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EVALUATION OF COFFEE SUPPLY CHAIN PERFORMANCE USING VALUE CHAIN ANALYSIS AND FISHBONE DIAGRAM (CASE STUDY ON COFFEE FARMERS IN EAST JAVA)

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ABSTRACT

Coffee has grown into a high-value commodity in international trade, contributing significantly to global GDP and creating millions of jobs worldwide. This study aims to analyze the value chain of the coffee industry in East Java, identify the root cause of the low margins obtained by coffee farmers, and provide recommendations to increase their income and efficiency in the supply chain. The methodology used included primary data collection through in-depth interviews with coffee supply chain actors in East Java and analysis using fishbone diagrams to identify factors causing low margins of coffee farmers, such as limited market access, inadequate processing equipment, and conventional drying methods. The results of the study show that coffee farmers get the lowest profit margin, less than 10%, due to low efficiency and productivity. The recommendations included digital technology training, financial assistance for equipment, and low-interest credit programs for coffee farmers. The implementation of this recommendation is expected to increase the efficiency, productivity, and profit margins of coffee farmers in East Java, increasing their competitiveness in the global market. The study also highlights the need for multi-stakeholder support and long-term evaluation to measure the effectiveness of proposed interventions.

Keywords : *Artificial Intelligence, Marketing Strategy, Bibliometric*

INTRODUCTION

Coffee has developed into a high-value and strategic commodity in international trade. The coffee industry is now one of the economic sectors that makes a significant contribution to the global Gross Domestic Product (GDP). The current global conditions indicate an increase in demand for coffee, which opens up substantial economic opportunities for coffee-producing and exporting countries. The coffee industry creates millions of jobs around the world, from farmers in coffee plantations, workers in processing plants, to workers in the distribution and sales sectors. Therefore, the coffee market not only has a great economic impact but also plays an important role in supporting people's livelihoods. In addition, coffee also plays a vital role in trade relations between countries. Many coffee-consuming countries rely heavily on coffee imports from producing countries, resulting in strong and mutually beneficial trade relations between various parties. (International Coffee Organization, 2023)

In the coffee industry, it is undeniable that the coffee supply chain plays a central role in regulating the flow of coffee production, distribution, and consumption from farmers to the end consumer. The coffee supply chain is defined as a process that includes the stages of coffee movement from the place of production to the consumer. The actors in this supply chain include producers (farmers and cooperatives), processors, exporters on a large and small scale, importers, and buyers. Research conducted by Aklimawati et al. (2014) stated that the coffee supply chain in Indonesia includes several parties such as farmers, collectors, wholesalers, and exporters. However, the latest research by Jacobi et al. (2023) updates all previous studies by identifying the perpetrators in the coffee supply chain in more detail. Jacobi et al. (2023) explain that the coffee supply chain begins with coffee farmers as the main producers, which can involve farmer organizations or cooperatives as managing entities to improve supply chain performance. The coffee distribution process then continues to domestic and international distributors. Domestic distributors are responsible for supplying coffee to retailers at the local level. Meanwhile, in an international context, distribution involves exporters as key intermediaries who direct coffee to the global market. Domestic distribution involves retailers efficiently distributing coffee products to the local market, while international distribution involves the export process, where quality and international trade requirements are crucial considerations. In this context, exports are a key element that facilitates the flow of coffee in the global market.(Lukas, 2015)

Indonesia is one of the largest coffee producers in the world, ranking fourth after Brazil, Vietnam, and Colombia. Coffee contributes 16.15% to the country's GDP and is the third largest plantation commodity after palm oil and rubber. East Java, as the 6th largest coffee producing province in Indonesia, recorded a coffee plantation area of 41.15 million spread across several districts

such as Banyuwangi, Malang, Jember, Bondowoso, and Blitar. The coffee industry in East Java contributed 29.1% to the province's economic growth in 2022. However, coffee farmers in East Java still face various challenges, including lack of knowledge and management, weak farmer institutions, limited access to capital, and low mastery of technology and post-harvest. In addition, unstable fluctuations in coffee prices add to the difficulties for farmers in planning their production so that coffee farmers are unable to maximize their profits when compared to other coffee supply chain players. Limited capital also affects the ability of farmers to carry out post-harvest processing, which results in the decision to sell coffee immediately after harvest even at a lower price. Unpredictable weather changes also make farmers reluctant to carry out further processing. This problem hampers farmers' income potential and their ability as providers in the coffee industry supply chain.(Kementrian Komunikasi dan Informatika Indonesia, 2022; Salam et al., 2021; Statistik, 2021; Sunanto et al., 2019; Werdiono, 2023)

This research aims to gain a deeper understanding of the value chain in the coffee industry in East Java. The coffee value chain is the main focus of this research because understanding this value stream is considered crucial in identifying critical points and opportunities to assist farmers in maximizing profits to improve the welfare of coffee farmers as well as the stability of coffee prices in the domestic and international markets. Previous research stated that value chain analysis provides an understanding of the role and contribution of each stage in creating added value for the supply chain of an industry. In addition, value chain analysis identifies weak points in the value chain and seeks the right solutions and strategies to improve the efficiency and effectiveness of the supply chain. In particular, value chain analysis can help in strengthening farmer institutions, increasing access to capital and technology, and facilitating cooperation between stakeholders in order to improve the welfare of farmers and the stability of the coffee market in East Java.

