

Coffee Commodity Supply Chain Design Using Business Model Canvas and Analytical Hierarchy Process Case Study Of Coffee IKM/UKM In West Java

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| Keywords | Abstract. Coffee is one of Indonesia's natural riches. West Java has quite a potential coffee commodity. Where West Java has an area of 43,555 ha with a total production of 20,732 tons per year. Based on this, there is a need for research to develop coffee in West Java This research approach method is firstly using the Business Model Canvas which consists of 9 elements or nine building blocks. The second study is the Analytical Hierarchy Process to process data. This method is carried out to determine the influence of the BMC segment on each tire of the coffee supply chain. The third study is to analyze the condition of the coffee supply chain in West Java The calculation results for the supply chain are as follows: At the farmer level the influence is channels with a value of 0.20. , At the SME level the influence is key partnership with a value of 0.46. , At the distributor level the influences are channels and cost structure with a value of 0.24. , At the retail/outlet level, the influence is customer relationship with a value of 0.46. At the consumer level, the influence is key resources with a value of 0.09. |
| Proses Bisnis, Business Model Canvas (BMC), Analytical Hierarchy Process (AHP), Supply Chain | |

I. INTRODUCTION

The coffee commodity in Indonesia is one of the plantation commodities that has important economic value. Coffee is also one of Indonesia's export commodities which is quite important for the country's foreign exchange earner besides oil and gas according to the 2021 Indonesian Coffee Statistics book. In 2021 the area of coffee plantations will reach 1,243,441 ha with production of 729,074 tons and a productivity level of 785 Kg/Ha of coffee based on data collected by the Central Statistics Agency. West Java, as one of the provinces in Indonesia, is one of the coffee producing provinces which is ranked in the top 10. has a coffee plantation with an area of 43,555 hectares with a percentage of 3.5% of the total area of coffee plantations in Indonesia, from this area coffee production reached 20,732 tons with a percentage of 2.84% of the total coffee production in Indonesia. This data can be seen in table 1

Table 1 Ranking of Coffee Plantation Area by Province in 2021

| No | Province | Production (Ton) | Presentage (%) |
|----|--------------------|------------------|----------------|
| 1 | South Sumatra | 184.900 | 25,361% |
| 2 | Lampung | 107.043 | 14,682% |
| 3 | East Java | 73.411 | 10,069% |
| 4 | North Sumatra | 69.105 | 9,478% |
| 5 | Aceh | 65.029 | 8,919% |
| 6 | Bengkulu | 56.969 | 7,814% |
| 7 | South Sulawesi | 30.992 | 4,251% |
| 8 | East Nusa Tenggara | 21.051 | 2,887% |
| 9 | West Java | 20.732 | 2,844% |
| 10 | West Sumatra | 19.055 | 2,614% |

The West Java community's need for coffee consumption reaches 90,000 tons every year. This consumption pattern is not balanced with the coffee production capacity in West Java which is only capable of producing 20,732 tons per year in 2021 based on data collected from the official West Java government website. The large demand for coffee has encouraged local coffee farmers to be more active in cultivating and increasing the yields of their plantations. The high production value of West Java coffee must be balanced with well-integrated processing and marketing activities aimed at

providing high added value to the region's coffee products. The increasing trend of people in West Java towards coffee is directly proportional to coffee production in West Java but is still not in line with the increase in coffee farmers' income. This is due to several things that farmers still cannot master, including marketing coffee beans. Coffee farmers in general are still faced with a coffee trading system that is still controlled by traders. It is the conditions of this trading system that can regulate coffee sales transactions both in relation to time, place and to whom the farmer's coffee beans are sold (Nasrudin, 2010). This condition causes the coffee distribution network to not be well integrated

Activities carried out by coffee farmers and other institutions give rise to supply chain activities. A supply chain can be said to be a collection of business organizations that are united in a commitment to produce and market products in a business chain. The agro-industrial supply chain system is a complex system and is interconnected with other system components (Hadiguna, 2015). In this case, the supply chain has a role in increasing competitiveness to create an integration between the flow of goods, the flow of information, and the flow of finance from upstream to downstream so that the supply chain can run well.

