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FDRE TECHNICAL & VOCATIONAL TRAINING INSTITUTE

FEDERAL TECHNICAL AND VOCATIONAL TRAINING INSTITUTE

FACULTY OF CIVIL TECHNOLOGY DEPARTMENT OF WOOD TECHNOLOGY

Modern Bamboo Sofa Chair Value Chain Analysis around Addis Ababa

BY

RUKIYA

SEMAN

A Thesis Submitted to the Faculty of Civil Technology for the Partial Fulfillment of the Requirements for the Masters of Science in Wood Technology

Advisor: DR. SEYOUM KELEMEWORK

June, 2024

Addis Ababa, Ethiopia

APPROVAL SHEET

This is to certify that the thesis prepared by Rukiya Seman, titled **"***Modern Bamboo Sofa Chair Value chain analysis in Addis Ababa* "submitted in partial fulfillment of the requirements for the Master degree in Wood Technology of the Graduate Program of the Department of Wood Technology Management in the Ethiopian Technical and Vocational Training Institute meets the accepted standards with respect to originality and quality, under my supervision, and no part of the thesis has been submitted for any other degree or diploma. The assistance and help received during the course of this investigation have been duly acknowledged. Therefore, recommend that it be accepted as fulfilling the thesis requirements.

Major Advisor, Dr. Seyoum Kelemework _____Date _____

Co-advisor, _____ Signature_____ Date _____

EVALUATION SHEET

We, the undersigned, members of the Board of examiners of the final open defense by Rukiya Seman have read and evaluated her thesis entitled "Modern Bamboo Sofa Chair Value chain analysis in Addis Ababa", and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree of Master of Science in Wood Technology.

1. _____ _____ _____

   Name of Chairperson Signature Date

2. _____ _____ _____

   Name of Internal Examiner Signature Date

3. _____ _____ _____

   Name of External Examiner Signature Date

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Last but not least I will always be grateful to my family and friends for their continuous moral support and encouragement throughout my academic time.

Declaration

I, Rukiya Seman Issa, hereby declare that this thesis entitled “Modern Bamboo Sofa Chair value chain analysis in Addis Ababa”. Submitted for the partial fulfillment of the requirements for the Master of wood technology, is the original work done by me under the supervision of major adviser Dr. Seyoum Kelemework Haile. This thesis has not been published or submitted elsewhere for the requirement of a degree program to the best of my knowledge and belief. Materials or ideas of other authors used in this thesis have been duly acknowledged and references are listed at the end of the main text.

Declared by:-

Rukiya Seman _____ _____

(Author’s Name) Signature Date

List of Abbreviations

- VC: Value Chain
- VCA: Value chain analysis
- SPSS: Statistical Package for Social Science computer software

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Abstract

Modern Bamboo Sofa Chair Value chain analysis in Addis Ababa

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This paper examines the modern bamboo sofa value chain around Addis Ababa, focusing on the links and roles of key actors, the production process, and the challenges faced by the industry. Through a case study approach, the paper analyzes the production process in selected workshops and identifies key challenges hindering the growth of the bamboo sofa value chain. The research has used primary and secondary data and descriptive analysis to obtain the following facts; diverse actors have been participated directly or indirectly in the chain. Directly input suppliers, producers, traders, consumers and indirectly actors are ministry of trade and investment are involved. The actors involved to bring bamboo sofa chair product to the final stage used several inputs such as bamboo culm producers, local traders, and wholesalers, manufacturers, and consumers. Commonly produced bamboo sofas in the selected enterprises are single seater sofa (55cm by 60cm seat area) and double seater sofa (69cm by 110cm seat area). The study revealed that, at study place the products are consumed by hotels, recreational places and individuals. The volume of production of bamboo sofa (both single and double seater) was about 620 pieces in the year 2016 E.C from which about 520 pieces were sold. The average total production cost incurred for raw material, labor, manufacturing over head and administrative issues is Birr 2060, 412, 309 and 4078, 815.6, 611.7 for single, and double seater bamboo sofa chair respectively. The manufactures received in average profit of Birr 3119 and 5295 form single, and double seater bamboo sofa chair respectively. The study revealed that the modern bamboo sofa chair industry around Addis Ababa faces issues related to sourcing sustainable bamboo, manufacturing quality products, and lack of demand markets efficiently. Based on the findings, the paper recommends the way that could enhance the sustainability and competitiveness of the industry. This study contributes to the existing literature by offering insights into the value chain of modern bamboo furniture, providing recommendations for industry stakeholders, and highlighting the theoretical significance of applying value chain analysis in the context of sustainable modern bamboo sofa production.

Keywords*: Bamboo, sofa, value chain*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Reports and studies show that there are over 1500 different uses of bamboo recorded around the world, and the number is growing rapidly with new development and innovation initiatives (Zhaohua 2001, Chele *et al.* 2012, Yun *et al*. 2022, Dai and Hwang 2021, Shergian and Immawan 2015, Zheng and Zhu 2021). Ethiopia is one of the few countries in the world endowed with a massive bamboo resource base (Embaye 2000, Kelbessa *et al*. 2000, Yemishaw *et al*. 2009). The country has an estimated 1.47 million hectares of natural bamboo forest (Embaye *et al*. 2003, FAO 2006, Wang 2006, INBAR 2018, Zaho *et al.* 2018). The furniture industry is undergoing a significant shift towards sustainable and eco-friendly practices. Bamboo, a fast-growing and renewable resource, holds immense potential as a sustainable alternative for furniture production.

Bamboo furniture, consisting of chairs, tables, sofas, and so forth is in high demand due to its cultural aesthetics, attractive designs, and resistance to termite, and low cost (Rathour *et al*., 2022). According to Zhang *et al*., (2022), bamboo furniture is becoming more and more popular with consumers as a major interior and landscape decoration in both urban and rural markets. Bamboo furniture does not necessarily mean the whole piece of furniture is made of bamboo, as bamboo can combined with other materials. Bamboo combined with soft materials such as, fabric and leather materials can provide soft and comfortable materials (Deng, W. *et al*., 2023).

Bamboo sofa chair are made from a new bamboo after a special treatment to make its water proof and fire resistance. Manufacturing of bamboo sofa chair needs different materials such as dried bamboo strips, well planed bamboo board, and finishing items. Accordingly, bamboo sofa chair manufacturing required many inputs, in particular, labor and bamboo strip. The major steps of a serving this product are including bamboo sourcing, preparation, manufacture, assemble, designing and selling (Xuan Ho *et al*., 2011).

The ergonomic factors play an important role in designing of bamboo sofa chairs. The optimised biomechanical parameters must be considered in the design of bamboo sofa chairs which are of three types; standard, hygienceatic and comfortable. And comfort is the most important factor among the three and this comfort design includes backrest height, misfit angle, seat inclination and seat height/length. The environmental factor should be considered in bamboo sofa chair design because the product based on natural bamboo which is a carbon sink bamboo (Kumar Saha *et al*., 2024).

The design philosophy of bamboo sofa sets is rooted in understated sophistication. Long lifespan and comfortable seating are top priorities in the design of bamboo sofas (Suren, 2018)**.** Modern bamboo sofa chair is a piece of furniture designed for 3–4 individuals to sit as a social unit (Zhang et al., 2022). When selecting a bamboo sofa set, it is better give special consideration to material durability, design versatility, comfort, space considerations, and maintenance needs (Suren, 2018)**.**

Bamboo sofa sets have several useful benefits in addition to captivating appeal on the aesthetic and environmental fronts. Because of its modest weight, moving and rearranging it is simple and convenient, which is great for areas that change or reorganize frequently. Bamboo sofa furniture is lightweight and easy to carry compared to other wooden sofa furniture (Suren, 2018)**.**

In Addis Ababa, the demand for bamboo furniture, particularly sofas, is steadily increasing. However, the area's small and medium sized bamboo furniture manufacturing industries operate at a very low and inefficient level. The lack of a well-defined value chain hinders the industry's growth and limits its economic impact. Therefore, it is high time that efficiency and competitiveness of the value chain of bamboo sofa furniture products in Addis Ababa should be upgraded and made to be efficient and competitive. So this study in Addis Ababa is initiated to contribute for improving the efficiency and competitiveness of the sector through identifying and characterizing different actors involved in the value chain; mapping the value chain of modern bamboo sofa furniture manufactured in the different small and medium enterprises and industries and identifying challenges and opportunities to upgrade the value chain.

1.2. Statement of the problem

Majority of bamboo workshops in Addis Ababa are mainly using obsolete hand tools for production of sofa chairs. On the other hand, these workshops are using bamboo without preservative treatments for production. These reasons might be affecting the durability and the quality of sofa chairs. Furthermore there is no clear and strong market and value chain links between all actors .The problem statement of this study is to identify main barriers of modern bamboo sofa chair in value chain from harvesting to the consumers.

1.3. Objectives

1.3.1. General Objective

The general objective of this study is to investigate the value chain analysis of modern bamboo sofa chair in the case of Addis Ababa city.

1.3.2. Specific Objectives

i. To identify links and roles of major actors in bamboo sofa chair value chain.
ii. To evaluate the production process of bamboo sofa chain in selected workshops
iii. To identify challenges of bamboo sofa chair value chain.
iv. To recommend alternative value chain based on the results.

1.4. Basic Research Question

* What is the existing marketing chain for bamboo sofa chair making and trading in Addis Ababa?
* What values are added by the processors to bamboo sofa chair processing and product design?
* What is the price trend of bamboo sofa chairs in the past five years compared to timber sofa chairs?
* What opportunities and challenges are prevalent in the bamboo sofa chair value chain in Addis Ababa?

1.5. Significance of the study

The finding of this study identifies formal and informal arrangements of modern bamboo sofa chair value chain in Addis Ababa.

1.6. Scopes and limitation of the study

The study was conducted in Addis Ababa focused on the assessment of bamboo sofa chairs value chain analysis. Small and medium bamboo enterprises and/or individual firms in Addis Ababa were the focus of the study. With time and budget limitations for this particular study, however, only selected

enterprises and firms were considered throughout the eleven sub-cities of Addis Ababa.

1.7. Thesis Structure

This research report has five chapters. The first chapter deals with the introduction, background of the study, statement of the problem, objectives of the study and other relevant introductory issues. The second chapter focuses on the literature review. The third chapter deals with the research design, approaches to be used throughout the data collection and methods of data analysis. The fourth chapter presents the overall findings of the study and the last, chapter five, encompasses the summary of findings, conclusion and recommendation.

CHAPTER TWO

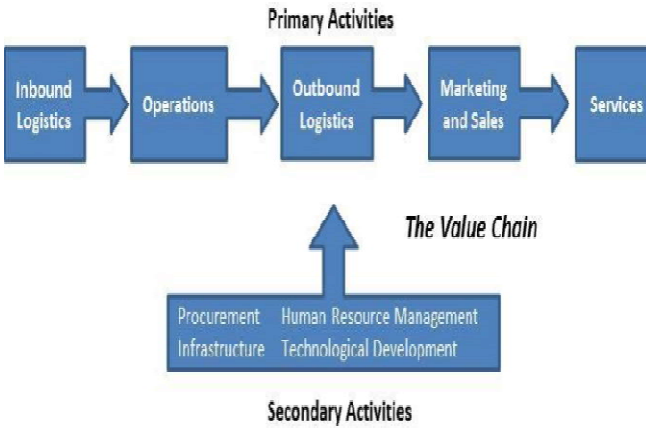
LITERATURE REVIEW

2.1. Concepts and definition of value chain

The basic characteristic of a value chain is market-focused collaboration: different business enterprises work together to produce and market products and services in an effective and efficient manner (Zakic *et al*. 2018). Value chains allow businesses to respond to the marketplace by linking production, processing and marketing activities to market demands. Collaborative implies voluntary involvement and an expectation of complementary behavior resulting in the achievement of a common result or goal. Vertically aligned means that companies are connected from one end of the primary production process (*e.g.,* farmer's field), through processing, and possibly into the final marketing stages where consumers purchase a finished product. At each stage, the product's value increases. This is different from other types of alliances, such as a collection of bamboo producers consolidating supply, which would be considered a horizontal alliance because no value is added to the product. Normally, the term value chain is applied when the vertical alliance includes three or more companies, known as links, in the supply chain.