In order to provide recommendations related to the problems faced by coffee farmers, this study also aims to identify the root causes of problems faced by coffee farmers, especially related to the limitations of farmers in maximizing margins. In identifying the root cause of problems that occur in coffee farmers, this study uses a fishbone diagram approach to find out the root cause of problems based on 6 factors, namely man, method, material, machine, measurement and environment. This study will also provide recommendations based on the root cause of the problem that has been identified in the fishbone diagram analysis. Based on this background, this study has several problem formulations, including: (1) What is the coffee value chain in East Java? (2) What are the results of identifying the root cause of the problem of low margins obtained by coffee farmers in East Java?, and (3) What are the recommendations that can be given to help increase farmers' income potential and their ability as providers in the coffee industry supply chain?

LITERATUR REVIEW

Coffee Industry

Coffee is one of the most profitable commodities in global trade, and the coffee industry serves as a major source of foreign exchange for several developing countries. In addition, the process of cultivating, processing, trading, transporting, and marketing coffee provides employment for millions of people around the world. Coffee is the third largest plantation commodity after palm oil and rubber, coffee shows great potential in boosting the Indonesian economy. In the last ten years, the coffee industry in Indonesia has experienced rapid growth, contributing 16.15% to the national Gross Domestic Product (GDP). However, despite the significant growth in the coffee industry, there are still a number of challenges that need to be overcome. One of the main problems in the coffee supply chain is the inability of farmers to increase the added value of their products, so they do not reap significant economic benefits. Research conducted by Effendi et al. (2021) also revealed that there are differences in the value received by each actor in the coffee supply chain.(Kementrian Komunikasi dan Informatika Indonesia, 2022; Leksic et al., 2020)

The inability of farmers to add value to their products is a challenge that must be considered in the coffee supply chain. This emphasizes the importance of a deep understanding of the coffee supply chain, as by understanding each stage in the coffee production and distribution process, the main causes of the inability to meet consumer demand can be identified. In addition, this understanding also allows for the design of effective strategies to improve the overall performance of the coffee supply chain.

The coffee processing process is highly dependent on the output of the product produced. The Ministry of Industry of the Republic of Indonesia emphasizes the importance of increasing added value to products. This increase in added value is very crucial and needs to be optimized as a source of foreign exchange for the country. The distribution of coffee output produced in Indonesia can be seen in Figure 1. (Kementrian Komunikasi dan Informatika Indonesia, 2022)

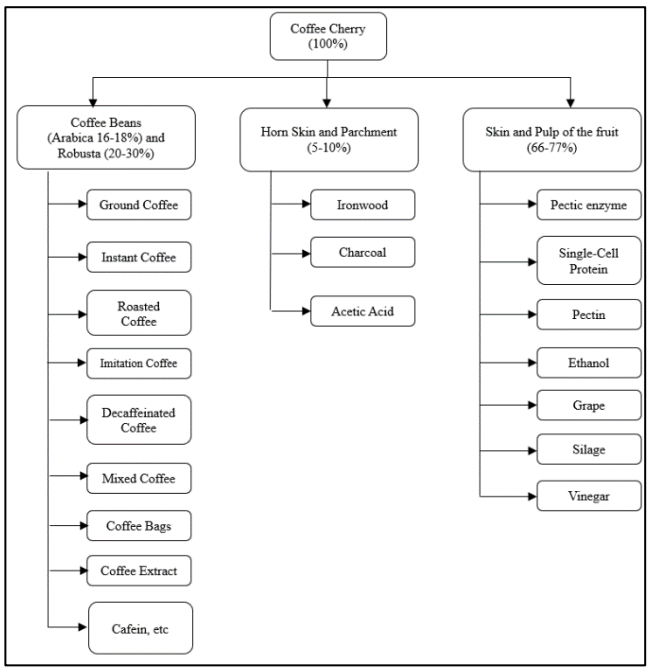


Figure 1. Coffee Output produced in Indonesia
Source: (Perindustrian, 2017)

The coffee industry, like any other industry, cannot function effectively without a supply chain. Coffee supply chains are typically complex and vary between regions, but generally involve farmers as processors, intermediaries, government agencies, exporters, distributors, and retailers. In the context of coffee, before the final product of coffee is available to consumers, the supply chain involves various intermediary agents such as processors, intermediaries or distributors, wholesalers, and retail traders. (Ibrahim & Zailani, 2010; T. T. H. Nguyen et al., 2021)

Previous research conducted by Jacobi et al (2023) explained that the coffee supply chain in Indonesia consists of coffee farmers, traders divided into domestic traders and international traders, coffee companies and retailers (consisting of coffee shops and roastries) as shown in Figure 2.

The coffee supply chain in Indonesia consists of a complex series of activities involving various parties, ranging from farmers to end consumers. Coffee farmers in Indonesia can be divided into two types, namely small-scale farmers who sell their coffee to cooperatives or collectors, and large-scale farmers who sell directly to coffee traders or companies. After that, coffee is sold to the industry to be processed into raw commodities and finished products, which are then sold to traders or coffee companies. Traders play a key role in the supply chain, with their roles divided into domestic traders and international traders. Domestic traders sell coffee to retailers who provide coffee products to end consumers in the domestic market, while international traders supply coffee to overseas retailers, allowing Indonesian coffee to enter the global market. (Uebernickel et al., 2020; Valkila et al., 2010)

Coffee companies also have an important role in distribution. They work with domestic distributors to supply coffee to retailers until it reaches the end consumer. Along with the development of the industry, coffee companies also conduct transactions with international distributors to expand the global market for Indonesian coffee products. The coffee supply chain in Indonesia reflects the close cooperation between farmers, farmer organizations, traders, coffee companies, and other related parties, ensuring a smooth flow of products from upstream to downstream in the national coffee industry.

