56*, 94–102. doi:10.1016/j.jclepro.2011.10.011

Lim, C. H., & Lam, H. L. (2016). Biomass supply chain optimisation via novel biomass element life cycle analysis (BELCA). *Applied Energy, 161*, 733–745. doi:10.1016/j.apenergy.2015.07.030

Lim, M. K., Tseng, M.-L., Tan, K. H., & Bui, T. D. (2017). Knowledge management in sustainable supply chain management: Improving performance through an interpretive structural modelling approach. *Journal of Cleaner Production, 162*, 806–816. doi:10.1016/j.jclepro.2017.06.056

Longoni, A., & Cagliano, R. (2018). Sustainable innovativeness and the triple bottom line: The role of organizational time perspective. *Journal of Business Ethics, 151*(4), 1097–1120.

Longoni, A., Golini, R., & Cagliano, R. (2014). The role of New Forms of Work Organization in developing sustainability strategies in operations. *International Journal of Production Economics, 147*, 147–160. doi:10.1016/j.ijpe.2013.09.009

Mandal, S. (2014). Supply chain resilience: a state-of-the-art review and research directions. *International Journal of Disaster Resilience in the Built Environment, 5*(4), 427–453. doi:10.1108/IJDRBE-03-2013-0003

Mani, V., Agarwal, R., Gunasekaran, A., Papadopoulos, T., Dubey, R., & Childe, S. J. (2016). Social sustainability in the supply chain: Construct development and measurement validation. *Ecological Indicators, 71*, 270–279. doi:10.1016/j.ecolind.2016.07.007

Markets Insider (2020). Coffee Commodity. Business Insider. Retrieved on June 18, 2020, from https://markets.businessinsider.com/commodities/coffee-price

Martins, V., Rampasso, I., Anholon, R., Quelhas, O., & Leal Filho, W. (2019). Knowledge management in the context of sustainability: Literature review and opportunities for future research. *Journal of Cleaner Production, 229*, 489–500. doi:10.1016/j.jclepro.2019.04.354

Minten, B., Assefa, T., & Hirvonen, K. (2017). Can Agricultural Traders be Trusted? Evidence from Coffee in Ethiopia. *World Development, 90*, 77–88. doi:10.1016/j.worlddev.2016.08.018

Minten, B., Dereje, M., Engeda, E., & Tamru, S. (2015). Who benefits from the rapidly increasing Voluntary Sustainability Standards? Evidence from Fairtrade and Organic certified coffee in Ethiopia. *Ethiopia Strategy Support Program, Working Paper, 71,* 1–25.

Minten, B., Dereje, M., Engida, E., & Kuma, T. (2019). Coffee value chains on the move: Evidence in Ethiopia. *Food Policy, 83*, 370–383. doi:10.1016/j.foodpol.2017.07.012

Minten, B., Dereje, M., Engida, E., & Tamru, S. (2018). Tracking the Quality Premium of Certified Coffee: Evidence from Ethiopia. *World Development, 101*, 119–132.

Minten, B., Tamru, S., Kuma, T., & Nyarko, Y. (2014). *Structure and performance of Ethiopia s coffee export sector* (Vol. 66): Intl Food Policy Res Inst.

Mitiku, F., De Mey, Y., Nyssen, J., & Maertens, M. (2017a). Do private sustainability standards contribute to income growth and poverty

alleviation? A comparison of different coffee certification schemes in Ethiopia. *Sustainability, 9*(2), 1–21. doi:10.3390/su9020246

Mitiku, F., Nyssen, J., & Maertens, M. (2017b). *Can Coffee Certification Promote Land-sharing and Protect Forest in Ethiopia?* Working Paper. Department of Earth and Environmental Sciences. University of Leuven. Belgium. doi: 10.22004/ag.econ.253567

Murthy, P. S., & Madhava Naidu, M. (2012). Sustainable management of coffee industry by-products and value addition—A review. *Resources, Conservation & Recycling, 66*, 45–58. doi:10.1016/j.resconrec.2012.06.005

Mussatto, S., Machado, E., Martins, S., & Teixeira, J. (2011). Production, Composition, and Application of Coffee and Its Industrial Residues. *An International Journal, 4*(5), 661–672. doi:10.1007/s11947-011-0565-z

National Geographic. (n.d.). SAVOR THE FLAVORS OF AN ANCIENT COFFEE. Retrieved April 22, 2020 from https://www.nationalgeographic.com/beyond-the-bean/map/coffee-craftsmanship/article-ethiopia/

Nichols, B. S., Stolze, H., & Kirchoff, J. F. (2019). Spillover effects of supply chain news on consumers' perceptions of product quality: An examination within the triple bottom line. *Journal of Operations Management, 65*(6), 536–559. doi: 10.1002/joom.1033

Nordic Approach. (n.d.-a). Coffee Calendar. Retrieved April 21, 2020 from https://nordicapproach.no/coffee-calendar/

Nordic Approach. (n.d.-b). Ethiopia. Retrieved June 23, 2020 from https://nordicapproach.no/origins/ethiopia/

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods, 16*(1), 1–13. doi:10.1177/1609406917733847

NSD. (2019). Nye Personvernløsninger. Retrieved April 4, 2020 from https://nsd.no/personvernombud/ledelse_administrasjon/nye_personvernlosninger.html

Nugusse, W. Z., Van Huylenbroeck, G., & Buysse, J. (2013). Household food security through cooperatives in northern Ethiopia. *International Journal of Cooperative Studies, 2*(1), 34–45. doi:10.11634/216826311302358

Nure, D. (2008). Mapping quality profiles of ethiopian coffee by origin. In *Coffee Diversity & Knowledge. Ethiopian Institute of Agricultural Research* (pp. 317–227). Addis Ababa.

Padmapriya, R., Tharian, J. A., & Thirunalasundari, T. (2013). Coffee waste management – An overview. *Current Science Journal, 9*, 83–91.