The contemporary value chain has multiple and complex definitions based on several disciplines and directions owing to different knowledge streams (Zakic *et al*. 2018). A value chain can be characterized by strategically relevant activities (Porter 1985a), value streams (Hines and Rich 1997), and value chain, value shop, and value network (Stabell and Fjeldstad 1998). Simatupang *et al*. (2018) stated that a *value chain* is associated with the activities of long-standing technology, while a *value shop* mobilizes resources and undertakes activities to identify solutions to customers' problems and a *value network* involves the use of mediating technology to facilitate network relationships between customers. As stated in Simatupang *et al*. (2018), a value chain can be classified into four: traditional (Porter 1985a), innovative (Hansen and Birkinshaw 2007), shared (Porter and Kramer 2011), and design-driven innovation value chains (Verganti 2009, Lowe 2010). The three most common definitions of value chain are given in **Table 1**.

Table 1. Most common definitions of Value chain

Definition	Schematic representation	References
"Value chains are an integral part of strategic planning for many businesses today. A value chain refers to the full life cycle of a product or process, including material sourcing, production, consumption and disposal /recycling processes."		WBCSD, 2011; University of Cambridge
"The *value chain* describes the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use."		Kaplinsky and Morris, 2000; University of Cambridge
"The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. The activities can be classified generally as either primary or support activities that all businesses must undertake in some form."		P*orter 1985b, 2001; University of Cambridge*

2.1.1. Value chain vs. supply chain

There is confusion in using the terms supply chain and value chain interchangeably (Singh, 2007; Boehlje, 1999). However, there are significant differences between the two terms (Walters and Walters, 2002,Feller*et al*. 2006, Fearne *et al*. 2012, Dubey *et al*. 2020).As stated in Zamora (2016) supply chain thinking is suitable for commodities and commodity markets whereby the management goal is to reduce

costs, increase margins, and increase market share, while value chain thinking is more applicable to differentiated products and segmented markets whereby the goal is to add value and segment the market with differentiated products designed to increase profitability at all stages in the chain. Furthermore, the focus of supply chain management is on efficiency, market access, and increased distribution, while that of value chain management is on quality, service, and agility with distribution determined by consumer demand rather than capacity utilization. The distinctions between supply chain and value chain are shown in table 2.

Table 2. The difference between supply chain and value chain

Basis for comparison	Supply chain	Value chain
Communication	Little or none	Extensive
Concept	Conveyance	Value Addition
Objective	Customer Satisfaction	Gaining competitive advantage
Organizational structure	Independent	Interdependent
Originated from	Operation Management	Business Management
Philosophy	Self-optimization	Chain optimization
Product	Commodity	Differentiated product
Relationship	Supply push	Demand pull
Sequence	Product request-supply chain- customer	Customer request-value chain-product
Value focus	Cost/price	Value/quality

2.1.2. Value chain Systematic mapping

Value-chain analysis systematically maps the actors participating in the production, distribution, marketing, and sales of a particular product such as bamboo sofa chairs for example. This mapping assesses the characteristics of actors, profit and cost structures, flows of goods throughout the chain (from raw material supply to final finished product), employment characteristics, and the destination and volumes of domestic and export sales (Zakic *et al*. 2018). The value chain mapping could be very simple to very complex. The simple one just starts with raw material production (in this case bamboo culms), collection/harvesting of the raw materials, transporting, processing, trading and consumption (Kaplinsky and Morris, 2000, Crain and Abraham, 2008, Utomo, 2021). The complex value chain mapping involves complex actors, activities and enablers along the value chain (Kaplinsky and Morris, 2000, Higgins *et al*. 2010, Zamora, 2016). Herr and Muzzira (2009) stated that mapping a value chain creates a visual presentation of connections between business entities and actors in the chain. Mapping is a fundamental part of the analysis that magnifies relevant interdependencies and enables to discuss opportunities for improvement. According to them, mapping allows one to illustrate and understand the flow of product

movements through different stages to the end consumer; serves to identify and categorize major market players in the chain; illustrates which support organizations are available and at what levels of the chain they concentrate their services; shows various market channels through which products and services reach the end customer; help companies to orient their activities, identify actors, supply channels, competitors, the weak links in the chain, and so on.

2.1.3. Distribution of Benefits in a Value Chain

Benefits sharing among actors across the value chain are not spread homogenously. Those firms/individuals that invest more in modern technology and specialization will take a greater share of the benefits (Cheng *et al*. 2015, Pleticha 2021).Value-chain analysis can play a key role in identifying the distribution of benefits of actors in the chain through the analysis of margins and profits within the chain. It is possible to determine who benefits from participation in the chain and which actors could benefit from increased support or organization(Kaplinsky and Morris, 2000, Pil and Holweg, 2006,Wan& Wu, 2017).

2.1.4. Value chain upgrading

As described by McDermott (2005), upgrading refers to shifting from lower-value economic activities to higher values within global value chains using local innovation capabilities to make improvements in processes, products, and functions. In value chains, there are four types of upgrading (Humphrey and Schmitz 2002, Zakic *et al*. 2018, Van Assche and Van Biesebroeck, 2018, Tanrattanaphong *et al*. 2020): (i) *process upgrading*, more efficient transformation of inputs into outputs by reorganization of production systems or introduction of superior technology; (ii) *product upgrading*, moving to more sophisticated production lines in terms of increasing unit value; (iii) *functional upgrading*, the acquisition of new superior functions in the chain, and the increase in overall skill content or abandoning low value-added functions to focus on those with higher added value; and (iv) *intersectoral upgrading*, the application of competencies acquired in a specific sector and moving horizontally to another sector.

Innovation and ensuring continuous improvement in product and process development are one of the key capabilities in a value chain. However, innovation in itself may not be adequate unless it is faster than competitors, which is termed as upgrading (Kaplinsky and Morris, 2000).Value-chain analysis can be used to examine the role of upgrading within the chain. Upgrading can involve improvements in quality and product design or diversification in the product lines served, allowing producers to gain higher value.

An analysis of the upgrading process includes an assessment of the profitability of actors within the value chain as well as information on limitations that are currently present.

2.1.5. Value chain governance

Value chain governance refers to the power and ability to realize control along the chain which could vary based on the complexity of transactions, the codification of information, and the ability of the supplier (Gereffi *et al*. 2005, Keijser *et al*. 2021). Value-chain analysis highlights the role of governance in the value-chain, which can be internal or external (Fernandez-Stark and Gereffi, 2019). Governance within a value-chain refers to the structure of relationships and coordination mechanisms that exist between actors in the value chain (Bijman *et al*. 2012). Governance is a broad concept which basically ensures that interactions between chain participants are organized, rather than being simply random (Kaplinsky and Morris, 2000, Kano 2018). As described in table 3, there are generally five value chain governance topologies (Gereffi *et al*. 2005, Sturgeon and Gereffi, 2008, Zakic *et al*. 2018).

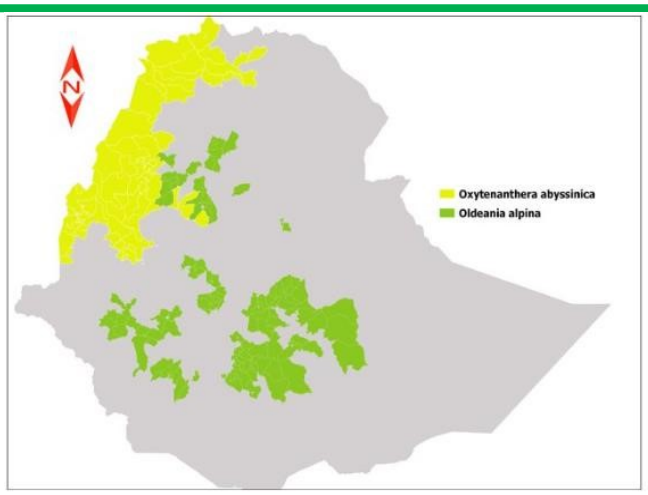
Table 3. General topologies of value chain governance

No.	Topology of value chain governance	Description
1	Market	• Transactions are relatively simple • Information about product specifications is easy to transfer and manufacturers can realize products with minimal input of buyers • The price is the central governance mechanism
2	Modular value chains	• The product requires chain companies to undertake complex transactions that are relatively easy to codify • It is common for suppliers in these chains to realize products according to customers' preferences
3	Relational value chains	• Buyer-seller interactions are based on mutual reliance, which is regulated through reputation, social closeness, spatial proximity, etc. • Interactions are complex, making the need to increase explicit coordination
4	Captive value chains	• Small suppliers are dependent on large, dominant customers and face significant replacement costs in the event of a change in customers • There is a high degree of power and control of leading companies
5	Hierarchy	• Characterized by vertical integration and management control within the company that independently realizes its products • Commonly materialized where product specifications cannot be codified, products are complex or competent suppliers cannot be found

2.2. Bamboo resources in Ethiopia

Understanding and knowing the potential bamboo raw material sources from which a particular bamboo product is made, is the first priority to make value chain analysis of that particular product. The global

coverage of bamboo was estimated to be more than 35 million hectares (FAO 2020). However, due to a lack the capacity and coordination for forest resource assessment by many countries, the estimate could rise as high as 50 million hectares (INBAR 2023). Data taken on bamboo coverage from major bamboo growing countries in Africa such as Ethiopia, Kenya, Nigeria, Uganda, the United Republic of Tanzania and Zimbabwe, show that there were over 2.7 million hectares of bamboo forest in 2005, of which 65% was in Ethiopia (Lobovikov *et al*. 2007). Figure 1 shows the most current bamboo forest distribution and area coverage by species type. The availability of abundant resources might not suffice in the supply chain for the marketing and trading of different bamboo sofa chairs. It requires the proper management of the bamboo resources in order to get quality bamboo culms as it is the essence of the value chain concept to get quality raw materials to produce quality products.



Dominant bamboo species in Ethiopia are:

1. *Oxytenanthera abysinica*covers the northwestern parts of Ethiopia with a total area coverage of about **1,332,243** hectares.
2. *Oldeania alpina*covers the central, south, southeastern and southwestern parts of Ethiopia with a total area coverage of about **115,220** hectares.

Figure 1. Bamboo distribution in Ethiopia (Source: INBAR 2021).