The coffee industry supply chain in Indonesia is currently managed by government organizations and non-government organizations. Government organizations that manage the supply chain of the coffee industry in Indonesia are the Directorate General of Indonesian Plantations and the Center for Coffee and Cocoa Research (Puslitkoka) while non-governmental organizations that manage include the Indonesian Coffee Exporters Association (AEKI), Special Coffee Association Indonesia (SCAI), Aceh Partnership for Economic Development (APED) and so on. Although there are problems with the performance of the coffee supply chain in Indonesia, the

development of the coffee industry in Indonesia has increased steadily, for example the production and sales of coffee products such as instant coffee, canned coffee, liquid coffee extract and ground coffee have increased. (Ibrahim & Zailani, 2010)

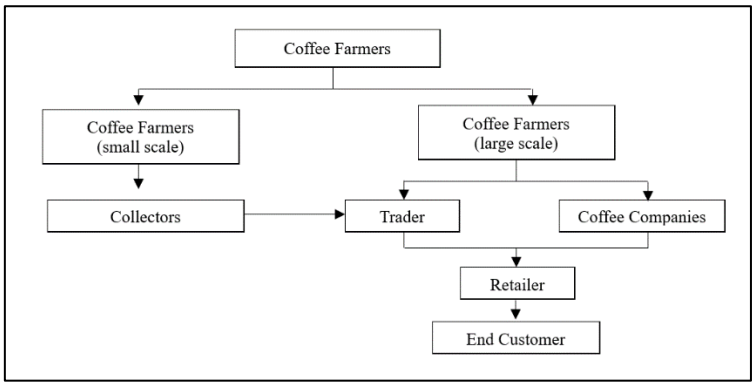
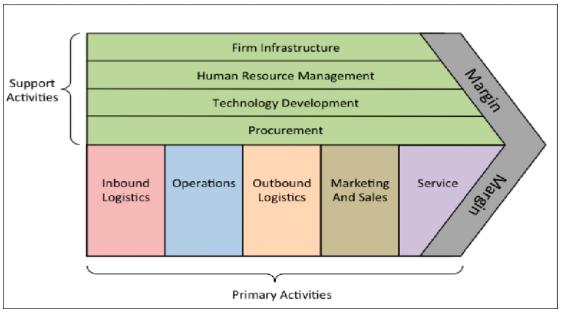


Figure 2. Coffee Supply Chain
Source: (Jacobi et al., 2024)

Value Chain Analysis

Value chain analysis or value stream mapping is a method used to identify operations that do not add value (non-value added) in an organization. Activities that use resources but provide little or no value to the product should be removed from the value chain (Buadit et al., 2023; Darmawan et al., 2014). Concept value chain is a simple but effective approach to increase efficiency in various business activities, so as to determine competitive advantages. This concept also views each company or organization as a collection of activities carried out to plan, produce, market, distribute, and support products, as a way to analyze their operations effectively to achieve competitive advantage (Anandarajan & Arinze, 1998). Value chain It can also be interpreted as an important instrument in determining how a product can create value that provides satisfaction to consumers, builds long-term relationships, and achieves competitive advantage. (Luitel et al., 2017)

Deep value chain analysis There are nine activities of the actors of a business so that it forms a chain that is grouped into two categories, namely the main activity and the supporting activity (Porter, 1985). Primary activities are all activities related to the physical creation, sale, maintenance and support of a product or service. Supporting activities are all activities related to the physical creation, sale, maintenance and support of a product or service. The role of the value chain can provide an opportunity to improve efficiency in the supply chain flow while identifying cost aspects that can be reduced, so that the businesses involved can achieve a competitive advantage. (Hinson, 2010)



Gambar 3. Model Value Chain
Source: (Porter, 2008)

Fishbone Diagram

A fishbone diagram or commonly called an Ishikawa diagram is a diagram used to identify the root cause of a problem. This diagram shows the causes of a problem that occurs, where the problem has been grouped based on 5M and 1E (Man, method, measure, machine, material and environment). By identifying and grouping the causes of these problems, a more appropriate strategy can be designed to overcome coffee supply chain problems. This in-depth analysis using Ishikawa diagrams will help stakeholders understand the complexity of the problem and take the necessary steps to improve the efficiency and effectiveness of the coffee supply chain, and ultimately achieve sustainability goals and improve the welfare of coffee farmers.