Looking at the development of coffee commodities above, it is necessary to organize coffee commodity management by paying attention to the supply chain management of coffee commodities in West Java.

Formulation of the Problem

Based on the background, the core discussion of this Final Project is as follows:

1. How to determine the business flow pattern for the distribution of coffee commodities from upstream to downstream, especially in West Java
2. How, a business model using the Business Model Canvas (BMC) method which consists of 9 elements or nine block buildings,
3. What is the importance weight of the 9 elements in BMC using the Analytical Hierarchy Process (AHP), to determine the preference order of the 9 BMC elements?

2. METHOD

Business Process

A business process is defined as a set of one or more related procedures or activities that collectively realize a business goal or policy, usually within the context of an organizational structure defining functional roles and relationships (Workflow Management Coalition, 1999).

IDEF (Integration Definition for Function Modeling)

IDEF0 was designed to allow a flexible development from description of system functions to the process of function decomposition and categorization of relationships between functions (Mayer, 1992)

Business Model

The business model according to Nielsen and Lund(2013: 9) is a sustainable way of doing business. Here sustainability emphasizes the ambition to survive over time and create a successful, perhaps even profitable, entity in the long term.

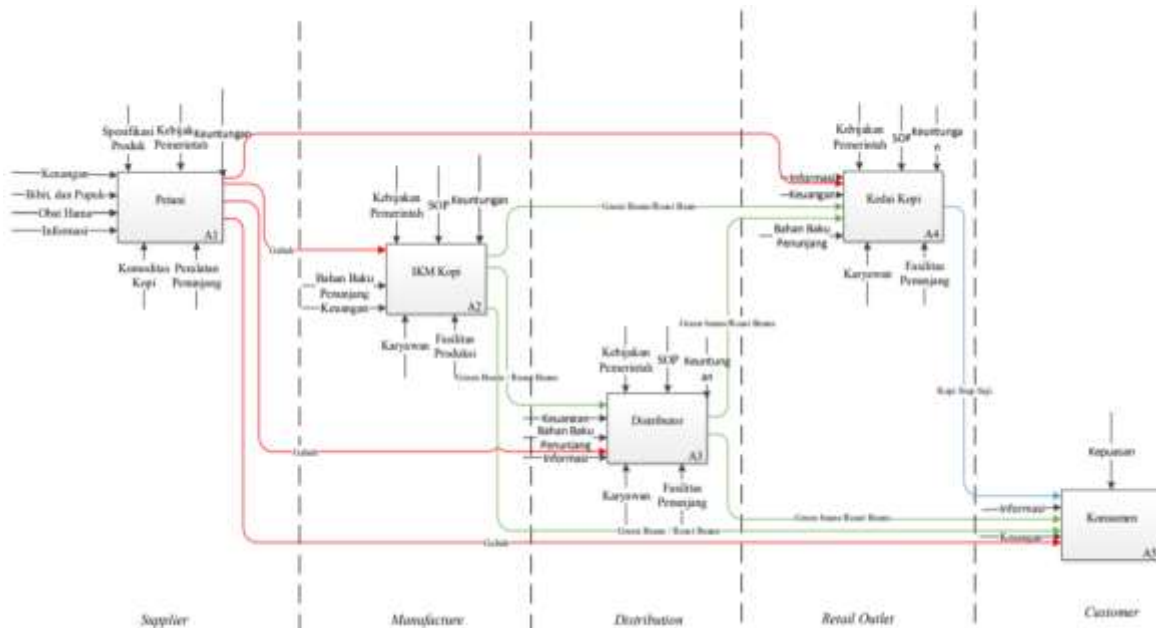


Figure 1: West Java IKM/UKM coffee SCM Process Business

Business Model Canvas (BMC)

A business model is described as a rationale for how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2010).