2.3. Bamboo sofa chair value chain

Bamboo is an important plant for making high value multiple products with greater contribution in the bio-economy of Ethiopia. However, the existing product value addition and utilization of the products at the current competitive market is underdeveloped (Bakala *et al.* 2017, Lin *et al*. 2019). There is an inefficient bamboo marketing chain in Ethiopia. This is due to the lack of linkages in the horizontal and vertical chains of bamboo marketing. The horizontal market linkage refers to the expansion of business at the same point within the supply chain in the same firm or other, while the vertical market chain refers to the acquisition of firms at different stages of production and/or distribution within the same firm. In most parts of Ethiopia, the bamboo marketing chain is unsustainable and discontinuous, and the relationship between growers and traders is not fair due to a lack of bargaining power from the bamboo growers' side

(Mekonnen *et al*. 2014,Tsegaye *et al*. 2022). In Ethiopia, bamboo furniture marketing, for example, sofa chairs, is mostly dominated by domestic consumption while export marketing is not exploited yet to its maximum potential. However, Data Bridge Market Research shows that the global bamboo furniture market was valued at USD 12.10 billion in 2022, and will reach USD 20.26 billion by 2030, growing at a Compound Average Growth Rate (CAGR) of 6.65% during the forecast period of 2023 to 2030. The bamboo furniture (*e.g*. sofa chairs) marketing channels start from sourcing raw bamboo culms to its final consumption by the end users (Figure 2). The actors in the marketing channel include bamboo growers (farmers), middlemen, bamboo culm transporters to cities, small and medium-sized bamboo-based industries/firms, wholesalers and retailers and consumers (individuals, hotels, lodges, offices).

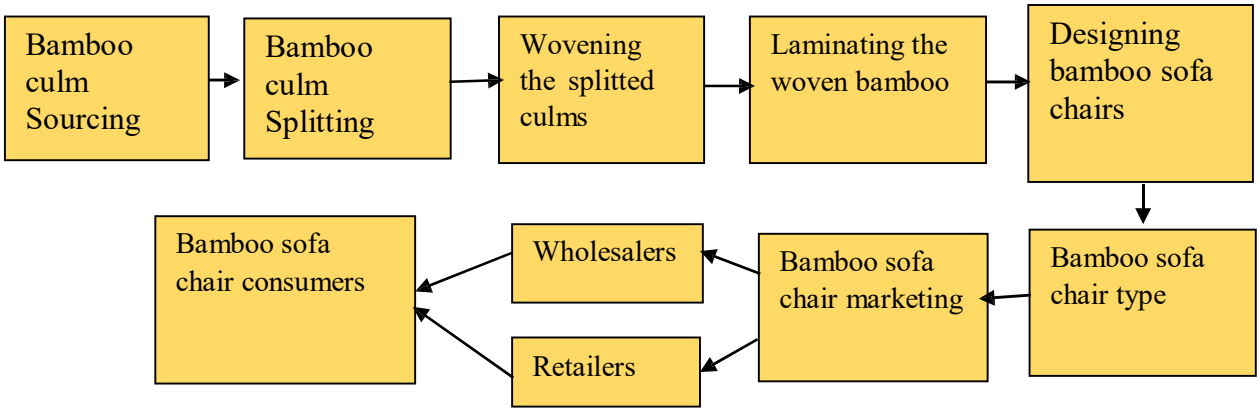


Figure 2. general modern bamboo furniture production to consumption pathway

2.4. Bamboo sofa chair processing

The quality of bamboo sofa chairs in Ethiopia does not fully fit the desired specifications and standards as most of them are traditionally made and used at local markets (Böck 2014, Hinde and Kaba 2018). The quality of the products stems from the quality of the culms used for making the bamboo products such as sofa chairs (Endalamaw *et al*. 2013, Nigatu *et al*. 2021). In contrast, there are few insights into modernizing bamboo products like making charcoal briquettes, curtains, sandal sticks, toothpicks, floorboards, and so on. An effective bamboo sofa chair value chain requires increased system efficiency, improved quality, and the development of differentiated sofa types that fit the consumers' demands (Mekonnen *et al*. 2014, Benfica and Thurlow 2017). This, in turn, helps bamboo furniture manufacturers and firms to minimize the increasing harsh competition among them; enables producers, processors, and retailers to track their products through the value chain; and to deserve premiums for a consistently high-quality product.

Collaboration of actors in the bamboo sofa chair value chain will help them to create a very strong value chain whereby enables them to lower costs and increase efficiencies in the market by producing differentiated products that are high quality and durable (Mekonnen *et al*. 2014). However, bamboo processing in Ethiopia is mostly limited to producing ordinary baskets, chairs, tables, sofas, lampshades and shelves, while there are well over 1500 different bamboo uses globally. To this end, product and functional upgrading in bamboo furniture processing, including modern sofa chairs, is at its infant stage in Ethiopia (Endalamaw 2015, Lin *et al*. 2019,Boissière *et al*. 2020, Mengstu *et al*. 2023).

2.5. History of furniture industry in Ethiopia

Bamboo utilization, at global context in general and in Ethiopia in particular, for different purposes, especially for construction, has counted for longer times (UNCTAD 2022). However, the utilization was mainly customary and traditional ways dominated by the construction of huts and fencing. To a lesser extent in design sustainability, bamboo is also accustomed to producing handicrafts, furniture, bamboo cups, grain storage, baskets, beehives, firewood, fodder, house utensils, various art-facts, and walking sticks (Bakala *et al*. 2017, Deng *et al.* 2023). Indeed, the use of bamboo in modern furniture making, like modern sofa chairs, in Ethiopia is still at its infant stage as compared to other countries like China (**Table 4**). There are more than 200 furniture manufacturing companies/industries/suppliers in Ethiopia which are mainly operating in household, kitchen and office furniture.

Table 4. Some of the best furniture suppliers in Ethiopia

No.	Best-furniture-suppliers in Ethiopia	Year of establishment	Country	Headquarter
1	Bed Bath & Beyond, Inc	1971	USA	New Jersey
2	Costco Wholesale Corp	N/A	Nigeria	
3	Easyhome New Retail Group Co.	1999	China	Beijing
4	JD.com, Inc.	1998	China	Beijing
5	Overstock.com, Inc	1999	USA	Salt Lake City
6	Target Corporation	2013	Nigeria	Lagos
7	The Home Depot, Inc	1978	USA	Atlanta
8	Walmart, Inc	1962	USA	Bentonville
9	Wayfair, Inc	2002	USA	Boston
10	Williams-Sonoma, Inc.	2011	USA	Plot 115A
11	Deluxe Furniture	1999	Ethiopia	Addis Ababa
12	School Furniture Manufacturers	1948	Ethiopia	Addis Ababa
13	Alpha Furniture Ethiopia	2000's	Ethiopia	Addis Ababa
14	GM Furniture SC	1990	Ethiopia	AlemGena
15	Ethio Furniture	N/A	Ethiopia	Addis Ababa
16	SunMateFurniture.com	2005	Ethiopia	Addis Ababa
17	Nor furniture	N/A	Ethiopia	Addis Ababa
18	Solina furniture	N/A	Ethiopia	Addis Ababa
19	Dubai Furniture Ethiopia	N/A	Ethiopia	Addis Ababa
20	Ablante Furniture	N/A	Ethiopia	Addis Ababa
21	Zefmesh Furniture	N/A	Ethiopia	Addis Ababa
22	Wow Furniture	N/A	Ethiopia	Addis Ababa
23	NH BAY Furniture	N/A	Ethiopia	Addis Ababa
24	Happy Furniture	N/A	Ethiopia	Addis Ababa
25	Yoni Furniture	N/A	Ethiopia	Addis Ababa
26	Adal Industrial PLC	2006	Ethiopia	Gelan/Sheger city

2.6. Opportunities and challenges for bamboo sofa chair value chain in Ethiopia

To utilize the bamboo potential in the furniture and construction industries in Ethiopia, it is essential to identify the opportunities and challenges in the bamboo sector in general and furniture industry in particular that could spur or hinder the value chain of bamboo products.

The opportunities includes, but not limited to, the following:

* Ethiopia has the largest amount of bamboo resources in Africa
* Many people in rural areas use bamboo to build homes and utensils
* Bamboo is a fast-growing species adapted to Ethiopian conditions
* Bamboo is suited to go from a non-timber forest product to commercial exploitation
* Indigenous knowledge of bamboo crafting in Ethiopia

* Inclusion as one of the best restoration species by the Ethiopian government
* The grown furniture industry from global and local contexts
* Potential timber substitution effect
* Bamboo has good tensile and compressive strengths
* Bamboo is an option for the supply of affordable housing and shelter

The challenges include:

→ Use of low technology in processing bamboo products (e.g. use of local processing tools)
→ Lack of innovative product design and differentiated products
→ Longer value chain in the marketing channel
→ Lack of actors integration in the bamboo product value chain
→ Poor management of bamboo growing to get quality culms
→ Untreated bamboo is susceptible to fungal infection and attack by insects
→ Bamboo is sensitive to moisture leading to high shrinkage
→ Bamboo is sensitive to nails and screws which leads to increases in the chance of cracking

2.7. Conceptual framework

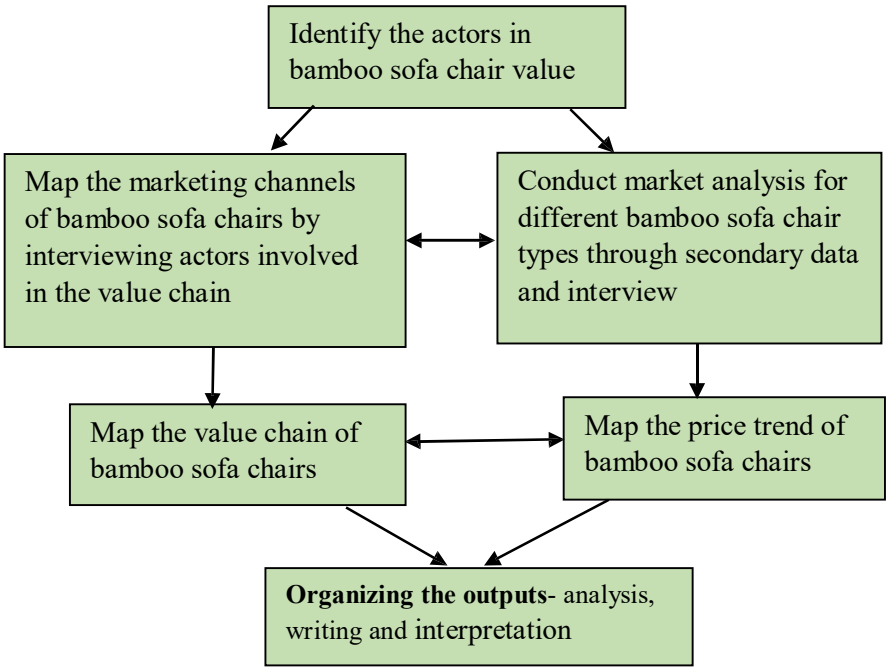


Figure 3.Conceptual frame work of the study

CHAPTER THREE

MATERIALS AND METHODS

3.1. Study area

The study was conducted in Addis Ababa City, the capital of Ethiopia. Its population was about 2.73 million according to the 2007 population census (CSA 2007). Currently, the population of Addis Ababa is estimated to be 5,703,628 (WPR 2024). Addis Ababa lies at an average elevation of 2,355 m a.s.l. and is located at 9°1′48″N 38°44′24″E. The city lies at the foot of Mount Entoto and forms part of the watershed for the Awash River. It stretches from2,100 m a.s.l. in the southern periphery to over 3,000 ma.s.l. in the Entoto Mountains to the north. It is subdivided into eleven administrative sub-cities (**Figure 4**).