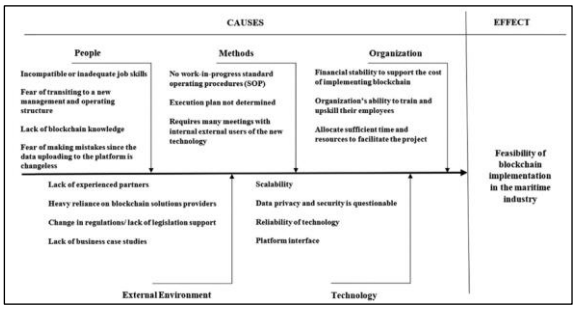


Figure 4. Fishbone Diagram
Source: (Zhou et al., 2020)

Previous research

Some previous studies that were used as reference materials are presented in the form of Table 1

Table 1. Previous Research

It	Reference	Purpose	Research Methods	Research Results	Research Gap
1	(T. Van Nguyen et al., 2017) Identifying key success factors in supply chain management for increasing the competitive advantages of Vietnamese coffee	Identifying which supply chain elements can be used to improve the competitive advantage of coffee products	**Type of Research:** Kualitatif **Data Collection Techniques:** In-depth Interview Random Sampling (Workshop-Based) **Research Object:** 60 workshop participants (Coffee producers, coffee processors, agents and exporters in the Vietnamese coffee industry) **Data Processing Method:** Bayesian Belief Networks	Increasing competitive advantages in Vietnam's coffee industry can be achieved by establishing good cooperation between fellow stakeholders in the supply chain and by providing high investment between all elements of the supply chain. Investment in transportation and productivity is the main key to the success of Vietnam's coffee industry.	The research of Ngunyen et al (2017) investigated that investment in transportation processes and productivity is a key point in the success of Vietnam's coffee industry. This study provides information on how the value chain in the coffee supply chain in East Java where the value chain that will be described in this study is the entire coffee supply chain actors, not only in the transportation process. In addition, this study also identifies factors that need to be improved from the performance of farmers as producers in the coffee supply chain in East Java.
2	(Vicol, Neilson,	Evaluating the impact of the relational coffee model	**Type of Research:**	The research of Vicol et al (2018) provides results that the relational coffee	The research of Vicol et al (2018) provides an explanation of

It	Reference	Purpose	Research Methods	Research Results	Research Gap
	Hartatri, & Cooper, 2018) Upgrading for whom? Relationship coffee, value chain interventions and rural development in Indonesia	on local agrarian livelihoods and dynamics	Kualitatif **Data Collection Techniques:** In-depth Interview Random Sampling (Workshop-Based) **Research Object:** Coffee farmers in three different locations in Indonesia (Sulawesi, Bali and Java) **Data Processing Method:** Descriptive Analysis	model provides opportunities for improving the living standards of coffee producers by involving direct involvement from coffee roasting companies and increased commitment to social responsibility. In addition, while there are opportunities for improvement, the benefits of the relational coffee model tend to be taken over by key individuals within the producer community, who are able to accumulate wealth and strengthen their social position.	opportunities in improving the living standards of coffee producers (farmers) from a social perspective. This study investigates how the value chain in the coffee supply chain in East Java. In addition, this study also identifies factors that need to be improved from the performance of farmers as producers in the coffee supply chain in East Java.
3	(Ceha, Dzikron, Muhamad, Syahmi, & Riyanto, 2019) The Proposal of West Java Export Coffee Distribution Model	Creating a design of a coffee distribution model and evaluating the export process in coffee distribution in West Java	**Type of Research:** Kualitatif **Data Acquisition Techniques:** In-depth interview **Research Object:** Coffee farmers, coffee distributors (Domestic and International), coffee retailers	Formulation of the supplychain process in the distribution of new coffee to save more time (Farmer - Gapoktan - Cooperative - Exporter - Consumer); The suggestion of the ineffectiveness of the coffee distribution process is the lack of human resource skills, lack of motivation for the spread of coffee in global and local contexts.	The research of Ceha et al (2019) investigated the causes of inefficiency of the coffee export process in West Java Province by using process mapping and classification analysis as processing methods. This study investigates how the value chain in the coffee supply chain in East Java where the value chain that will be described in this study is the entire coffee supply

It	Reference	Purpose	Research Methods	Research Results	Research Gap
			and coffee consumers in West Java **Data Processing Method:** Business Process Mapping; Classification Analysis		chain actors, not only in the transportation process. In addition, this study also identifies factors that need to be improved in the performance of farmers as producers in the coffee supply chain in East Java. In analyzing the factors that need to be improved from the performance of coffee farmers in East Java, this study uses the Kano model and Importance Performance Analysis. The use of the Canoe model and Importance Performance Analysis was chosen because this study aims to conduct in-depth exploration by conducting thorough interviews.
4	(Umaran, Perdana, Kurniadie, & Parikesit, 2021) Co-Creation Approach in Designing a Sustainable Coffee Supply Chain (a Case in Bandung Regency, West Java, Indonesia)	Designing a system to make the coffee supply chain in Bandung Regency sustainable.	**Type of Research:** Kuantitative **Data Collection Techniques:** In-depth interview; FGD; Survey; Scenario-based workshops **Research Object:** Coffee supply chain in Bandung Regency	The research of Umaran et al (2021) provided results regarding the need for the formation of cooperatives representing farmers and traders in the coffee supply chain in Bandung Regency. In addition, the research of Umaran et al (2021) highlights the importance of collaboration in social innovation to address problems in a social context in the coffee supply chain, by changing the relationships, positions, and rules	The research of Umaran et al (2021) has made a significant contribution related to the sustainability of the coffee supply chain. Umaran et al (2021) limited interviews to farmers, middlemen or processors and retailers only. This study uses a more in-depth approach by conducting thorough interviews with all parties involved in the supply chain, ranging from farmers, processors, distributors,