Paget, S., & Regan, H. (2019). Ethiopia plants more than 350 million trees in 12 hours. *CNN*. Retrieved June 12, 2020 from https://edition.cnn.com/2019/07/29/africa/ethiopia-plants-350-million-trees-intl-hnk/index.html

Park, H., Bellamy, M. A., & Basole, R. C. (2016). Visual analytics for supply network management: System design and evaluation. *Decision Support Systems, 91*, 89–102. doi:10.1016/j.dss.2016.08.003

Persson, G., & Grønland, S. E. (2002). Supply chain management: en flerdisiplinær studie av integrerte forsyningskjeder. Retrieved March 10, 2020 from http://hdl.handle.net/11250/94135

Poltronieri, P., & Rossi, F. (2016). Challenges in Specialty Coffee Processing and Quality Assurance. *Challenges, 7*(2), 19. doi:10.3390/challe7020019

Prasad, D. S., Pradhan, R. P., Gaurav, K., Chatterjee, P. P., Kaur, I., Dash, S., & Nayak, S. (2018). Analysing the critical success factors for implementation of sustainable supply chain management: an Indian case study. *Decision, 45*(1), 3–25. doi:10.1007/s40622-017-0171-7

Pusavec, F., Krajnik, P., & Kopac, J. (2010). Transitioning to sustainable production ? Part I: application on machining technologies. *Journal of Cleaner Production, 18*(2), 174–184. doi:10.1016/j.jclepro.2009.08.010

Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting & Management, 8*(3), 238–264. doi:10.1108/11766091111162070

RA. (2020a). 2020 Rainforest Alliance Certification Program. Retrieved June 15, 2020 from https://www.rainforest-alliance.org/business/sustainable-farming/farm-certification/2020-rainforest-alliance-certification-standard/

RA. (2020b). ISSUES. Retrieved June 15, 2020 from https://www.rainforest-alliance.org/issues

Rajak, S., & Vinodh, S. (2015). Application of fuzzy logic for social sustainability performance evaluation: a case study of an Indian automotive component manufacturing organization. *Journal of Cleaner Production, 108*, 1184–1192. doi:10.1016/j.jclepro.2015.05.070

Rajeev, A., Pati, R. K., Padhi, S. S., & Govindan, K. (2017). Evolution of sustainability in supply chain management: A literature review. *Journal of Cleaner Production, 162*, 299–314. doi:10.1016/j.jclepro.2017.05.026

Raut, R. D., Narkhede, B., & Gardas, B. B. (2017). To identify the critical success factors of sustainable supply chain management practices in the context of oil and gas industries: ISM approach. *Renewable and Sustainable Energy Reviews, 68*(1), 33–47. doi:10.1016/j.rser.2016.09.067

Raynolds, L. T. (2009). Mainstreaming Fair Trade Coffee: From Partnership to Traceability. *World Development, 37*(6), 1083–1093. doi:10.1016/j.worlddev.2008.10.001

Roehrich, J. K., Hoejmose, S. U., & Overland, V. (2017). Driving green supply chain management performance through supplier selection and value internalisation. *International Journal of Operations & Production Management, 37*(4), 489–509. doi:10.1108/IJOPM-09-2015-0566

Rubin, H. J., & Rubin, I. (2011). *Qualitative interviewing: the art of hearing data* (3rd ed.): Sage.

Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research, 57*(7), 2117–2135. doi:10.1080/00207543.2018.1533261

Savitz, A., & Weber, K. (2014). The triple bottom line: How today's best-run companies are achieving economic, social, and environmental success--and how you can too (Revised and updated. ed.). San Francisco, California: Jossey-Bass.

Schaltegger, S., Burritt, R., Acquaye, A., Genovese, A., Barrett, J., & Koh, S. L. (2014). Benchmarking carbon emissions performance in supply chains. *Supply Chain Management: An International Journal*.

Schaltegger, S., & Wagner, M. (2017). Managing and Measuring the Business Case for Sustainability – Capturing the Relationship between Sustainability Performance, Business Competitiveness and Economic Performance. In S. Schaltegger & M. Wagner (Eds.), *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance*. Retrieved from

https://books.google.no/books?id=Gqo0DwAAQBAJ&lpg=PT9&ots=wdBSKe1ifW&dq=Schaltegger%20%26%20Wagner%2C%202017&lr&pg=PT63#v=onepage&q&f=false

Schilling, M., & Chiang, L. (2011). The effect of natural resources on a sustainable development policy: The approach of non-sustainable externalities. *Energy policy, 39*(2), 990–998. doi:10.1016/j.enpol.2010.11.030

Scholz, M., Prudencio, S., Kitzberger, C., & Silva, R. (2019). Physico-chemical characteristics and sensory attributes of coffee beans submitted to two post-harvest processes. *Journal of Food Measurement and Characterization, 13*(1), 831–839. doi:10.1007/s11694-018-9995-x

Scott. (2015). When is Coffee Harvested? Retrieved April 21, 2020 from https://driftaway.coffee/when-is-coffee-harvested/

Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production, 16*(15), 1699–1710. doi:10.1016/j.jclepro.2008.04.020

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information, 22*(2), 63–75. doi:10.3233/EFI-2004-22201

Shou, Y., Shao, J., Lai, K.-h., Kang, M., & Park, Y. (2019). The impact of sustainability and operations orientations on sustainable supply management and the triple bottom line. *Journal of Cleaner Production, 240*, 1–13. doi:10.1016/j.jclepro.2019.118280

Shumeta, Z., & D'Haese, M. (2018). Do Coffee Farmers Benefit in Food Security from Participating in Coffee Cooperatives? Evidence from Southwest Ethiopia Coffee Cooperatives. *Food and Nutrition Bulletin, 39*(2), 266–280. doi:10.1177/0379572118765341

Slaper, T. F., & Hall, T. J. (2011). The triple bottom line: What is it and how does it work. *Indiana business review, 86*(1), 4–8.

Smith, M., Fannin, J. M., & Vlosky, R. P. (2009). Forest Industry Supply Chain Mapping: An Application in Louisiana. *Forest Products Journal, 59*(6), 7–16.

Sun, S., Wang, X., & Zhang, Y. (2017). Sustainable traceability in the food supply chain: The impact of consumer willingness to pay. *Sustainability, 9*(6), 1–19. doi: 10.3390/su9060999

Swanson, D. L., & Orlitzky, M. (2018). Leading the Triple Bottom Line: A Corporate Social Responsibility Approach. In D. S. Ones, N. Anderson, C. Viswesvaran, & H. K. Sinangil (Eds.), *The Handbook of Industrial, Work & Organizational Psychology: Managerial Psychology and Organizational Approaches* (2nd ed.)(pp. 313–332). Retrieved from https://ebookcentral-proquest-com.ezproxy.library.bi.no/lib/bilibrary/reader.action?docID=5312946&ppg=344

Tadesse, G., Zavaleta, E., & Shennan, C. (2014). Coffee landscapes as refugia for native woody biodiversity as forest loss continues in southwest Ethiopia. *Biological Conservation, 169*(C), 384–391. doi:10.1016/j.biocon.2013.11.034

Takahashi, R., & Todo, Y. (2017). Coffee Certification and Forest Quality: Evidence from a Wild Coffee Forest in Ethiopia. *World Development, 92*, 158–166. doi:10.1016/j.worlddev.2016.12.001

Tamru, S., & Minten, B. (2018). Investing in wet mills and washed coffee in Ethiopia: Benefits and constraints (Vol. 121). IFPRI: International Food Policy Research Institute.