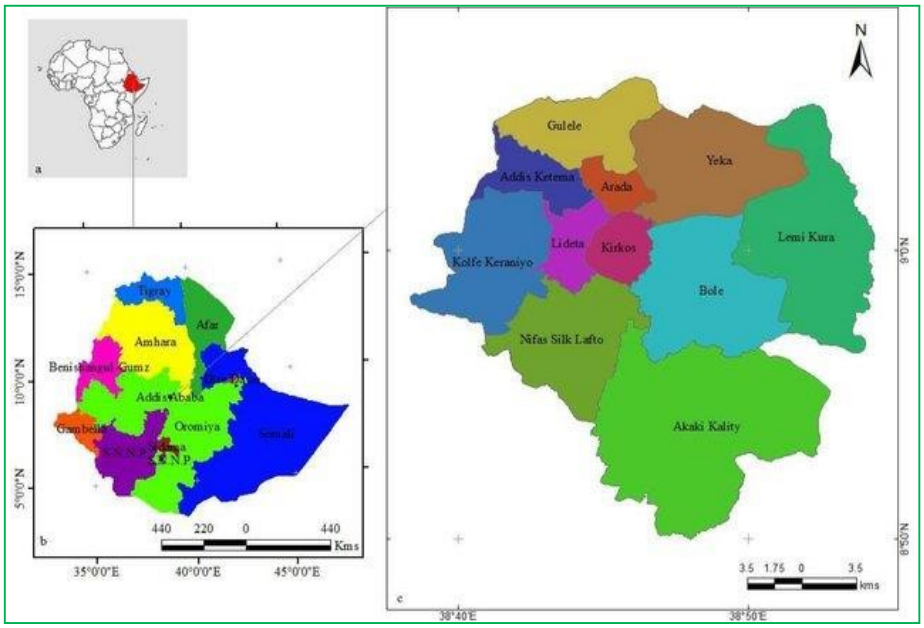


Figure 4. Map of Addis Ababa and its sub cities (source: Ayele et al. 2022)

3.2. Research design

Value chain analysis depends on multiple sources of data, for a deeper understanding and investigation of the whole process, for actors involved, and for complex issues in the system. The case study approach is an effective approach to conduct such types of research (Munuyee, 2018). In this study, a case study was conducted. The methods used to achieve the study objectives can be summarized as shown in **Fig.** The findings from the literature review of previous studies served as a key source for this study.

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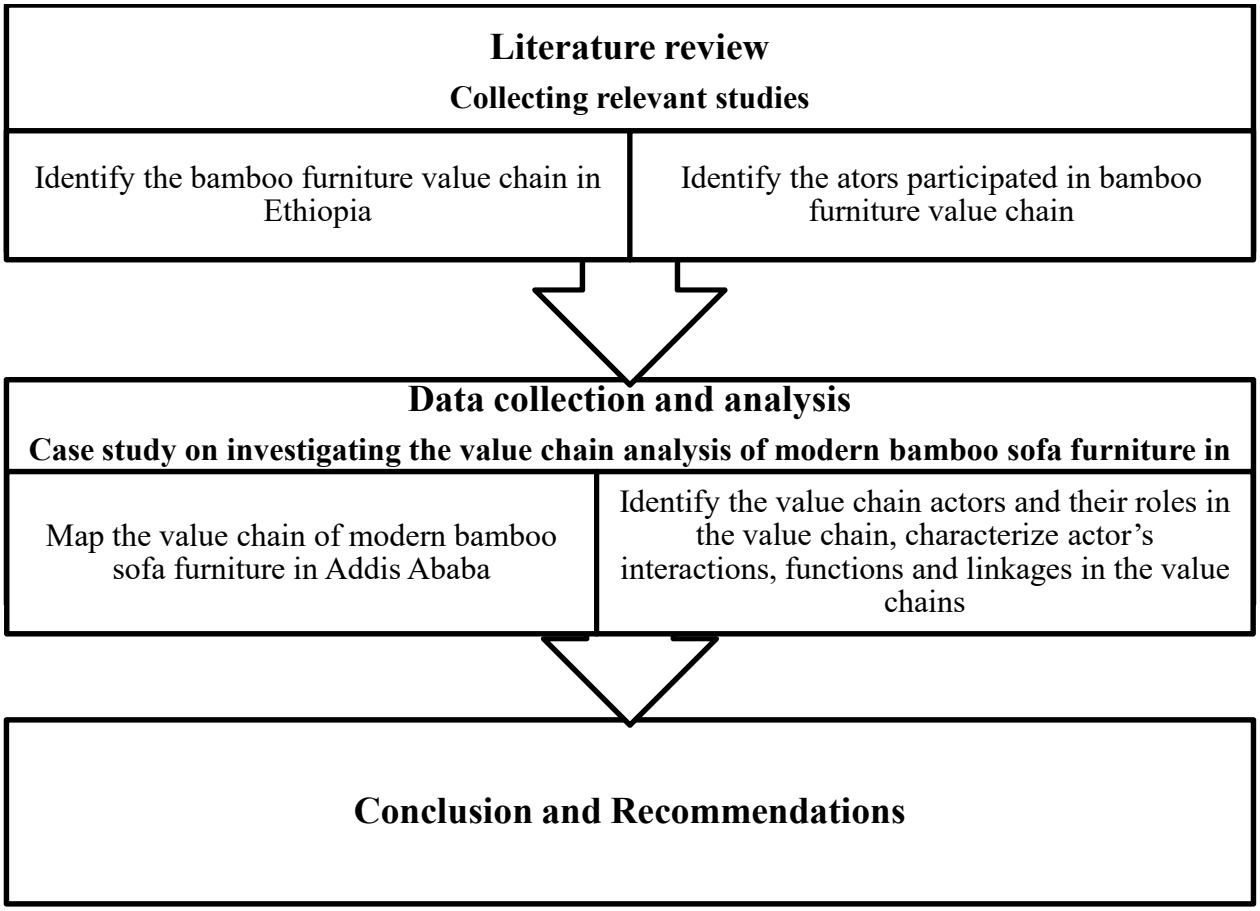

Figure 5. Research Design

3.3. The Research Sample Selection

A random sampling technique was used to draw the farmer's sample. With consultations of agricultural and development agents of the Awi zone banja east woreda, three bamboo producer kebeles were identified and selected randomly. The sampled kebeles include Gashena Akayta, and Surta. From each sampled kebele 7 bamboo producer farmers (by giving priority to those farmers who know the basics of producing and marketing the bamboo culms) were selected with the help of development agents at kebele level. Accordingly, total of 21 farmers (from three kebeles) were selected.

Twelve Traders (2 wholesalers around Addis Ababa: 1 around Burayu area, 1 from Gelan, and 10 local traders: from Injibara town) were selected by using snowball sampling.

Legal registration by Addis Ababa trade and investment bureau was a criterion for considering bamboo sofa chair manufacturers as sampling units. However, there isn't any precise information available from the Addis Ababa Trade and Investment Bureau to help choose bamboo furniture companies. Because the precise number of the general population is unknown, three modern bamboo furniture industries were found and purposefully picked using the purposive sample selection approach. To place greater emphasis on the creation of modern bamboo sofas, the following furniture companies have been chosen for this case study: Adal Industrial PLC, SA Bamboo works, and Ethio. Indo. Lux…Bamboo Enterprise. Thus, the number of employers (directly participating on bamboo sofa work) in these three bamboo sofa chair manufacturers' enterprises was 79; the researcher used Slovene's formula, which is stated as follows:

$$n = \frac{N}{1+N(e)2},$$

where: n= sample size,

N= size of total population

e = 5% margin of error (95% confidence level).

$$n = \frac{79}{1 + 79(0.05)2}$$

$$n = \mathbf{66}$$

In order to proportionally distribute the samples among the strata (enterprises) the formula (Yamane's, 1967) is implemented. See **table .**

$$n_h = \frac{N_h}{N_s} \cdot n$$

Where: n_h = Sample size from each stratum

N_h = Total population from each stratum

N_s = Total population of the sum of strata for the study

n = Total sample size from the study population

No.	Enterprises	Estimated no. of bamboo sofa processors within three enterprises	Sample from each enterprise
1	Adal Industrial PLC	40	(66/79)x40=34
2	SA bamboo works	22	(66/79)x22=18
3	Ethio. Indo. Lux. Bamboo	17	(66/79)x17=14
	Total	**79**	**66**

For the users of bamboo sofa chairs, hotels and recreational places were purposively selected, those using bamboo sofa to collect information on bamboo sofa chair value chain around Addis Ababa.

3.4. Data Collection methods

A total of 21 farmers and 10 traders (with exclusion of unwilling respondents) were participated in data collection. With the exclusion of participants who were unwilling to participate in the survey, 57, out of 66 selected bamboo sofa chair processors were participated from the three selected bamboo enterprises. For bamboo sofa users (consumers), 20 respondents were involved on information about bamboo sofa chair satisfaction around Addis Ababa. Therefore, the researcher followed a case study research approach and by considering the limitation of time a total of **108** respondents were questioned/ interviewed with response rate of 89 % (**Table 2**).

No.	Value chain actors	Location	Questionnaire issued	Responses	Response rate
1	Manufacturers	Adal Industrial PLC	34	29	85 %
		SA Bamboo	18	16	89 %
		Ethio. Indo. Lux	17	12	71 %
2	Traders	Injibara town & Addis Ababa	12	10	100 %
3	Farmers	Geshena	7	7	100 %
		Akayta	7	7	100 %
		Surta	7	7	100 %
4	Users	Addis Ababa	20	20	100%
Total			**122**	**108**	**89 %**

In addition, key informants were interviewed and focus group discussions were held with farmers to supplement the data collected with a questionnaire. Structured, semi-structured, and unstructured individual interviews were used to interview key informants.

3.5. Data analysis

Descriptive statistics was used to determine the relative contribution of bamboo-made sofa chair revenue to the firm owners and major socio-economic factors that influence engagement in and benefit from bamboo-made sofa chair processing and marketing. Data from the original source were verified, coded, and analyzed using Statistical Package for Social Science (SPSS) computer software. Qualitative data was summarized in the form of narration and interpretation and was used to elaborate the results from quantitative analysis.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1. Demographic characteristics of the respondents

4.1.1. **Gender composition**

The majority of the sample respondents participating in the value chain for bamboo sofa chairs were male households: farmers, traders, manufacturers (of which 33 were male and 24 were female), and users (13 responders were men and the remaining 7 were women) as shown in **Table 5 and fig. 6**. The reason might be due the involvement of female-headed households in bamboo furniture production was low as compared to male headed respondents.

Even though the current Ethiopian constitution calls for affirmative action to allow women to participate equally with men in political, economic, and social fields, in the past four decades, the government has failed to adequately address the plight of women entrepreneurs (Munuyee, 2018).

Table 5. Sex composition of households (N =108) involved in bamboo sofa value chain around Addis Ababa

Variable	Category	Direct actors (108)							
		Farmers N= 21		Traders N= 10		Manufacturers N= 57		Users N= 20	
		N	%	N	%	N	%	N	%
Gender	Male	21	100	10	100	33	58	13	65
	Female	0	0	0	0	24	42	7	35

Thus, in order to facilitate their full contribution to sustainable furniture manufacturing, relevant support services for the promotion of women entrepreneurship should, therefore, be identified and supported.