It	Reference	Purpose	Research Methods	Research Results	Research Gap
			Data Processing Method: Co-Creation Approach	between stakeholders involved for further sustainability.	importers, exporters to retailers related to how the value chain in the coffee supply chain in East Java. This provides a comprehensive and comprehensive overview of the dynamics and challenges faced by each actor in the coffee supply chain.
5	(Bashiri et al., 2021) The Dynamics of Sustainability Risks in the Global Coffee Supply Chain; A Case of Indonesia-UK	Investigating sustainability risks in the coffee supply chain between Indonesia and the UK	**Type of Research:** Kuantitative **Data Collection Techniques:** Survey; In-depth interview **Research Object:** Coffee supply chain in Indonesia and the UK **Data Processing Method:** System Dynamics (SD)	Research by Bashiri et al (2021) found that sustainability risks in the coffee supply chain tend to be concentrated on social aspects.	Bashiri et al (2021) specifically focus on the challenges faced in Indonesian coffee exports to the UK. This is based on fluctuations in the number of Indonesian coffee exports to the UK, which is an indicator that the supply chain has not yet reached the desired level of sustainability. This study investigates how the value chain in the coffee supply chain in East Java where the value chain that will be described in this study is the entire coffee supply chain actors, not only in the transportation process. In addition, this study also identifies factors that need to be improved from the performance of farmers as producers in the coffee supply chain in East Java.

RESEARCH METHODS

This research requires one type of data, namely primary data. Primary data is data that is original and obtained directly through the source which is then observed and recorded for the first time through the results of questionnaires and interviews. Primary data in this study were obtained

through in-depth interviews related to how (Sugiyono, 2013) value chain in the coffee supply chain as well as in-depth interviews with stakeholder related to the solutions offered.

This study has two types of samples, the first is a type A sample to describe how value chain coffee in East Java. The type A sample represents the actors in the coffee supply chain in East Java. In addition, there is a type B sample that represents coffee farmers in East Java providing information related to the root cause of the problem of low margins obtained by coffee farmers in East Java. Determination of the number of samples in type A using the Snowball sampling. Snowball sampling It is a non-probability sampling technique which means that the chances of being elected by each member of the population are unknown. This technique was chosen because it is the best option to use in finding members of the population that are quite difficult to reach with reference references as a way to do it. Meanwhile, type B sampling in this study uses the slovin formula with an error rate of 10%. The type A and type B samples in this study will be explained as shown in Table 2. (Zikmund et al., 2000)

Table 2. Number of Research Samples

Type A Sample	
Supply Chain Actors	**Number of samples**
Coffee farmer	3
Collector	3
Trader	3
Coffee companies	2
Retailers	3
Type B Sample	
Supply Chain Actors	**Number of Population** / **Number of samples**
Coffee farmer	4.221 / 98

This study carried out several stages to manage and analyze the primary data that had been obtained from the interviews. First, this study will describe how the coffee value chain in East Java is based on the results of in-depth interviews with coffee supply chain actors. This study will further analyze the root cause of the problem of low margins obtained by coffee farmers in East Java using fishbone diagrams. After finding the root cause of coffee price instability, this research will continue with the provision of recommendations for improvements that must be made by coffee farmers based on the root cause of the problem that occurs.

RESULTS AND DISCUSSIONS

Coffee Value Chain Analysis in East Java

The coffee supply chain in Indonesia itself involves several actors or actors in the coffee supply chain, including coffee farmers, collectors, traders, coffee companies and retailers. These supply chain actors certainly have differences in their value chains both in the main and supporting activities. This study describes how the value chain analysis on each supply chain actor is as shown in Figure 5 to Figure 9 below.

SUPPORTING ACTIVITIES	**Farming Infrastructure** (*self-financing, technical guidance counselors*)			**MARGIN**
	Human Resource Management (*recruitment process, job assignment and remuneration*)			
	Technology Development (*use of mobile devices, and use of sprayers*)			
	Purchasing / Procuring (*procuring tools or machines that support coffee plant maintenance activities*)			
MAIN ACTIVITIES				
Logistic Inward *Using fallen fruits and replanting them*	**Operation** *Maintenance of Coffee Plants*	**Logistic Outward** *Distribution process of coffee beans*	**Sales and Marketing** *Sale of coffee beans*	

Figure 5. Value Chain Analysis on Coffee Farmers in East Java

SUPPORTING ACTIVITIES	**Collector's Infrastructure** (*self-financing, bank loans*)				**MARGIN**
	Human Resource Management (*recruitment process, work instructions, job assignments, and remunerations*)				
	Technology Development (*use of mobile devices, negotiation through mobile devices, use of peeling machines*)				
	Purchasing / Procurement (*procuring tools or machines that support coffee plant maintenance activities*)				
MAIN ACTIVITIES					
Logistic Inward *Arabica and Robusta Coffee Beans*	**Operation** *Drying coffee beans and selling coffee to traders*	**Logistic Outward** *Distribution process of Arabica and Robusta coffee beans to traders*	**Sales and Marketing** *Setting the selling price of coffee beans based on their type per kg*	**Service** *Good communication with traders and farmers*	