Tamru, S., Minten, B., & Swinnen, J. (2019). Trade, value chains, and rent distribution with foreign exchange controls: Coffee exports in Ethiopia (Vol. 136). IFPRI: International Food Policy Research Institute.

Tate, W. L., & Bals, L. (2018). Achieving Shared Triple Bottom Line (TBL) Value Creation: Toward a Social Resource-Based View (SRBV) of the Firm. *Journal of Business Ethics, 152*(3), 803–826. doi:10.1007/s10551-016-3344-y

TechnoServe. (n.d.). Water Wise Coffee. Retrieved June 13, 2020 from https://www.technoserve.org/our-work/projects/water-purification-project/

Tefera, A. (2016). *Ethiopia: Coffee annual, Coffee Production and Exports Remain Steady* (ET1615). Retrieved April 10, 2020 from https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Coffee%20Annual_Addis%20Ababa_Ethiopia_6-13-2016.pdf

Tefera, A., & Tefera, T. (2014). *Ethiopia: Coffee Annual, Coffee Annual Report* (ET 1402). Retrieved April 10, 2020 from https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Coffee%20Annual_Addis%20Ababa_Ethiopia_5-12-2014.pdf

Tikkanen, I., & Jaakkola, L. (2019). Sustainable value chain activities towards sustainable food services: a case study from Finland. *Journal of Hospitality and Tourism Insights, 2*(4), 409–424. doi:10.1108/JHTI-12-2018–0086

Tröster, B. (2015). *Global commodity chains, financial markets, and local market structures: Price risks in the coffee sector in Ethiopia*. Working Paper. Austrian Foundation for Development Research (ÖFSE). Vienna.

Tseng, M., Lim, M., & Wong, W. P. (2015). Sustainable supply chain management. *Industrial Management & Data Systems, 115*(3), 436–461. doi:10.1108/IMDS-10-2014-0319

UN. (1987). *Our Common Future*. Retrieved March 20, 2020 from https://sswm.info/sites/default/files/reference_attachments/UN%20WCED%201987%20Brundtland%20Report.pdf

UN. (2019). Circular Economy Crucial for Paris Climate Goals. Retrieved March 20, 2020 from https://unfccc.int/news/circular-economy-crucial-for-paris-climate-goals

UN Environment Programme. (2019). Ethiopia plants over 350 million trees in a day, setting new world record. Retrieved June 12, 2020 from https://www.unenvironment.org/news-and-stories/story/ethiopia-plants-over-350-million-trees-day-setting-new-world-record

UNGCO. (2014). A Guide to Traceability. A Practical Approach to Advance Sustainability in Global Supply Chains. In. New York, NY: United Nations Global Compact Office.

UNIDO. (2014). *Improving the Sustainability and Inclusiveness of the Ethiopian Coffee Value Chain through Private and Public Partnership*. Retrieved November 11, 2019 from https://open.unido.org/api/documents/2264814/download/final%20project%20document

Utz. (2019). UTZ: What's in a name? Retrieved June 15, 2020 from https://utz.org/better-business-hub/marketing-sustainable-products/utz-whats-in-a-name/

Utz. (2020a). Certification. Retrieved June 15, 2020 from https://utz.org/what-we-offer/certification/

Utz. (2020b). Certification for Farmers. Retrieved June 15, 2020 from https://utz.org/what-we-offer/certification/for-farmers/

Vachon, S., & Mao, Z. (2008). Linking supply chain strength to sustainable development: a country-level analysis. *Journal of Cleaner Production, 16*(15), 1552–1560. doi:10.1016/j.jclepro.2008.04.012

Vanderhaegen, K., Akoyi, K. T., Dekoninck, W., Jocqué, R., Muys, B., Verbist, B., & Maertens, M. (2018). Do private coffee standards 'walk the talk'in improving socio-economic and environmental sustainability? *Global Environmental Change, 51*, 1–9.

Veleva, V., & Ellenbecker, M. (2001). Indicators of sustainable production: framework and methodology. *Journal of Cleaner Production, 9*(6), 519–549. doi:10.1016/S0959-6526(01)00010-5

Vuthy, T., Socheat, K., Keosothea, N., Sreymom, S., & Pirom, K. (2014). Impact of Farmer Organisations on Food Security: The Case of Rural Cambodia. CDRI Working Paper Series No. 95. Phnom Penh: CDRI

Walton, J. (2020, March 15). The 5 Countries That Produce the Most Coffee. Retrieved April 21, 2020 from https://www.investopedia.com/articles/investing/091415/5-countries-produce-most-coffee.asp

Wheeldon, J., & Åhlberg, M. K. (2012). *Visualizing Social Science Research: Maps, Methods, & Meaning*. Thousand Oaks, CA: SAGE Publications, Inc.

Wichmann, P., Brintrup, A., Baker, S., Woodall, P., & McFarlane, D. (2018). Towards automatically generating supply chain maps from natural language text. *IFAC-PapersOnLine, 51*(11), 1726–1731.

Wiersum, K., Gole, T., Gatzweiler, F., Volkmann, J., Bognetteau, E., & Wirtu, O. (2008). Certification of wild coffee in Ethiopia: experiences and challenges. *Forests, Trees and Livelihoods, 18*(1), 9–21. doi:10.1080/14728028.2008.9752614

Wilding, R., Wagner, B., Miemczyk, J., Johnsen, T. E., & Macquet, M. (2012). Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels. *Supply Chain Management: An International Journal, 17*(5), 478–496. doi:10.1108/13598541211258564

Wilhelm, M. M., Blome, C., Bhakoo, V., & Paulraj, A. (2016). Sustainability in multi-tier supply chains: Understanding the double agency role of the first-tier supplier. *Journal of Operations Management, 41*(1), 42–60. doi:10.1016/j.jom.2015.11.001

Wilson, J. P. (2015). The triple bottom line. *International Journal of Retail & Distribution Management, 43*(4/5), 432–447. doi:10.1108/IJRDM-11-2013-0210

Winkler, H. (2011). Closed-loop production systems?A sustainable supply chain approach. *CIRP Journal of Manufacturing Science and Technology, 4*(3), 243–246. doi:10.1016/j.cirpj.2011.05.001

Woldesenbet, A. G., Woldeyes, B., & Chandravanshi, B. S. (2014). Characteristics of Wet Coffee Processing Waste and Its Environmental Impact in Ethiopia. *International Journal of Research in Engineering and Science, 2*(4), 1–5.