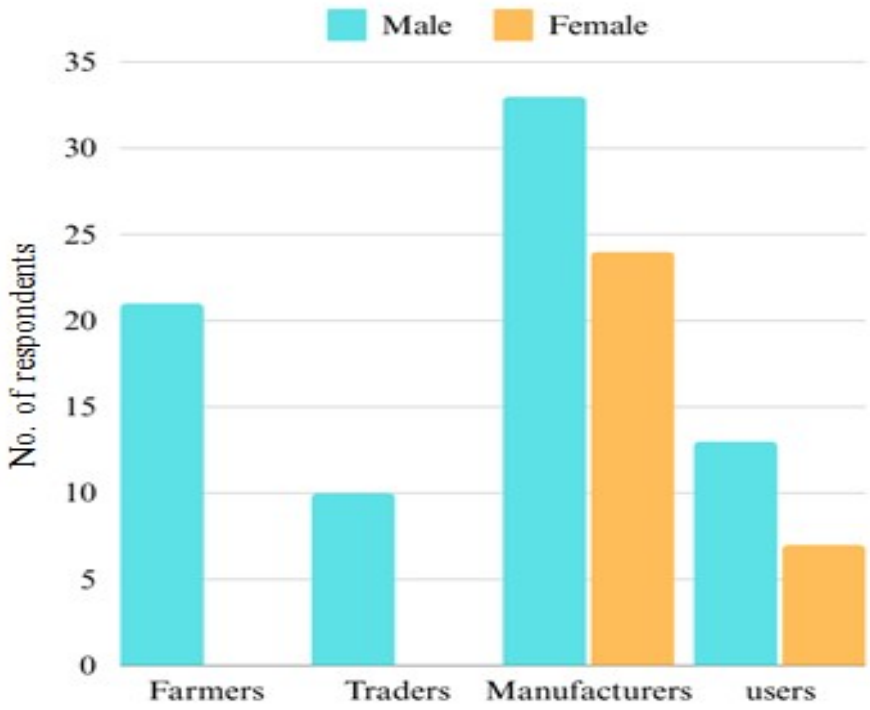

Figure 6. Sex composition of respondents

4.1.2. **Age composition of the respondents**

With regard to, the age respondents' age classification of (farmers, traders, manufacturers and users), shows that youth between 18 and 45 years dominate. Interestingly, a majority of the households within these two groups implying participation in bamboo sofa manufacturing value chain is mainly the job of youth generation. The age compositions of the respondents are shown in **table 6, and Fig. 7.**

Table 6. Age composition of households (N =108) involved in bamboo sofa value chain around Addis Ababa

Variable	Category	Direct actors (108)							
		Farmers N= 21		Traders N= 10		Manufacturers N= 57		Users N= 20	
		N	%	N	%	N	%	N	%
Age	18 – 25	2	10	1	10	17	30	0	0
	26 – 35	11	52	7	70	23	40	4	20
	36 – 45	5	24	2	20	12	21	9	45
	> 45	3	14	0	0	5	9	7	35

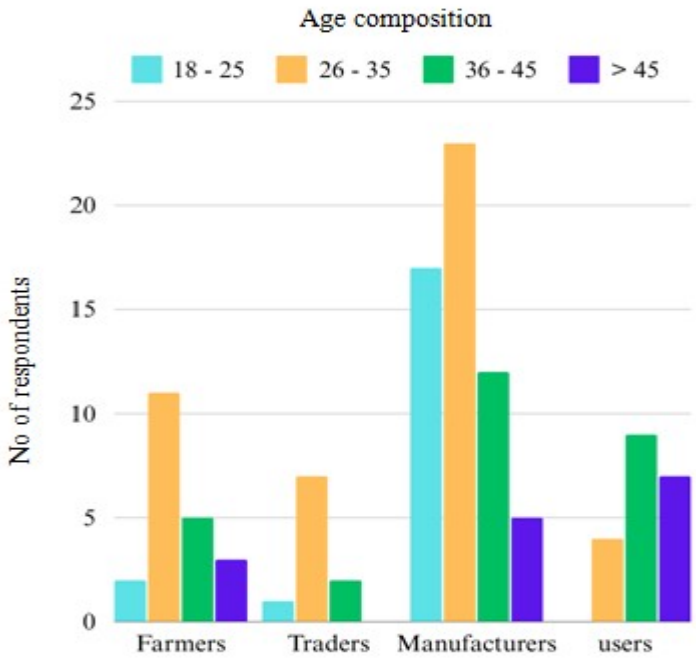

Figure 7. Age of the respondents

4.1.3. Educational background of the respondents

The education level of the farmers, trader, manufacturers and users respondents varies from the informal education to completion of secondary school. The proportion of education level is as follows; 52% of the farmers, 40% of the manufactures cannot attain formal education, 24% of the sampled farmers, 50% of the traders and 30% of manufacturers have attended primary school education, 14% of the sampled farmers, 40% of the traders, 21% of manufacturers and 35% of users have attended secondary school education, 10% of the sampled farmers, 10% of the traders, 9% of manufacturers and 65% of users have attended more than secondary school education. See **table 7** and **fig. 8**

Table 7. Educational background of respondents

Variable	Category	Direct actors (108)							
		Farmers N= 21		Traders N= 10		Manufacturers N= 57		Users N= 20	
		N	%	N	%	N	%	N	%
Educational background	No formal Education	11	52	0	0	23	40	0	0
	Primary	5	24	5	50	17	30	0	0
	Secondary	3	14	4	40	12	21	7	35
	> secondary	1	`10	1	10	5	9	13	65

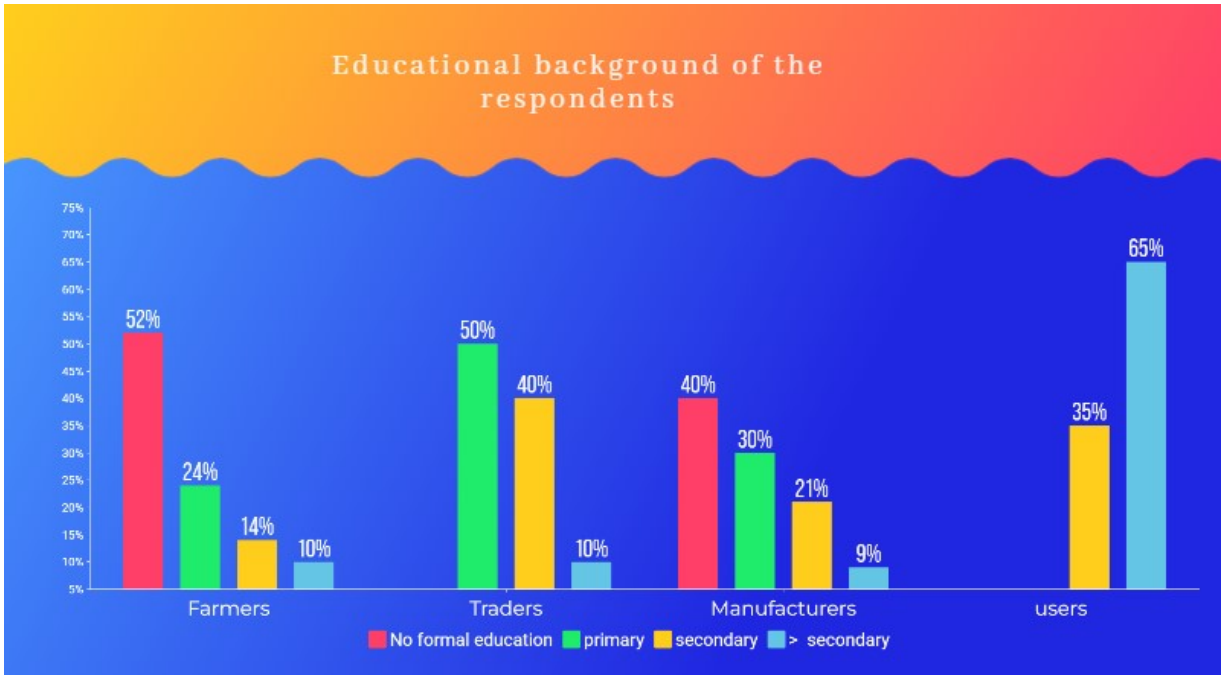

Figure 8. Educational Background of respondents

4.1.4. Experience of respondents in bamboo sofa chair value chain

Majority of the sample respondent's participants in bamboo sofa chair value chain was experienced and, about 10%, 60%, 53% and 70% of the farmers, traders, manufacturers and users respectively have experience 5 – 10 years, about 36.1% of the respondents have experience 10 – 15 years, about 21.3% of the respondents have experience 15 – 20 years. The detail of respondent's experiences is summarized in **table 8 and fig. 9**.

Table 8. Experience level of respondents

Variable	Category	Direct actors (108)							
		Farmers N= 21		Traders N= 10		Manufacturers N= 57		Users N= 20	
		N	%	N	%	N	%	N	%
Experience of actors in value chain	5 – 10	2	10	6	60	30	53	14	70
	11 – 15	15	70	4	40	19	33	6	30
	16 - 20	3	14	0	0	7	12	0	0
	> 20	1	`6	0	0	1	2	0	0

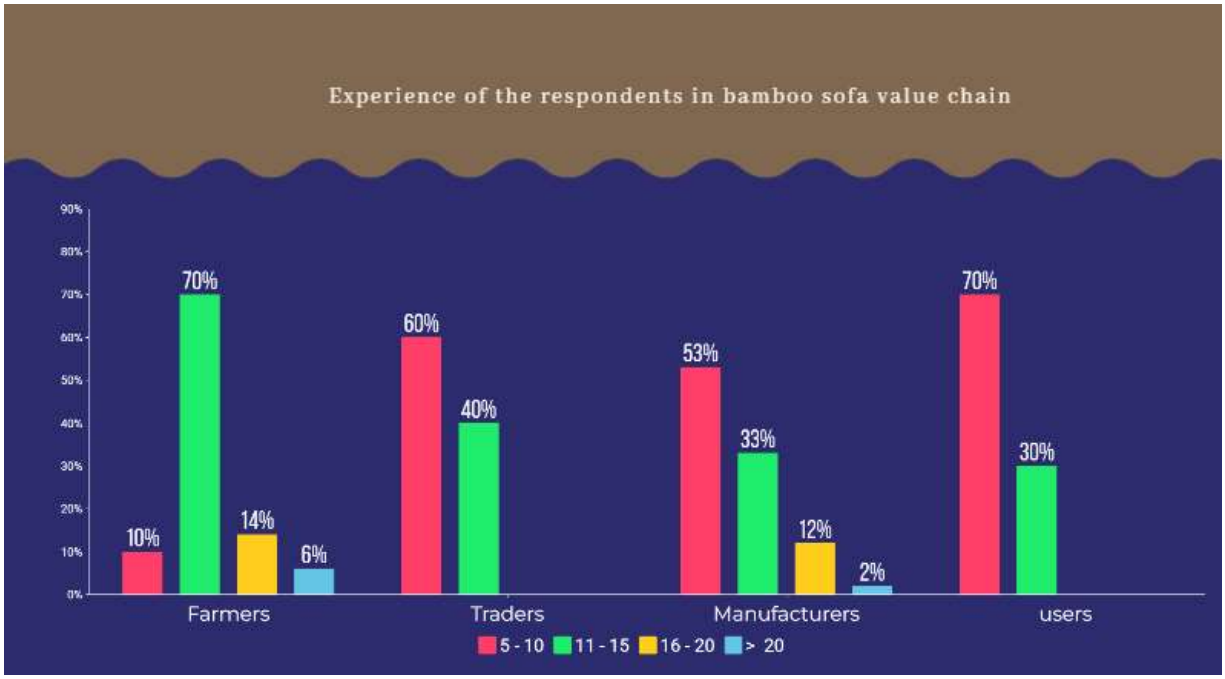

Figure 9. Experience level of respondents

In their research, Capelleras and Rabetino (2008) found no connection between business growth and prior MSE experience. The medium- and large-scale manufacturing of bamboo furniture in Addis Ababa operates similarly. The study's findings demonstrated that the marketable supply of bamboo sofa chairs was unaffected by the respondents' previous experience in bamboo sofa chair manufacturing.