Figure 6. Value Chain Analysis on Coffee Collectors in East Java

SUPPORTING ACTIVITIES	**Trader's Infrastructure** (*self financing*)				**MARGIN**
	Human Resource Management (*recruitment process, work instructions, job assignments and remuneration*)				
	Technology Development (*use of mobile devices, negotiation through mobile devices and social media, platforms containing product sales catalogs*)				
	Purchasing / Procurement (*support facilities and infrastructure such as packaging aids and coffee weighing machines*)				
MAIN ACTIVITIES					
Logistic Inward *Arabica and Robusta Coffee Beans*	**Operation** *Packaging coffee under the traders' brand*	**Logistic Outward** *Distribution process of Arabica and Robusta coffee beans to retailers/customer*	**Sales and Marketing** *Setting the selling price of coffee beans based on coffee type and packaging type*	**Service** *Good communication with collectors and customers*	

Figure 7. Value Chain Analysis on Coffee Traders in East Java

SUPPORTING ACTIVITIES	**Company's Infrastructure** (*self-financing, bank loans*)				**MARGIN**
	Human Resource Management (*recruitment process, work instructions, job assignments, employee development, corporate culture management, employee termination management and reamuneration*)				
	Technology Development (*use of mobile devices, negotiation through mobile devices and social media, platforms or websites containing company profiles and product sales catalogs*)				
	Purchasing / Procurement (*support facilities and infrastructure for coffee processing such as coffee powder machines, packaging aids, and transportation vehicles*)				
MAIN ACTIVITIES					
Logistic Inward *Coffee beans*	**Operation** *Coffee roasting, coffee grinding, packaging and labeling, stock management*	**Logistic Outward** *Distribution process of ready-to-serve coffee powder to retailers/customers*	**Sales and Marketing** *Setting the selling price of coffee beans based on coffee type and packaging type, consumer segmentation analysis, market target analysis*	**Service** *Good communication with suppliers and customers. Availability of customer service platforms*	

Figure 8. Value Chain Analysis in Coffee Companies in East Java

SUPPORTING ACTIVITIES	**Retailer's Infrastructure** (*self-financing, bank loans*)				**MARGIN**
	Human Resource Management (*recruitment process, work instructions, job assignments, employee development, culture management, employee termination management, and remuneration*)				
	Technology Development (*use of mobile devices, negotiation through mobile devices and social media, platforms or websites containing company profiles and product sales catalogs*)				
	Purchasing / Procurement (*support facilities and infrastructure for coffee processing such as grinders, drip coffee makers, ready-to-drink coffee equipment, and packaging support equipment*)				
MAIN ACTIVITIES					
Logistic Inward *Coffee Powder / Coffee Beans*	**Operation** *Coffee roasting, coffee grinding, packaging and labeling, stock management*	**Logistic Outward** *Process of serving ready-to-drink coffee to customers, product packaging process for customers*	**Sales and Marketing** *Setting the selling price of coffee beans based on coffee type and packaging type, consumer segmentation analysis, market target analysis*	**Service** *Good communication with suppliers and customers. Availability of customer service platforms*	

Figure 9. Value Chain Analysis on Coffee Retailers in East Java

Figures 5 to 9 show variations in the coffee value chain at each stage of the supply chain. These variations include main activities such as inbound logistics, operations, outbound logistics, sales and marketing, and services, and include supporting activities such as infrastructure processes, human resource management, technology development, and purchasing or procurement. This difference depends on the activities carried out by each actor in the supply chain. Although the main and supporting activities are different, there is consistency in the goals of each supply chain actor, which aims to increase profit margins.

Analysis of the Root Cause of Low Margins of Coffee Farmers in East Java

Based on the results of interviews with coffee supply chain actors in East Java, coffee farmers are the only supply chain actors who still do not receive maximum margins. This is shown by the margin obtained by coffee farmers is still lower than the margin obtained by other coffee supply chain actors as shown in Table 3.

Table 3. Range Margin of Coffee Supply Chain Players in East Java

Supply Chain Actors	Range Margin (%)
Coffee farmer	5 – 8%
Coffee collector	15 – 20%
Traders	20 – 50 %
Coffee companies	25 – 45 %
Retailer	30 – 60 %

Table 3 shows that among other supply chain actors, farmers are the only actors who have the lowest profit margin, reaching < 10%. Therefore, the next analysis will be carried out to find out what is the root cause of the low margins of coffee farmers in East Java using the Fishbone Diagram as shown in Figure 10.

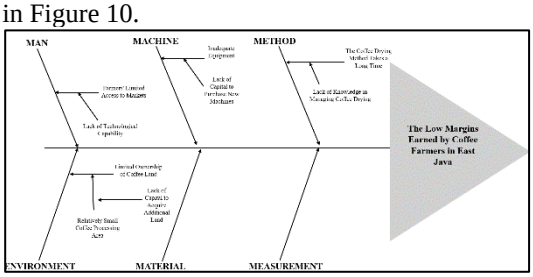


Figure 10. The Root Cause of Low Margins Obtained by Coffee Farmers in East Java

Figure 10 provides information that there are four main reasons why farmers get relatively low margins compared to other coffee supply chain actors. The cause of the low margin is due to four categories out of six categories in the fishbone diagram including man, machine, method and environment.

Based on the results of in-depth interviews with coffee farmers in East Java, the main cause of the low margin obtained is due to the limitations of coffee farmers in reaching the market, where the limitation is also caused by the lack of ability of coffee farmers to use technology such as social media. Another cause of low margins is that the equipment in coffee processing owned by farmers is inadequate, making farmers reluctant to carry out additional processing to get added value to their products. In addition, the limited coffee processing land is also the cause of the low margin obtained by farmers. Lack of capital is the only reason why coffee farmers are unable to renew equipment and purchase additional land for increased coffee production. On the other hand, coffee farmers also mentioned that in terms of methods, the main cause

of low margins is due to the conventional method of drying coffee where it takes longer. The reason why coffee farmers still use conventional coffee drying methods is due to the lack of knowledge of coffee farmers in operating coffee drying machines.