Woldesenbet, A. G., Woldeyes, B., & Chandravanshi, B. S. (2015). WET COFFEE PROCESSING WASTE MANAGEMENT PRACTICE IN ETHIOPIA. *Asian Journal of Science and Technology, 6*(6), 1467–1471.

Woldesenbet, A. G., Woldeyes, B., & Chandravanshi, B. S. (2016). Bio-ethanol production from wet coffee processing waste in Ethiopia. *SpringerPlus, 5*(1), 1–7. doi:10.1186/s40064-016-3600-8

Wolf, J. (2008). *The Nature of Supply Chain Management Research : Insights from a Content Analysis of International Supply Chain Management Literature from 1990 to 2006* (1st ed.). Wiesbaden: Gabler Verlag.

World Bank. (2019). Seventh Ethiopia Economic Update: Special Topic: Poverty and Household Welfare in Ethiopia, 2011-2016 (English). Retrieved April 9, 2020 from http://documents.worldbank.org/curated/en/432421554200542956/Special-Topic-Poverty-and-Household-Welfare-in-Ethiopia-2011-2016

YCharts. (2020). New York Arabica Coffee Price. Retrieved June 12, 2020 from https://ycharts.com/indicators/new_york_arabica_coffee_price

Zhang, W., Padmanabhan, P., & Huang, C.-H. (2018). Firm level offshoring activities, pollution regulation, triple bottom line, and market structure: What do they have in common? *Journal of Cleaner Production, 195*, 618–624. doi:10.1016/j.jclepro.2018.05.232

7 Appendices

7.1 Appendix 1: Field Trip Report

Reflection Report – Study Trip to Ethiopia

Introduction

Name and Age: Birta Rós Ívarsdóttir (23) and Kristina A. Myklestu (24)
University: BI Norwegian Business School
Home University Program: MSc in Business, Major in Logistics, Operations and Supply Chain Management
Period in Ethiopia: Feb. 6th-20th, 2020 (Addis Abeba: 6-10th and 16-20th of February; Jimma: 10-16th of February).
Purpose and Approach of Thesis Project: Mapping out the coffee chain and detecting sustainability challenges in the value chain
Purpose of Stay: Data collection in the form of semi-structured interviews and observations.

Overall Experience

How did you find the university you visited?
When we first visited the university, we were a bit overwhelmed by all the attention we got. Almost all the students were staring at us, which we are not used to from our home university. We later heard that many students at Jimma University have never seen foreigners before, and this was one the reasons for their interest in us.

We experienced that Jimma University is a big university with several campuses located throughout Jimma. During our first day, we were lucky to get a guided tour of the university by two employees of the university. We started at the business campus where we met with the campus Dean and other employees and got an introduction to the university, including for example the number of students and types of students (fulltime, weekend, and so on), campuses, types of studies and so forth. Thereon, we explored the campus facilities including classrooms, computer rooms, libraries, cafeterias and gardens. We especially enjoyed seeing all the green areas of the campus, as they were welcoming and offered students a place to breathe

in the fresh air. We also saw one of the women's dormitories, which surprised us, as the room was quite small and there were 8 beds there.

After seeing the business campus, we crossed the bridge to the main campus. Here we saw the sports stadium, main library, study halls and swimming pool (which was under construction). The main library was especially interesting to see, as we were surprised to see the very dimmed lighting, and that it was overcrowded with students. As Norwegians we were also surprised with the low maintenance of the facilities, with broken windows, torn curtains and chairs, dust and spiderwebs. After having a walk around, we had a break at the faculty cafeteria, where we met other employees of the university, who seemed happy to meet us. We found this experience to be very welcoming.

Another day, we had the chance to visit the agriculture and veterinary medicine campus. Here we explored the great gardens - with its coffee plants, banana, avocado and cinnamon trees, pineapple plants and apes - and had the opportunity to ask questions to different employees of the university.

During our visit to Jimma University, we were lucky to meet a student who was also a teacher at the university. She invited us to one of her lectures, which gave us an insight on how different lectures are at Jimma compared to BI in Norway. One

of our main takeaways was the students' punctuality mentality. Some of them arrived 30 minutes after the lecture had begun, when the lecture only lasted 40 minutes. The teacher even said before the lecture that she did not expect her students to arrive on time. For us this is very strange, as we are used to punctuality, so much so, that we arrive 10 minutes before lectures start. Another key takeaway from our lecture visit was that the students had very varying English knowledge, leading to the teacher switching between English and several Ethiopian languages. This enabled all students to understand the lecture, and to learn.

How did you get help with contacts for interviews?

We got help finding contacts for interviews through the SUSTAIN project and our contacts at Yara International. Other than that, we applied the snowballing effect after talking to different professors and professionals during our stay in Ethiopia.

We started our planning and process of gaining contacts already last fall from Norway. We reached out to professors at Jimma University and told them about the purpose of our stay, of our master thesis and asked them to meet us during our stay in Jimma. Already at this point, we found it difficult to make concrete plans, as the professors could not pinpoint a specific time and place to meet.

During our campus tour, we met some professors, who were very interested in meeting us and would gladly talk to us on our thesis topic. This casual and spontaneous way of getting contacts was refreshing.

We expected more guidance from the responsible SUSTAIN project contact at Jimma, as we were more or less on our own throughout our stay. We were also surprised when our contact cancelled one of our meetings (with one of our master thesis contacts), as he believed that there were other matters that were more pressing in relations to the SUSTAIN project. We were told by our SUSTAIN-contact that

he would postpone our meeting by letting our contact know, which to our surprise he did not do. We felt very bad when we heard from our contact that he had been waiting for us all day.

Before and during our stay, we found it difficult to get in touch with people. Some replied days and even weeks before us contacting them, and some did not even reply, even if we sent multiple emails to get a response. In some cases, we found it easier to get hold of people by phone calling them.

Practical logistics while visiting

Jimma university provided us with a driver during our stay, which was very helpful, as getting transportation that felt safe with drivers that would understand us was not an easy affair. It was particularly useful as we had to travel to different sights, including the ECX, a coffee farm located in the outskirts of Jimma, and the university with its many campuses. Even though our driver provided by the university had a basic English understanding, it was sometimes difficult to agree on pickup time and place. The driver was also almost always late, which did not surprise us do to our knowledge of their punctuality - or lack of thereof - mentality.