4.2. Value Chain Analysis (VCA)

4.2.1. Value chain (VC) map of modern bamboo sofa chair around Addis Ababa

Figure 10 displays the value chain map of a modern bamboo sofa chair around the Addis Ababa. Value chain mapping, according to McCormick and Schmitz (2002), makes it possible to see how a product moves via different actors from conception to end user. It also helps to identify the different actors involved in the bamboo sofa manufacturing enterprises/industries value chain, and to understand their roles and linkages.

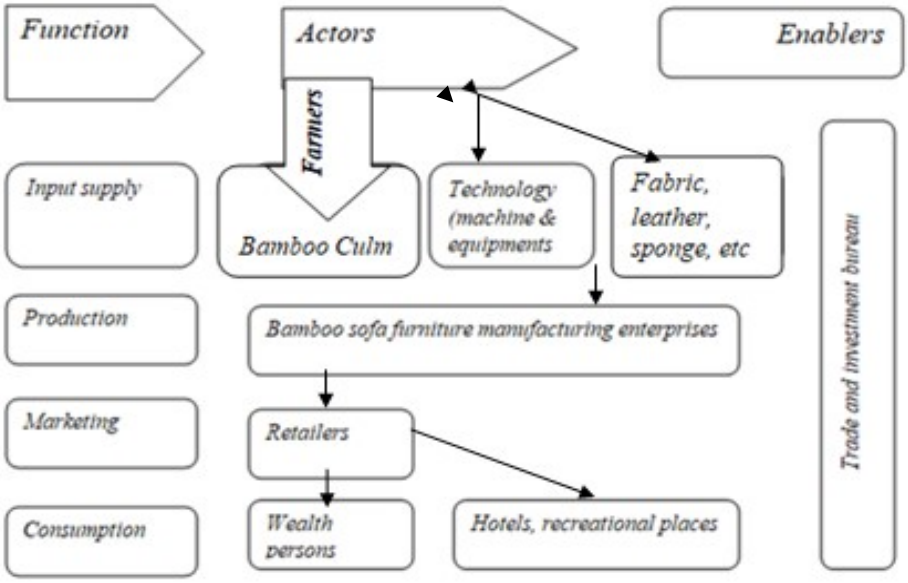

Figure 10. Value chain map of modern bamboo sofa chair around Addis Ababa

4.2.2. **Actors and their Role**

The value chain map highlighted the involvement of various actors who have participated directly or indirectly in the value chain. KIT *et al.,* (2006) define indirect actors as those who provide financial or non-financial support services, such as credit agencies, business service providers, government, NGOs, cooperatives, researchers, and extension agents, and direct actors as those engaged in commercial activities along the chain (input suppliers, producers, traders, and consumers).

4.2.2.1. **Input supply stage (Upstream of the bamboo sofa chair VC)**

Two operations are carried out at the input supply level in the manufacturing of bamboo sofa chair, according to the value chain analysis. The first activity illustrates the movement of raw bamboo via a variety of transactions and processes from its production in a natural or cultivated system to the end user. The second activity involves obtaining extra input materials needed to produce sofas.

In the first channel bamboo farmers and local traders are the main participants in the chain that are directly involved.

- **Bamboo Farmers:**

Harvesting and transportation of bamboo culms from natural stands is done manually, including the transport of culms on foot. Since the harvester households' family members perform the work, they do not require cash to cover the cost of additional labor. In all three selected kebeles (Gashena Akayta, and Surta) during the dry season, which runs from November to April in the study area, when farming

operations are suspended, bamboo is mostly gathered. Ten individual bamboo culms are tied together for marketing purposes; this is the locally marketed unit. The average price of the culm varies from 35 – 50 ETB/ culm at these selected study kebeles (Gashena Akayta, and Surta). Compared to local traders, bamboo culm harvesters had low bargaining power and hence were price taker. The bargaining power of the harvesters is low due to quasi unlimited local supply, low local demand and lack of access to market information. Regarding the terms of payment, about 87% of the harvesters indicate that payments for bamboo culm were received in cash. About 13 % said they sold in credit.

Farmers have been encouraged to sell bamboo culms for a variety of reasons, including the rising costs of the culm, their rapid growth, their ease and low cost of management, and their minimal processing requirements. At the study site, farmers' only duties are to harvest the bamboo culm from the natural stand and sell it to local traders. This study is in line with Munuyee (2018) discovered that the role of *Eucalyptus* tree farmers in Chefasine kebele is restricted to clearing land, planting *Eucalyptus* trees, and caring for *Eucalyptus* stands.

- **Bamboo Culm traders**:

According to the study two types of traders are encountered. Those are village Traders: the traders who purchased and collected bamboo culm from the producers and sold bamboo culm to wholesalers.

Like the farmers these actors also sell their product (bamboo culm) in piece. They sell a single culm 90 – 110 ETB/ Culm to wholesalers. Purchasing, drying, and storing are the main functions of these traders. Local traders participated in bamboo trading mainly during the dry seasons. The second one is wholesalers: actors are the traders who purchase bamboo culms in large amount from village traders and they sell to bamboo enterprises. These actors also sell their product bamboo culm in piece. They sell bamboo culm in average from 120 – 150 ETB/ Pole based on the diameter of the culm.

In the second activity, which involves obtaining extra input materials needed to produce sofas manufacturing enterprises themselves do the work. In the channel of input Supply Stage (Upstream of the bamboo sofa VC) several inputs are considered additional materials needed, design, and technology are the major input utilized by bamboo enterprises around Addis Ababa for the production of modern bamboo sofa furniture.

Moreover, sofa making is needed different materials and process to bring it in to final stage. Bamboo is used as primary material in bamboo sofa making, but in order to achieve greater strength and

resistance a stainless steel or iron structure is used instead. Spongy Cushion can also be fitted to the chairs to make it more attractive and beautiful.

4.2.2.2. **Production stage**

The bamboo furniture manufacturing enterprises are the key actors who were directly involved in bamboo furniture (modern sofa) production activities. There are several types of sofas with different design which are produced by bamboo works enterprises around Addis Ababa. In order to make simplified the modern bamboo sofa VCA, two common types of bamboo sofas were identified for this study based on their dimension and frequent availability. These are, Single seater sofa with dimensions of (55cm by 60cm) seat area, 42 cm front height and 76 cm back height. The second type is double seater sofa with dimensions of (69cm by 110cm) seat area; 42 cm front height and 76 cm back height are common types of modern bamboo sofa frequently produced by bamboo sofa manufacturers as show in **table 10.**

Table 9. Common types of bamboo sofa manufactured in bamboo enterprises around Addis Ababa

Types of bamboo sofa	Specifications		
	Area of seat	Front height	Back height
Single seater sofa	55cm by 60cm	42 cm	76 cm
Single seater sofa	69cm by 110cm	42 cm	76 cm

Single and double seater sofa produced in SA enterprise and Ethio. Indo. Lux... Bamboo works in Addis Ababa

Figure 11. Bamboo sofa

The major value chain functions that bamboo sofa manufactures perform include procurement of raw material, product design, making bill of material, cutting and shaping, assembling, finishing and delivery of the product to end consumer at the point of sale. Selected bamboo sofa manufacturing

enterprises in this study have good relationship with buyers of the value added bamboo products. It enables them to reduce the cost of processing and obtain quality raw materials from the suppliers.

4.2.2.3. **Marketing Stage (forward linkage of the modern bamboo sofa VC)**

Marketing stage is an important stage in the value chain. After the product is ready for sell bamboo sofa production enterprises deliver their product to their show room and or directly sell to consumer. Also they promote and sell using online system.

4.2.2.4. **Consumption Stage**

Consumers are the last step of the value chain. They are those who purchase the products for use. About two types of bamboo sofa consumers were identified: wealthy households, and institutions which give services Such as hotels etc.

Majority of the consumers purchase the bamboo sofa chair directly from manufacturer show room while there are also some retailers those buy the product from manufacturers and sell. Frequently, double seater (69cm by 110cm seat dimensions) and 42 cm front height and 76 cm back height sofas are much requested by consumers. Specially, they are demanded by hotels and recreational places.

4.3. The production process of bamboo sofa chain in selected workshops

An analysis of bamboo sofa in selected workshops around Addis Ababa (**fig. 8**) reveals the following production process:

- **Bamboo Selection and Preparation:** Sourcing suitable bamboo culms, drying, and treating them to prevent insect infestation and decay. Bamboos with large culms and thick walls are ideal as they maximize the number of sections obtained from each culm. During material selection a preferred diameter of bamboo culm is ideally ranging 5-6 cm.
- **Cutting the bamboo culms:** After removing branches and tips the culms are crosscut into short lengths with a cross cutting saw. Cutting bamboo into desired lengths and shapes using fine-toothed saw, ideally for cutting bamboo cleanly. A hacksaw or a pull saw can work well. Once selected, proceed to cut these bamboo culms into segments measuring approximately 1 meter in length.
- **Straightening/ Bending**

During Straightening/ Bending they apply heat on the specific portion of the bamboo poles and its surrounding area, where straightening needs to be performed. Then by moving the bamboos back and forth avoid heating at a single point. Charcoal or wood can be used as a heating source. According to the manufacturers responses heating increases flexibility of bamboo, which allows bending or straightening of bamboo. Using the support of bending column (holes on wooden logs to accommodate the diameter of bamboo), straighten or bend the bamboo poles in the desired form by applying force. They were use eye alignment to check the straightness. As soon as the specific bent is straightened they apply water with the help of the cloth to the heated part for cooling down, which enables the pole to retain the new shape / form.

- **Scraping/Knot Removal**

Remove the knot portion using hand planer or angle grinder to smoothen out the surface. Then, using curved knife or scrapper, scrap the outer skin of bamboo pole.

- **Making Mortise &Tenon and Groove Joinery**

After marking, use a Flat Chisel and a hammer to make the grooves on the bamboo. The depth of the groove should be slightly more than half of the diameter of bamboo. Use the hand saw to make a cut on both sides of the flat tongue. Secondly using the knife or chisel, scoop out the bamboo above the

cut portions of bamboo. The tongue should exactly fit in the groove to ensure strength / sturdiness of the product.

- Assembling the Chair Frame

Assembling the bamboo sofa chair involves the following steps:

→ Assembling the separate components together
→ Applying adhesive or glue in the joineries
→ Clamping the product with rope or clamps to ensure symmetry or dimensions
→ Fixing the components into a single product using bamboo nails

Immediately after application of glue, firmly clamp or fix the product using steel clamps or rope. Once clamping is done, drill holes diagonally at two or three locations for each joinery using drill. Size of the hole can range from 4-6 mm. Peg bamboo nails using hammering inside each hole, so that it firmly fixes each component of the product. Dip bamboo nails in adhesive or glue for firm fixing. Trim or cut the extra portions of nails using chisel or knife. Finally, they make assembling by adding the various components like sponge, fabric and cushions to a complete sofa.