Repair Recommendations

In helping to solve the problems faced by coffee farmers in East Java, namely the low margin of coffee farmers. Recommendations for improvement given based on the root causes of low margins of coffee farmers include Table 4.

Table 4. Repair Recommendations

Cause of the Problem	Root Cause of the Problem	Repair Recommendations
Farmers' Limitations in Reaching the Market	Lack of technological capabilities	• Provide training programs that focus on the use of digital technology such as the use of social media, the use of e-commerce • Provide product marketing management training programs to farmers
Inadequate equipment	Lack of capital to buy a new machine	• Funding assistance programs and subsidies for the purchase of machinery • The People's Business Credit Program (KUR) with low interest is specifically for coffee farmers so that farmers can get capital to provide new equipment
The coffee drying method takes a long time	Lack of knowledge in managing coffee drying	Organizing training for farmers on more efficient and faster coffee drying methods. This includes mechanical drying techniques and the use of modern drying equipment.
Relatively small coffee processing area	Lack of capital to own additional land	• Forming farmer groups that can access aid or credit more easily • The People's Business Credit Program (KUR) with low interest is specifically for coffee farmers so that farmers can get capital to expand their coffee land • There is a government land cultivation program by local coffee farmers so that farmers can increase coffee production.

Table 4 explains the recommendations for improvements that can be made to help coffee farmers in East Java in increasing the margins obtained. The recommendation was obtained based on the results of in-depth interviews with coffee farmers and institutions related to the development of the coffee supply chain in East Java such as the East Java Plantation Office and the East Java Coffee and Cocoa Research Center.

Several improvement recommendations can be implemented to help increase the margins of coffee farmers in East Java, including providing training programs that focus on the use of digital technology such as social media and e-commerce, providing product marketing management training programs for farmers, providing financial assistance and subsidies for the purchase of machinery, and launching the People's Business Credit Program (KUR) with low interest specifically for farmers coffee to help them obtain capital to buy new equipment. In addition, organizing training on more efficient methods of drying coffee, including mechanical drying techniques and the use of modern

drying equipment, is essential. The formation of farmer groups that can access aid funds or credit more easily is also recommended. The low-interest KUR program for coffee farmers can help them get capital to expand their coffee fields, while the government's land cultivation program by local coffee farmers can increase coffee production. The implementation of these recommendations is expected to significantly increase the profit margin of coffee farmers in East Java.

CONCLUSION AND SUGGESTION

This study has analyzed the coffee value chain in East Java, identified the root cause of the low margins obtained by coffee farmers, and provided recommendations for improvement to increase farmers' income and their capabilities in the coffee industry supply chain. The results of the value chain analysis show that each actor in the coffee supply chain, ranging from farmers, collectors, traders, coffee companies, to retailers, has a different role and main and supporting role. The main activities include inbound logistics, operations, outbound logistics, sales and marketing, and services. Meanwhile, supporting activities include process infrastructure, human resource management, technology development, and procurement. However, the ultimate goal of each actor remains consistent, which is to increase profit margins through efficiency and effectiveness in each of their activities.

Based on the results of the interview, it was found that coffee farmers are the supply chain actors who get the lowest profit margin, which is less than 10%. The analysis using Fishbone diagrams identified four main categories of causes of low margins for coffee farmers: man, machine, method, and environment. These factors include farmers' limited access to the market due to the lack of ability to use digital technology, inadequate coffee processing equipment, limited land, lack of capital, and conventional coffee drying methods. All of these factors contribute to low efficiency and productivity, which ultimately affects the profit margins received by coffee farmers.

Recommendations for improvement given to overcome the problems faced by coffee farmers and increase their profit margins, several recommendations have been submitted. These recommendations include the provision of training programs for the use of digital technology and product marketing management, the provision of financial assistance and subsidies for the purchase of machinery, and the launch of the People's Business Credit Program (KUR) with low interest specifically for coffee farmers. In addition, training on more efficient coffee drying methods and the formation of farmer groups that can access aid funds or credit more easily is also highly recommended. The implementation of these recommendations is expected to increase efficiency, productivity, and ultimately profit margins for coffee farmers in East Java, so that they can be more competitive in the coffee industry.

This research has several limitations that need to be considered. The data used in this analysis are based solely on interviews with coffee supply chain actors in East Java, which may not be fully representative of the entire region of Indonesia or global conditions. In addition, this study identifies the causes of low coffee farmers' margins in only four categories in the Fishbone diagram (human, machine, method, and environment), so that other potential factors that can affect coffee farmers' margins may be missed. The implementation of the proposed recommendations requires support from a wide range of stakeholders, including governments, financial institutions, and farming communities, who may face challenges in coordinating and providing resources. Changes in the value chain and profit margins of coffee farmers take a considerable amount of time to be seen, so long-term research and ongoing evaluation are needed to measure the effectiveness of the proposed intervention.