The hotel we stayed at provided us with transportation to the airport, which was nice, as we had a lot of luggage, and we were four people. During our time in Ethiopia, we spent a week in the capital, Addis Abeba, where we were dependent on taxis most of the time. The hotel there also provided shuttle service to the airport.

Experiences in interviews and follow-up

Overall, the English level of our interview subjects was good. However, due to some language barriers and cultural differences, some misunderstandings occured. We also experienced that they talked about their research and interests instead of listening and answering our questions. This sometimes made it difficult for us to get the information we needed. We were forced to ask the same questions using different wording in hope of them understanding us better.

Some of our interview subjects seemed surprised that we were visiting Jimma, even though we had let them know in advance. We also expected our SUSTAIN-contact to have arranged some meetings and visits, as we discussed our first day in Jimma. It was a bit disappointing hearing "if I had known you were coming, we could have helped you" from some of our contacts at the university.

Most people we talked to and met were very happy to help, which made us feel more welcome.

In terms of follow up, we found it challenging to get a hold of people. We see the importance of sending multiple emails and contacting people in different ways.

Events/issues that surprised you the most

Event/issue 1: Meeting Locals

One of the things we valued the most during our stay was to get to know locals. We met a student who was also a teacher at the university, and we became good friends. She showed us different parts of Jimma that we otherwise would not have seen and experienced. We got to taste local food and got to live as locals for a few days. This would not have been possible if we had only been us four students from BI.

One of the events we enjoyed the most was when she invited us to her home and introduced us to the people she lives with. We got to experience a coffee ceremony in authentic surroundings with local people. We highly appreciate this experience, as we have heard that coffee ceremonies are a major part of their culture and a big part of their lives. We were surprised to hear that they never drink coffee alone, as it is a way of gathering people and spending time together. This is very different from our culture, where it is normal to relax and enjoy a cup of coffee in silence by yourself, as well as drinking it in social settings. In addition, we found it amusing that coffee is always accompanied by popcorn with sugar and salt in the coffee. We learned about community and the importance of being there for each other as students, as many of them are far away from their families.

We also enjoyed how they shared other cultural aspects with us, for example the music and dance. Ethiopian music and dance are very different from what we usually listen to and the way we dance in Norway. We met someone who had previously been a traditional dancer, and she showed us some of the most typical moves. We found this to be very enjoyable. We also appreciated when they tried to translate some of the lyrics, to make us better understand the values and topics they encompass.

We appreciated and were surprised by their curiosity towards Norwegian lifestyle, culture, religion, climate, school and so on. They were eager to learn about us. Meeting locals is truly the best way of sharing different perspectives on life and learning about other cultures.

We were surprised by how open, attentive and welcoming the locals in Jimma are. They opened up their homes and took time from their busy lives to show us the real Jimma. They also told us personal stories that gave us a wider perspective on how it is to live in the city. This made us more aware of the smaller things in life and appreciate and value what we have.

Event/issue 2: Uncertainty

One of the things we found most challenging and surprising was the degree of uncertainty throughout our stay. Even before arrival, we struggled to make concrete plans so we did not know when and where we were meeting people. This made it difficult to plan our days as we often did not know until the same day when and where we were meeting. We felt that we had to be ready at all times in case

something suddenly came up. This is something we are not used to coming from a country where most meetings are planned in advance.

We experienced several times that plans changed, either in terms of time, day or place. Some plans even fell through, as we could not reach our contact even though we had pre-arranged a meeting. This was unfortunate as it would have been interesting and beneficial for us to meet them. This impacted our motivation as it felt like it was impossible to make plans and we were always on alert in case something would come up.

On our first day at the university, we were surprised when we had to sit on a stage in front of a classroom full of students by ourselves. We had not received any information about what we were supposed to talk about, and neither had the students. The students had been summoned to meet us the same day and did not understand why they had to attend our "meeting". We felt that it was a bit uncomfortable as none of us knew the purpose of our "meeting". However, we took advantage of the situation and presented our master thesis topic to them and listened to their thoughts on it. Their response showed us cultural differences, such as their local perspective as opposed to our more global take on it. It also showed their lack of knowledge about Norway and technology. It ended up being a valuable "meeting" where we got useful insights from the students and got the chance to meet some locals.

One of our main aims of our trip to Jimma, was to visit a coffee farm. We had emailed about this before arriving and on the day of our arrival we talked to our SUSTAIN-contact about it too. We were assured that it would be arranged at some point during our stay in Jimma. However, at the end of our stay we had still not been able to visit a farm, and it was not until our supervisor back in Norway contacted our SUSTAIN-contact in Jimma, that they took action. This showed us that students are not taken as seriously by faculty as they are in Norway. When we finally got to visit a farm on our last day, it was very unclear when we were to leave and what farm we were visiting. To our surprise, when we arrived at the farm, no one was expecting us. The only person available for us to talk to was a security guard at the facility, who did not speak any English. Luckily, we made the trip to the facility with one of our local friends, who could translate for us. It was a bit

disappointing that we could not meet anyone who could answer our questions, especially after the SUSTAIN-contact had arranged the visit and - we believe - explained the purpose of it.

Event/issue 3: Student Life

We were surprised by how different the student life was in Jimma compared to Norway. During our guided tour at the university, we visited the student dormitories. The dormitory area was divided in two: the girls' and the boys' buildings. Students were not allowed to spend time in the other genders' rooms. Coming from a country were gender equality is at the center, we are used to mixed environments in all aspects of life, including living arrangements. We talked about this with the people who showed us around, and they were very surprised and shocked by the fact that students in Norway live in mixed apartments or dorms. Another surprising fact was that students living at the university had a night curfew. They were not allowed to be out after a certain set time. We thought this was very strict, as we are not used to such limitations, we are used to walking in and out of our dorms/apartments whenever we like.

Further, we were told that the students were not allowed to cook in their dorms, mainly due to fire hazards as they cook with open fire. We naturally understand this, however, we also believe that this could limit students from becoming more independent and develop their cooking skills. We talked to students of our age that had never cooked before and who were afraid of trying. As Norwegians we are used to making food from a young age.

After talking to some locals, we were surprised to hear that most students marry young, and that they are judged if they are unmarried by the age of 30. This is unusual for us, as it is becoming increasingly common for Norwegians to marry older. We had a laugh when the locals found out that we four Norwegian students were still unmarried in our mid-twenties. After this, we talked about relationships and the dating customs came up. To our surprise, the most common way of meeting

a future spouse is at church. So, they recommended us to go to church more often in order to not be doomed by the time we are thirty. A natural consequence of marrying young, was that many students were parents already.