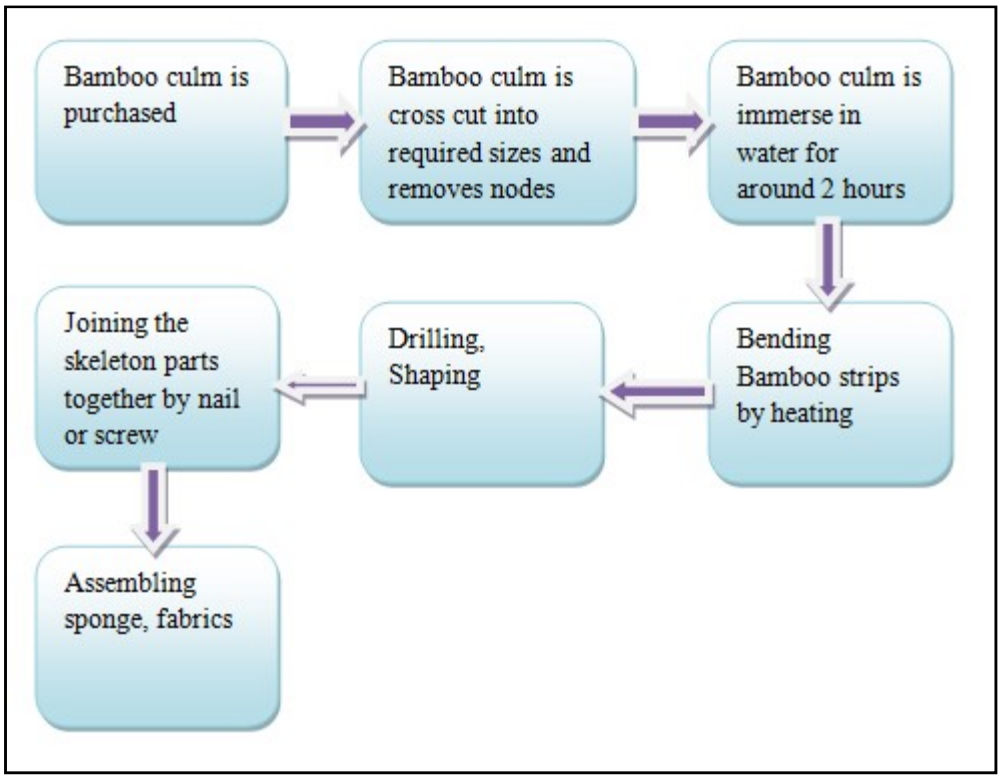

Figure 12. Production process of bamboo sofa chain in selected workshops

4.3.1. **Price trend of bamboo sofa chairs in the past five years**

Table 9, showed the specification of bamboo sofa chair and its price trend in the past five years at study area.

Table 10. Specification of bamboo sofa chair and its price trend in the past five years

No.	Description of material	Price (ETB) / Years (Ethiopian calendar)				
		2012	2013	2014	2015	2016
1	Single seater bamboo sofa	750	1350	2500	4800	8000
2	Double seater bamboo sofa	2500	3500	5100	7500	14800

According to the study the price of bamboo sofa was increasing from year to year in Addis Ababa. This is depends on the increase demand individual preferences of bamboo sofa and needs. This is in line with findings of Mekonnen *et al*. (2014) that the price of single seater sofa and double seater bamboo sofa as 10 and 19.91 respectively, in Ethiopia in year 2010.

4.3.2. **Analysis of the Cost and Return of the modern sofa chair**

Table 10, showed the specification of average raw materials and other input consumed by selected bamboo sofa chair manufacturing workshop at study area.

Table 11. Average unit production Cost and Average selling price of single seater bamboo sofa

No.	Description of material	Unit	Qty		Unit price	Total price	
			Single seater	Double seater		Single seater	Double seater
1	Bamboo culm	Pcs	2	3	135	270	405
2	Glue	Kg	1/2	1	800	400	800
3	Nail	Kg	1/4	½	400	100	200
3	Sponge	Pcs	1/4	½	4000	1000	2000
4	Mastish		1/4	½	3000	750	1500
4	Fabric	M	7	14	280	1960	3920
6	Total material cost					4480	8825
6	Labour cost (15%)					672	1323.7
7	Manufacturing OH and administrative costs (5%)					224	441.2
	Total average manufacturing cost					5376	10590
	Total selling price					8000	14800
	Profit	Selling cost – total manufacturing cost				2624	4210

The average total production cost for single seater bamboo sofa was Birr 5376: which is 4480 Birr raw material cost, 672 Birr labor cost and 224 Birr manufacturing over head and administrative cost. The average selling price of single seater bamboo sofa of manufacturers in the study area was 8000 Birr. The bamboo sofa chair manufacturing industries earned 2624 Birr/ single seater bamboo sofa chair as average profit.

The average total production cost for double seater bamboo sofa was Birr 10590 which is 8825 Birr raw material cost, 1323.7 Birr labor cost and 441.2 Birr manufacturing over head and administrative cost. The average selling price of double seater bamboo sofa of manufacturers in the study area was 14800 Birr. The bamboo sofa chair manufacturing industries earned 4210 Birr/ double seater bamboo sofa chair as average profit.

Selected bamboo sofa chair manufacturing enterprises on average processes 620 modern bamboo sofa chairs in year 2016 E.C. All these selected bamboo sofa chair manufacturing enterprises used on average two bamboo culm to make a single modern bamboo chair and 4 culm on average for double seater modern sofa chair. These selected bamboo sofa manufacturing enterprises earn highest annual income per year. On average in year of 2024 these selected bamboo sofa chair manufacturing enterprises earn 2610,200 ETB per double seater bamboo sofa chair and 1626,880 ETB per single seater bamboo sofa chair. It indicates that investing on modern bamboo sofa chair manufacturing business leads to better business profit. This is in line with Dafroza (2016) reported that processors received 46% of the profit margin.

4.4. Challenges and Opportunities in bamboo sofa chair manufacturing industries Value Chain

4.4.1. Contribution of bamboo culm to farmers livelihood (lower stream of modern bamboo sofa chair VC)

Farmers can greatly benefit from bamboo culm in terms of sustaining their livelihoods. As a result, bamboo culm was harvested by farmers in the study villages for a variety of purposes, including building, fuelwood, and fencing and shading, and making furniture. The income generated from the sale of bamboo culm has used for purchasing household consumption materials (clothes, food and other equipment) (49.5 %), for buying input livestock's (48.2 %) and for medical and health care's (2.3%) see **table 12.** This is in line with Fayera; et al. (2016) bamboo culm contribution to individual households ranges widely.

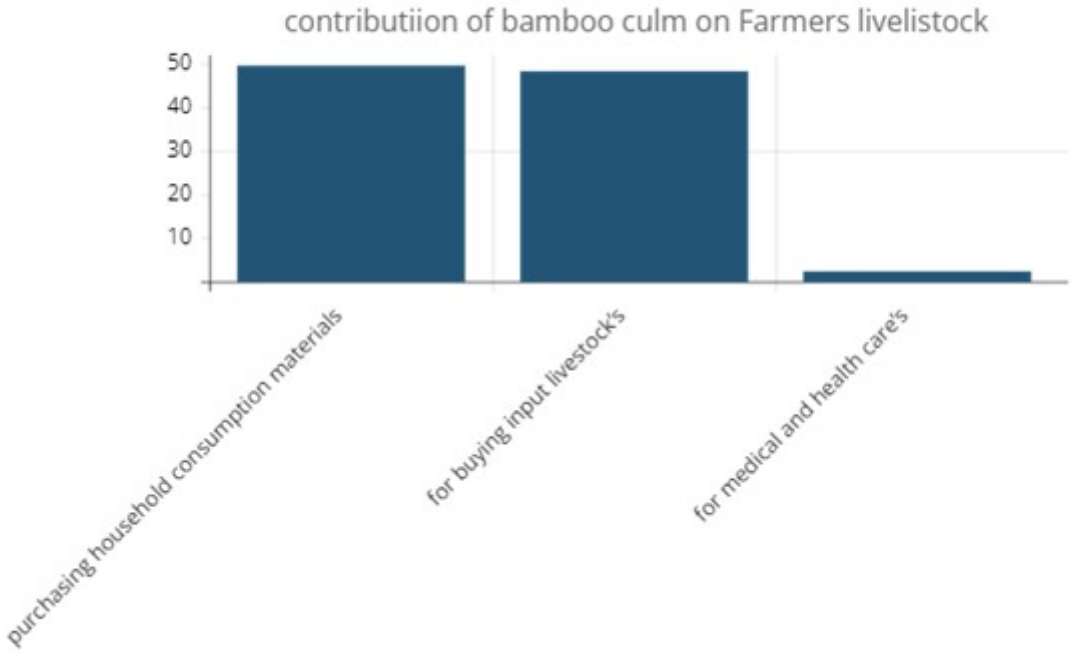

Figure 13. Contribution of bamboo culm to farmers

4.4.2. Constraints of farmers

Over the course of the bamboo culm value chain, farmers in study kebeles have encountered numerous challenges. During the dry season, every household surveyed gathers bamboo culms from the natural forest, either for their own use or to sell. Due to the fact that bamboo was primarily gathered informally and occasionally without restriction from natural forests in study areas, there was little demand for bamboo culm and only a low local market price.

Martin et al. (2007) found a similar situation in Laos, where bamboo from natural forests had a low demand at the provincial bamboo market, because these bamboo resources were more or less freely available to most of the people and processing industries were far. Nevertheless, bamboo commercialization in these study areas provides farmers the opportunity to earn some cash, although it is not attractive as bamboo culms are sold at very low prices

4.4.3. Contribution of bamboo culm to traders (lower stream of modern bamboo sofa chair VC)

Awi, Sidama, and Gurage were the top, second, and third primary sources of raw materials, respectively, for a medium-sized bamboo manufacturing company in Addis Ababa. This was due to

their relative proximity and superior road access to the city (Fayera et al., 2016). This indicates that there is a significant market demand from Addis Ababa for the traders from the study's kebeles, Gashena, Akayta, and Surta. The traders profit from the sale of bamboo culm because an increase in market demand and a corresponding rise in the price of the culm allows them to pay for housing, household necessities (food, clothing, and medical care), education, rent for their homes, and savings for the future.

4.4.4. Challenges of traders face (lower stream on modern bamboo sofa chair VC)

Even though the study's kebeles (Gashena, Akayta, and Surta) were chosen as a convenient location to provide bamboo culms to Addis Ababa- companies that manufacture bamboo sofa chairs, the bamboo culms were harvested from far-off places with poor road access, making it difficult for traders to travel to the Addis Ababa due to its remoteness. This discouraged individual traders from engaging in bamboo culm trading activities. In addition, the study found that local traders in study kebeles had a minimal amount of years of experience in trading bamboo culm due to low margins, which meant that only small number individuals operated a bamboo culm trading business. This is congruent with research by Ingram et al. (2010), which found that low infrastructure, weak and erratic market demand and a lack of business acumen make Africa's commercial bamboo industry inefficient.

4.4.5. Contribution of modern bamboo sofa manufacturing to manufacturers (upstream of the VC)

These selected bamboo sofa chair manufacturing enterprises produces bamboo furniture with its own specification and sells products to high price. The study discovered that selected modern bamboo sofa manufacturing enterprises in the study area receive an ample quantity of income from modern bamboo sofa chair sale to sustain their everyday existence.