REFERENCES

Anandarajan, M., & Arinze, B. (1998). Matching client/server processing architectures with information processing requirements: A contingency study. *Information & Management*, *34*(5), 265–274. https://doi.org/10.1016/S0378-7206(98)00064-0

Bashiri, M., Tjahjono, B., Lazell, J., Ferreira, J., & Perdana, T. (2021). The dynamics of sustainability risks in the global coffee supply chain: a case of Indonesia–UK. *Sustainability*, *13*(2), 589. https://doi.org/10.3390/su13020589

Buadit, T., Ussawarujikulchai, A., Suchiva, K., Papong, S., Ma, H., & Rattanapan, C. (2023). Environmental impact of passenger car tire supply chain in Thailand using the life cycle assessment method. *Sustainable Production and Consumption*, *37*, 156–168. https://doi.org/10.1016/j.spc.2023.02.013

Darmawan, M. A., Putra, M. P. I. F., & Wiguna, B. (2014). Value chain analysis for green productivity improvement in the natural rubber supply chain: a case study. *Journal of Cleaner Production*, *85*, 201–211.

https://doi.org/10.1016/j.jclepro.2014.01.098

Hinson, R. (2010). The value chain and e-business in exporting: Case studies from Ghana's non-traditional export (NTE) sector. *Telematics and Informatics*, *27*(3), 323–340. https://doi.org/10.1016/j.tele.2009.06.013

Ibrahim, H. W., & Zailani, S. (2010). A review on the competitiveness of global supply chain in a coffee industry in Indonesia. *International Business Management*, *4*(3), 105–115.

Jacobi, J., Lara, D., Opitz, S., de Castelberg, S., Urioste, S., Irazoque, A., Castro, D., Wildisen, E., Gutierrez, N., & Yeretzian, C. (2024). Making specialty coffee and coffee-cherry value chains work for family farmers' livelihoods: A participatory action research approach. *World Development Perspectives*, *33*, 100551. https://doi.org/10.1016/j.wdp.2023.100551

Kementrian Komunikasi dan Informatika Indonesia. (2022). *Apresiasi Kopi, Pemerintah Dukung Indonesia Premium Coffee Expo & Forum 2022*. Kominfo.

Leksic, I., Stefanic, N., & Veza, I. (2020). The impact of using different lean manufacturing tools on waste reduction. *Advances in Production Engineering & Management*, *15*(1).

Luitel, N. P., Jordans, M. J. D., Kohrt, B. A., Rathod, S. D., & Komproe, I. H. (2017). Treatment gap and barriers for mental health care: a cross-sectional community survey in Nepal. *PloS One*, *12*(8), e0183223. https://doi.org/10.1371/journal.pone.0183223

Lukas, K. D. (2015). *The supply chain of fair trade coffee: challenges, opportunities & the future inside a troubled industry*. https://scholarworks.uvm.edu/graddis/441/

Nguyen, T. T. H., Bekrar, A., Le, T. M., & Abed, M. (2021). Supply chain performance measurement using SCOR model: A case study of the coffee supply chain in Vietnam. *2021 1st International Conference On Cyber Management And Engineering (CyMaEn)*, 1–7. https://doi.org/10.1109/CyMaEn50288.2021.9497309

Nguyen, T. Van, Nguyen, N. C., & Bosch, O. J. H. (2017). Identifying key success factors in supply chain management for increasing the competitive advantages of Vietnamese coffee. *Competitiveness Review: An International Business Journal*, *27*(5), 438–461. https://doi.org/10.1108/CR-10-2016-0066

Perindustrian, K. (2017). Peluang Usaha IKM Kopi. *Jakarta: Direktorat Jenderal Industri Kecil Dan Menengah Kementerian Perindustrian Republik Indonesia*.

Porter, M. E. (2008). *Competitive advantage: Creating and sustaining superior performance*. simon and schuster.

Salam, M., Viantika, N. M., Amiruddin, A., Pinontoan, F. M., & Rahmatullah, R. A. (2021). Value chain analysis of Toraja coffee. *IOP Conference Series: Earth and Environmental Science*, *681*(1), 012115. https://doi.org/10.1088/1755-1315/681/1/012115

Statistik, B. P. (2021). Statistik Kopi Indonesia 2021. *Jakarta: Badan Pusat Statistik*.

Sugiyono, D. (2013). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*.

Sunanto, S., Salim, S., & Rauf, A. W. (2019). Analisis kesepakatan peningkatan produktivitas kopi arabika pada pengembangan kawasan Di Kabupaten Toraja Utara. *Jurnal Sosial Ekonomi Pertanian*, *15*(1), 42–55.

Uebernickel, F., Jiang, L., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2020). *Design thinking: The handbook*. World Scientific.

Valkila, J., Haaparanta, P., & Niemi, N. (2010). Empowering coffee traders? The coffee value chain from Nicaraguan fair trade farmers to Finnish consumers. *Journal of Business Ethics*, *97*, 257–270. https://doi.org/10.1007/s10551-010-0508-z

Werdiono, D. (2023, October 9). *Kenaikan Harga Jadi Penyemangat Petani Malang Jaga Produksi*. Kompas.Id.

Zhou, Y., Soh, Y. S., Loh, H. S., & Yuen, K. F. (2020). The key challenges and critical success factors of blockchain implementation: Policy implications for Singapore's maritime industry. *Marine Policy*, *122*, 104265. https://doi.org/10.1016/j.marpol.2020.104265

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2000). *Business research methods* (Vol. 6). Dryden Press Fort Worth, TX.