During our walk around campus, we noticed several posters hanging on light posts. These included original slogans creating awareness for students. The most common topics were aids, condoms and safe sex, as well as motivational quotes from famous figures, such as Gandhi. We were surprised by this, as we thought that many of these topics were taboo. These topics being taboo was to a certain degree confirmed by some local students and professors.

After spending time at the campus, we noticed that students seemed to be very happy. People were smiling, looked like they were enjoying life, and they even told us how much they were enjoying their lectures. They seemed very appreciative of the fact that they had the chance to study. This is something they we take for granted in Norway. After our stay, we have become more appreciative of our opportunities in life.

Recommendations for students doing the same

- We felt more comfortable and safe travelling as a mixed group of four, as opposed to travelling two girls on their own. This because we stand out in a crowd due to our complexion. People stared at us, and others begged for money. We are not used to getting all this attention back in Norway, so we did not feel this was very comfortable. Students going there, should expect to hear “farangi”, which means “foreigner”, when walking around.
- We recommend students not to stay out too late, and to always travel in groups. Also, take care of your belongings, especially when walking through crowded areas.
- We recommend that students are flexible and for them to expect changes in plans. It is important to be patient and students should expect to wait as things take time. For example, we experienced that people were often late to meetings

and appointments. Another example was that it took us 40 minutes to get our bill at a restaurant.

- If possible, students should make as many plans they can in advance and to consistently follow up on them and remind people that they are coming.
- When contacting parties in Ethiopia, be very clear on what you need, your purpose and expectations.
- As we have mentioned, in many cases the most efficient way of getting in touch with people is by phone. Therefore, we recommend students to get a local SIM-card.
- Unfortunately, we were unwell throughout most of our stay in Ethiopia (most likely due to the diet and the malaria pills we took). Students should be prepared for this, use antibacterial lotion/liquid for handwashing (when no water available to wash hands), medicines to make you feel better (the pharmacies are not like the ones we are used to in Norway), and always drink water from a bottle, not from the tap.
- As we wrote, one of the most valuable and enjoyable experiences throughout our stay was to meet local people. This is the best way to learn about other cultures and about the country itself.
- Be open-minded and make the most of your time.

What our institution can learn from our experience

We believe that students would highly benefit from more support from their home university when reaching out to people, making people understand the importance and purpose of their stay. In some cases, it seemed like people were uninformed or unaware of the purpose of our visit, even though most of them had previously been informed about it. Furthermore, sometimes we felt like the university and our contacts were unprepared to meet us. We felt that we lacked authority as students and we were not taken as seriously as we wished. We felt that our time was not valued, as people showed up late to meetings, failed at making plans and appointments, changed plans consistently, and did not inform us about what was going on. It is important that our institution makes it clear that the students should be listened to and informed. It is crucial that the purpose and the outcome of the trip coincide.

In terms of the length of our stay, we believe that 2 weeks is enough, especially when travelling during the month of February, when courses are ongoing at our home university. We have been a bit concerned with the course going on back home, as we have been unable to work on it while here in Ethiopia. It is a demanding trip, especially when you are unwell, which we were most of the time. Also, as previously mentioned, we felt like we had to be alert all day in case we got a chance to meet one of our contacts, all the uncertainty involved made this a strenuous trip. It should also be mentioned that it is a trip characterized by many new experiences and impressions, which also takes a toll on you.

We believe that this has been a great opportunity to learn more about Ethiopia and its culture. Experiencing it firsthand is different than solely reading about it. The trip gave us the chance to meet with experts in the field of our chosen topic, and to visit some of the sites that are relevant for our project. On a personal note, it has been an eye-opening experience, that has made us appreciate the small things in life - such as community, the people around us and taking the time to do things, instead of rushing through the day, which is typical in Norwegian culture.

How you plan to share this experience at your home university?

We plan to share our experience by writing this report, by talking to our supervisor and our fellow students at BI.

7.2 Appendix 2: Interview Guide

INTERVIEW GUIDE

Introducing questions

1. How long have you been working with coffee?
2. What is your current position?
3. What part of the supply chain are you involved in?

Coffee supply chain (map out suppy chain)

4. What actors within the coffee supply chain operate in the country? How many are there?
5. How is the interaction (relationships/interdependencies?) between different parts of the supply chain? – *Collaboration*
6. What is your view/perspective on the coffee supply chain? What actors do you focus when making decisions?
7. How is coffee transported within the supply chain?
8. How long does it take (estimate) from the coffee is harvested until it reaches the end customer?
9. What sources of information (about market demand, best practices...) do you have? How do you keep updates on new practices etc? - *Visibility, transparency, knowledge-sharing*
10. What do you believe are your and the supply chain's strengths?

Challenges/issues in the coffee supply chain

11. What do you believe are your and the supply chain's weaknesses/challenges?
12. Do you believe the supply chain will change in the future? How?

Sustainability

13. What is sustainability to you? How would you describe sustainability? - *Sustainability awareness (*People, Planet, Profit)
14. How do you see sustainability at your workplace/in the supply chain? Is it a major concern to people?
15. Do you recognize sustainability awareness from your customers/end-customers and thereby their expectations of how the coffee is produced/handled/packaged in the supply chain?
16. Do you follow any certification requirements or standards in terms of sustainability? Fairtrade?

17. What are major incentives for you to be more sustainable?
18. What incentives do you think are important in other parts of the supply chain?
19. Are you/your part of the supply chain/the entire supply chain flexible to change?
20. To what degree do you feel there is transparency in the coffee supply chain regarding sustainability?

Waste Management

21. What type of waste is predominant in your part of the supply chain/in the entire supply chain?
22. Is waste handled? How?
23. What do you consider to be the greatest challenges in the supply chain in terms of waste management?
24. What can the industry do to reduce waste? Who should be responsible for this?
25. According to you, is coffee waste a major issue?
26. What are major incentives for you to handle waste?

Improvements/coping/solutions

27. Do your current processes represent a barrier to change to more sustainable practices? What could be done to improve this? Are there any infrastructure constraints?
28. Are there any aspects of your practices that you plan to alter in the future?
29. What do you believe are the major risks/constraints to sustainability in the coffee supply change?

Concluding questions

30. Do you think it would be more beneficial to apply a more sustainable mindset in the coffee supply chain? Why? What impact would it potentially have on the supply chain as a whole and on the product itself (triple bottom line)?