"The design and manufacturing of modern bamboo sofa chairs is not well adopted in Ethiopia, so If we can do it in a more unique and better way, we would benefited," the key informant at Ethio. Indo. Lux Bamboo Sofa Enterprise stated in an interview.

Modern and contemporary bamboo sofa seats have become more and more popular in Addis Ababa in recent years. A growing local manufacturing sector has emerged in response to this shift in consumer preferences, meeting the home demand for high-quality bamboo sofa chair items from overseas markets. The increasing consumer interest in eco-friendly products creates a significant market potential for bamboo furniture.

4.4.6. Challenges face modern bamboo sofa chair manufacturers (upstream of the VC)

The results show that some of the challenges selected bamboo sofa chair manufacturing enterprises identified include the rising bamboo culm costs, rising costs of other additional materials required for bamboo sofa chair manufacturing, lack of technical training on the trend of modern bamboo sofa chair design and manufacturing, and lack of awareness among the public about choosing local modern bamboo sofa chairs over imported ones. See **table 13**.

Table 12. Challenges bamboo sofa chair manufacturers face

	Marketing constraints in bamboo sofa chair production	Proportion (%) of respondents (N = 108)
1	rising bamboo culm costs	29.6
2	rising costs of other additional materials required for bamboo sofa chair manufacturing	24.8
3	lack of technical training on the trend of modern bamboo sofa chair design and manufacturing	3.2
4	lack of awareness among the public about choosing local modern bamboo sofa chairs over imported ones	17.1

These results align with Julian's (2023) study, which lists 13 obstacles and difficulties faced by bamboo furniture producers.

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The value chain map highlighted the involvement of diverse actors participated directly or indirectly in the chain. Directly input suppliers, producers, traders, consumers and indirectly actors are ministry of trade and investment are involved. The actors involved to bring bamboo sofa chair product to the final stage used several inputs such as bamboo culm producers, local traders, and wholesalers, manufacturers, and consumers. There are several types of bamboo sofa chair with different design which are produced by bamboo chair manufacturers in Addis Ababa. Commonly produced are single seater sofa (55cm by 60cm seat area) and double seater sofa (69cm by 110cm seat area).

The products are consumed by hotels, recreational places and individuals. The volume of production of bamboo sofa (both single and double seater) was about 620 pieces in the year 2016 E.C from which about 520 pieces were sold. The average total production cost incurred for raw material, labor, manufacturing over head and administrative issues is Birr 2060, 412, 309 and 4078, 815.6, 611.7 for single, and double seater bamboo sofa chair respectively. The manufactures received in average profit of Birr 3119 and 5295 form single, and double seater bamboo sofa chair respectively.

In general, manufactures enterprises gained more profit in all types of Bamboo sofa chair. The overall value chain assessment showed that modern bamboo sofa chair in Ethiopia had a weak integration except some advancement around Addis Ababa by bamboo-based enterprises that have started chain upgrading. Despite the inefficient value chains, respondents indicated an increasing trend of demand for modern bamboo sofa chair. The finding also included challenges and opportunities of bamboo sofa chair manufacturing industries. The challenges are Lack of Sufficient Supply of locally raw material; Lack of demand, competitors for similar products and market, Low price which account 29.6, 24.8, 3.2 and 17.1 percentage of respondent. The basic opportunities are increasing existence of high market potential in the study area and availability of raw material (bamboo forest) resource around the area.

5.2. Recommendations

- → Broad policy and development intervention measures are, needed to address the various challenges and constraints undermining the socio-economic importance of bamboo sofa chair and to tap opportunities attached to it.
- → The trade and industry office should encourage the bamboo traders by giving its own license and support and effort should be made to increase the contribution of the sector to the national economy
- → The government and ministry of trade and investment offices should support bamboo sofa chair manufacturing enterprises by enhancing the processors' skill and capacity to transform the business into more modern and profitable bamboo sofa chair manufacturing enterprises.
- → Technologies that diversify modern bamboo sofa chair products based on consumer needs and behavior are crucial.
- → Providing access to microfinance and other financial instruments for modern bamboo sofa chair manufacturing enterprises can facilitate investment in technology, equipment, and marketing.
- → Initiating training programs for bamboo sofa chair producers to enhance their skills in modern bamboo sofa chair processing, design, and manufacturing would improve product quality and innovation

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Appendix's

Appendix 1. Questionnaires used to gather data based on specific objective one

Introductory note: The main objective of this questionnaire is to investigate the value chain of modern bamboo sofa chair around Addis Ababa. The questions are prepared to identify links and roles of major actors in bamboo sofa chair value chain. The study will be conducted as part of the M.Sc. thesis in Wood Science Technology. I am thankful for your willingness, respect and taking the time to fill this questionnaire'. Information given by you will strictly be kept confidential during the course of the study and beyond.

Questionnaire number …… Date of interview ----------

Sub city …… kebele ……

1. **Personal information of a respondent:**

A. Name of the respondent……

B. Age in years ……..

C. Sex of respondent: Male ☐ Female ☐

D. Formal educational level of the respondent:

1. No formal education 2. Primary school

3. Secondary school 4. more that secondary education

E. Marital status: 1. Married 2. Single 3. Divorced 4. Widowed

Questions for producers

1. Do you have bamboo plant on your land?

   A. Yes B. No

2. Where do you plant bamboo?

   A. Farmland and homestead B. Grazing land C. Marginal land D. Others specify

3. Do you think bamboo contribute to your livelihood? A. Yes B. No

4. How long have you been planting bamboo?

A. Less than 5 years

B. 5-10 years

C. 10-15 years

D. 15-20 years

E. More than 20 years

5. How do you sell your bamboo products?
   A. On stand B. Felled & processed C. Forwarding to landing D. Others
6. Do you know where your product goes? Do you know the price of your product at the subsequent places? ----------
7. Who is the buyer of your bamboo products?
   A. Consumers B. Middlemen C. Wholesalers D. Retailers. E. Others. …
8. Do the buyers come to you or you yourself contacted them?
9. Do you have the power to negotiate? 1. Yes 2. No: If no, why……
10. Are you satisfied with the current price of your product? 1. Yes 2. No: If no, why……
11. Do you have collaboration with other actors?
    A. Producers B. Traders C. Government forestry departments D. NGO's E. Others
12. How do you examine the connection between you and other participants in the bamboo product value chain?
    A. Too strong B. Strong C. Weak D. Too weak
13. How do you think the performance of bamboo products value chains can be improved? _____
14. Do you get any support from the government or not? If yes, what kind of support?

Questions for traders

15. Which stages of the marketing chain are you involved in?

    A. Production B. Wholesale C. Retail D. Other, type what

17. How long have you been engaged in this business? _____years

18. from where you purchase your bamboo products?

    A. from the farmers

    B. Middle men

    C. Local market

    D. Other

19. Why do you choose to purchase from them? For the above question_____

20. How do you purchase bamboo products?

    A. On stand B. Felled/processed/ C. Fuelwood D. Charcoal E. Others specify

21. What is the current purchasing price per kada/hectare at your ranking preferred location of purchase……

22. Who determines the price? 1. Seller 2. Purchaser 3. Market 4. Others please specify……

23. What factors are considered in setting up the price of bamboo product?

    A. Production costs B. Transportation costs C. Quality D. Seasonality E. others (specify)……

24. To whom did you sell bamboo products? ----------

25. Did you have any collaboration with others traders/your suppliers/buyers? ----------

26. Are you satisfied with the current price of your bamboo product?

    A. Yes B. No , if No, why? _____

27. What factors influence the price? ----------

28. What values or activities contribute to your bamboo pole product's increased selling price?

29. What are the most significant challenges you face in your business?

Questions for manufacturers

30. How long have you been involved in the production process of bamboo sofa?

A. Less than 1 year

B. 1-3 years

C. 3-5 years

D. More than 5 years

31. How satisfied are you with the current bamboo sofa production process in your company?

A. Very Satisfied B. Satisfied C. Neutral D. Dissatisfied E. Very Dissatisfied

32. Where do you purchase bamboo resources for sofa production?

A. Direct from the farmer B. from wholesaler C. from retailer D. others, specify

33.How do you rate your bamboo suppliers in terms of the following aspects?

	Poor	Average	Good	Excellent
Reliability				
Cost				
Quality				
Communication				

Appendix 2. Questionnaires used to gather data based on specific objective two

Introductory note: The main objective of this questionnaire is to investigate the value chain of modern bamboo sofa chair around Addis Ababa. The questions are prepared to evaluate the production process of bamboo sofa chain in selected workshops. The study will be conducted as part of the M.Sc. thesis in Wood Science Technology. I am thankful for your willingness, respect and taking the time to fill this questionnaire'. Information given by you will strictly be kept confidential during the course of the study and beyond.

Questionnaire number …… Date of interview ----------

Sub city …… kebele ……

1. **Personal information of a respondent:**
   A. Name of the respondent……
   B. Age in years ……..
   C. Sex of respondent: Male ☐ Female ☐
   D. Formal educational level of the respondent:

   1. No formal education 2. Primary school

   3. Secondary school 4. more that secondary education

   E. Marital status: 1. Married 2. Single 3. Divorced 4. Widowed
   F. Number of people in the household…….

2.How many years of experience do you have in bamboo sofa production?

A.Less than 1 year B. 1-3 years C. 3-5 years D. More than 5 years

2. What is your selling price in the last 5 years per sofa set?

Selling price per single set of sofa	Years				
sofa (single seater)	2019	2020	2021	2022	2023
sofa (double seater)					

3. Can you describe the stages of modern bamboo sofa production in your company?

4.What are the values/ activities you add in bamboo sofa manufacturing process?

5.Which materials do you combine with bamboo while bamboo sofa designs?

A.Metal B. Fabric C. Leather D. Plastic E. Other, type what

6.Rate the following aspects of the bamboo sofa chair value chain

	Poor	Average	Good	Excellent
Raw material availability				
Production efficiency				
Market demand				

4. How much weight do you give the following factors when manufacturing bamboo sofa?

	Very important	Somewhat important	Somewhat unimportant	Very unimportant
Product finishing				
Product quality (durable)				
Product brand				
Product price				

5. How do you rate bamboo sofa with other wooden sofa furniture according to their quality, cost and safety? Please rank the materials for their quality, cost and safety (1 for very good, 2 for good).

Material	Quality	Cost	Safety
Bamboo sofa			
Wooden sofa			

Appendix 3. Questionnaires used to gather data based on specific objective three

Introductory note: The main objective of this questionnaire is to investigate the value chain of modern bamboo sofa chair around Addis Ababa. The questions are prepared to identify the challenges of bamboo sofa value chain. The study will be conducted as part of the M.Sc. thesis in Wood Science Technology. I am thankful for your willingness, respect and taking the time to fill this questionnaire'. Information given by you will strictly be kept confidential during the course of the study and beyond.

1. Do you have constraints for your bamboo production? 1. Yes 2. No, if yes, what are the major constraints? ----------

2.What challenges do you face in the bamboo sofa chair value chain?

A.Supply chain disruptions B. High costs C. Quality issues D. Market competition E. Other, type what

2. What are the potential barriers you face during the production of bamboo sofa?

   _____

3. What obstacles do face in getting modern bamboo sofa chair?

   1 = low quality [ ]

   2 = inadequate supplies [ ]

   3 = low aesthetic [ ]

   4 = high price [ ]

   5 = others [ ] (specify) ……

4. Do you have any recommendations for bamboo sofa furniture, distributors, retailers, or other actors or stakeholders to improve the product value chain's performance?

“Thank you for your cooperation”