7.3 Appendix 3: Search Strategy

PARAMETERS	SUBJECT TERMS	BROADER ALTERNATIVES (if applicable)
Language	English	
Database and search engine	Google scholar Web of Science Online library	Google
Methodology	Qualitative	
Search terms and keywords	Ethiopia Coffee supply chain Coffee value chain Sustainability Supply chain management Sustainable production Sustainable waste management Waste management Coffee waste Coffee production Circular economy Closed-loop supply chain Triple bottom line Mapping Supply chain mapping Process activity mapping Value stream mapping Supply network representation Supply network mapping	Green supply chain management Production process Water pollution Production waste Coffee Ethiopia Flow chart
Business sector and industry	Coffee Agriculture Food Production Waste	
Geographical area	Ethiopa	World
Literature type	Journal articles Literature reviews Reports Newspaper articles Books and textbooks	Websites Government reports Scientific literature Theses Conference proceedings
Publication period	1987-	

7.4 Appendix 4: Information Letter and Contract

Are you interested in taking part in the research project

"Master Thesis on Sustainability in the Coffee Value Chain"?

This is an inquiry about participation in a research project where the main purpose is to identify improvement potential in the coffee value chain, with a focus on sustainability. In this letter we will give you information about the purpose of the project and what your participation will involve.

Purpose of the project
We are two master students, currently on the last year of an MSc in Business with a major in Logistics, Operations and Supply Chain Management at BI Norwegian Business School. As part of our Master Thesis, we need to collect and analyze data on sustainability in the coffee value chain.

Our aim is to map out the coffee value chain to get a clearer picture and a broader perspective on the topic, as well as to gain more insights on the issue. Thereon, we would like to go in-depth into a particular area of the value chain, as our aim is to detect what area has most to gain (most improvement potential) in terms of sustainability, waste reduction and optimization of operations.

The developed research question is: *How can the coffee value chain become more sustainable?*

Who is responsible for the research project?
BI Norwegian Business School is the institution responsible for the project.

The finished Master Thesis will be handed to the SUSTAIN Project faculty, BI Norwegian Business School (students and employees), and Yara International.

Why are you being asked to participate?
You have been selected to be part of this project as you have knowledge on the topic and/or field experience that could be very useful and beneficial for the Master Thesis.

What does participation involve for you?
The participation will entail an in-person/online interview.
We will collect qualitative information that can guide us further in answering the research question. The questions will be about the coffee value chain, challenges and strengths, improvement areas, and your take on sustainability.
If you chose to take part in this project, your answers will be recorded on paper/computer, and/or sound recorded. The interview length will vary depending on interview circumstances.

Participation is voluntary
Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data
We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

The Master Thesis supervisor, and the two master students responsible for the project will have access to the personal data (such as name, gender, occupation and educational background). The finished Master Thesis will be published on BI Norwegian Business School's online library services, and will include gender, occupation and educational background.

To ensure that no unauthorized persons are able to access the personal data, we will store the information on personal devices that are password protected.

What will happen to your personal data at the end of the research project?
The project is scheduled to end 1st of July 2020.

At the end of the project, the personal data (names of interview objects) will be anonymized. Sound recordings will be deleted at the end of the project. The purpose of further storage of the remaining data (gender, occupation and educational background) is verification, to enable follow-up studies and future research.

The personal data will be stored until the 1st of October 2020 on our personal devices and will be handed over to interested parties (e.g. supervisor, future researchers, master students) upon request. The final Master Thesis (including gender, occupation and educational background) will be published on BI Norwegian Business School's online library services, and be available for everyone who has access to the library services.

Your rights
So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?
We will process your personal data based on your consent.

Based on an agreement with BI Norwegian Business School, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?
If you have questions about the project, or want to exercise your rights, contact:

- BI Norwegian Business School via Marianne Jahre (supervisor), [redacted]
- Master Thesis students: [redacted]
- Our Data Protection Officer: [redacted]
- NSD – The Norwegian Centre for Research Data AS, by email: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.

Yours sincerely,

Project Leader (Supervisor) | Student | Student

Consent form

Consent can be given in writing (including electronically) or orally. NB! You must be able to document/demonstrate that you have given information and gained consent from project participants i.e. from the people whose personal data you will be processing (data subjects). As a rule, we recommend written information and written consent.

- *For written consent on paper you can use this template*
- *For written consent which is collected electronically, you must chose a procedure that will allow you to demonstrate that you have gained explicit consent (read more on our website)*
- *If the context dictates that you should give oral information and gain oral consent (e.g. for research in oral cultures or with people who are illiterate) we recommend that you make a sound recording of the information and consent.*

If a parent/guardian will give consent on behalf of their child or someone without the capacity to consent, you must adjust this information accordingly. Remember that the name of the participant must be included.

Adjust the checkboxes in accordance with participation in your project. It is possible to use bullet points instead of checkboxes. However, if you intend to process special categories of personal data (sensitive personal data) and/or one of the last four points in the list below is applicable to your project, we recommend that you use checkboxes. This because of the requirement of explicit consent.

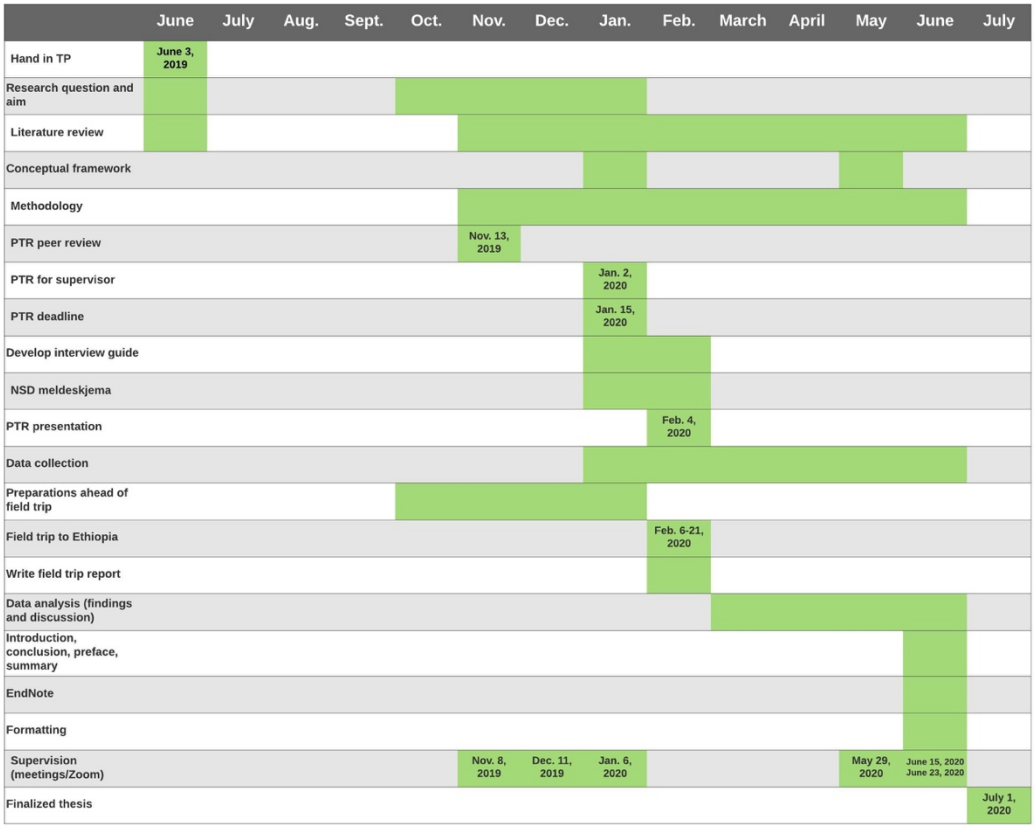
I have received and understood information about the project ***Master Thesis on Sustainability in the Coffee Value Chain*** and have been given the opportunity to ask questions. I give consent:

- ☐ to participate in an interview
- ☐ for information about me/myself to be published in a way that I can be recognised (gender, occupation and educational background)
- ☐ for my personal data to be stored after the end of the project for the purpose of further storage of the remaining data (gender, occupation and educational background) is verification, to enable follow-up studies and future research.

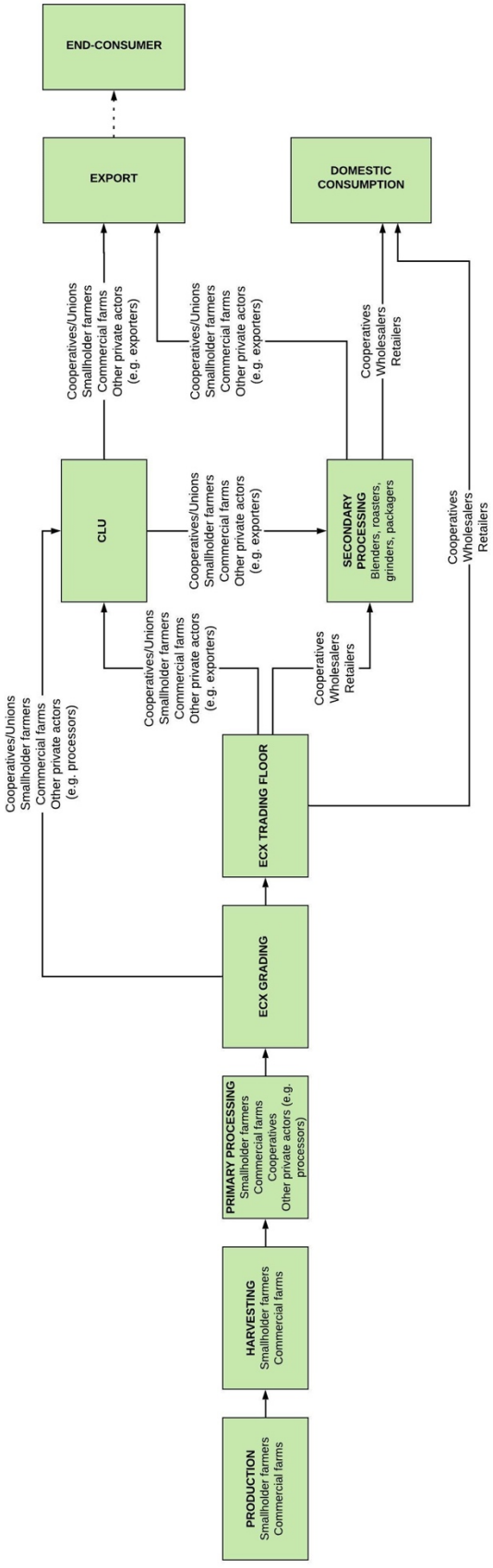
I give consent for my personal data to be processed until the end date of the project, approx. 1st of July 2020.

(Signed by participant, date)

7.5 Appendix 5: Project Plan



7.6 Appendix 6: Ethiopian Coffee Supply Chain Map



7.7 Appendix 7: Summary table

SUPPLY CHAIN STAGE	MAIN CHALLENGES/OPPORTUNITIES	POTENTIAL SOLUTION
Production	1. Deforestation 2. Coffee price and its impact on production 3. Smallholder farmer restrictions	1.1. Certification schemes 1.2. Initiatives (e.g. tree planting) 1.3. Avoid intensified production system 2.1. Price premiums (e.g. certification schemes, ECX, cooperatives and unions) 3.1. Skills and knowledge development (e.g. cooperatives and unions)
Harvesting	1. Coffee quality 2. Labor and time intensity	1.1. Avoid low quality harvesting methods (e.g. use of less modern machines, strip harvesting) 1.2. Waste management practices (e.g. 3Rs, CE, waste as fuel, fertilizer) 2.1. Avoid labor and time-consuming harvesting methods (e.g. selective harvesting) 2.2. Labor standards (e.g. certifications) 2.3. Additional labor
Primary Processing	1. Waste management 2. Coffee quality 3. Smallholder farmer restrictions	1.1. Waste management practices (e.g. 3Rs, CE, water tanks, water purification, waste as fuel, fertilizer) 1.2. Initiatives (e.g. Water Wise Coffee Project) 1.3. Certifications 2.1. Avoid low quality primary processing methods 3.1. Skills and knowledge development (e.g. cooperatives and unions)
Storage, Handling and Transport	1. Coffee quality 2. Smallholder farmer restrictions	1.1. Avoid low quality storage, handling and transportation practices 1.2. Improved infrastructure (e.g. roads, trucks, storage facilities) 2.1. Skills and knowledge development (e.g. cooperatives and unions) 2.2. Price premiums (e.g. certification schemes, ECX, cooperatives and unions)
Ethiopian Commodity Exchange	1. Price premiums and stability 2. Traceability	
Secondary Processing	1. Lack of secondary processing in Ethiopia 2. Waste management	1.1. Do more secondary processing in Ethiopia 2.1. Waste management practices (e.g. 3Rs, CE, waste as fuel, fertilizer) 2.2. Certifications
Export	1. Coffee quality and price premiums 2. Cost of quality inspection	1.1. Apply quality measures and processing mehods depending on export market 1.2. Traceability (e.g. ECX, certifications) 2.1. Avoid re-work 2.2. Avoid waste generation (e.g. waste management)
Domestic Consumption	1. Illegal market	1.1. Avoid illegal market 1.2. Go through legal channels