Analytical Hierarchy Process (AHP)

Analytical Hierarchy Process (AHP) is a method of Multi Criteria Decision Making (MCDM) developed by Prof. Thomas Lorie Saaty from Wharton Business School in the early 1970s.

Supply Chain Management (SCM)

Supply Chain Management (SCM) according to Mary Summer, 2005, p. 132) is a planning and Control of the flow of goods and services, information and money up the supply chain from the acquisition of raw materials to the final product is in the hands of consumers.

Solution to Problem

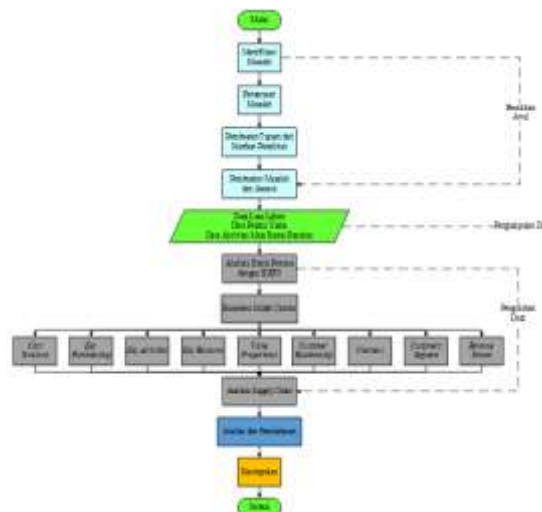


Figure 2: Problem Solving Flow Chart

3. RESULTS AND DISCUSSION

This research was conducted in West Java. The data in the research was carried out through questionnaires and an interview process In this case, the respondents are farmers, coffee SMEs,

distributors, coffee shops. The aim of this process is to understand the business process and supply chain of coffee commodities in West Java.

Analytical Hierarchy Process (AHP)

Based on the research results, there are coffee commodity supply chain activities in West Java. There is a business model canvas hierarchy which can be seen in Figure 3

Analysis of Farmer Level Alternative Calculations

Calculations using AHP obtained values in the form of importance weights in table 2, as follows:

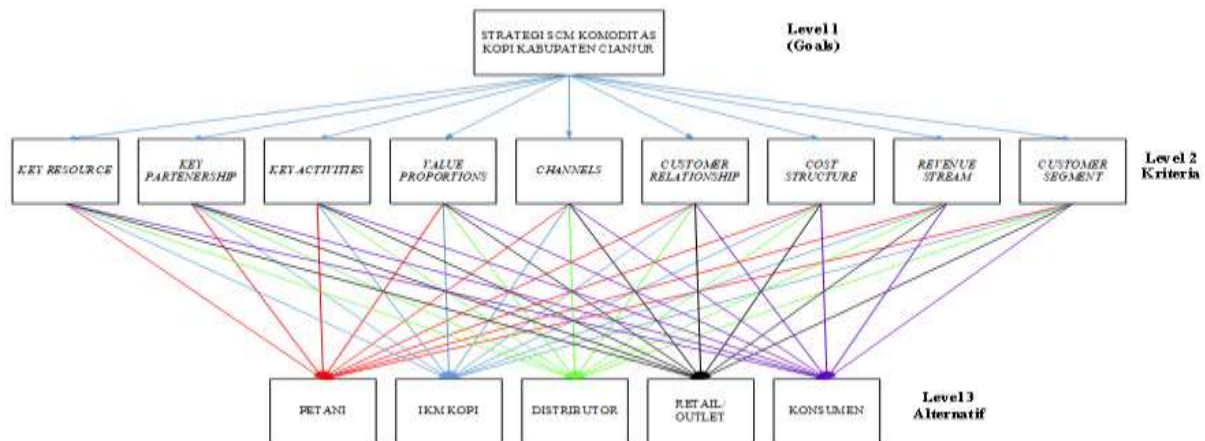


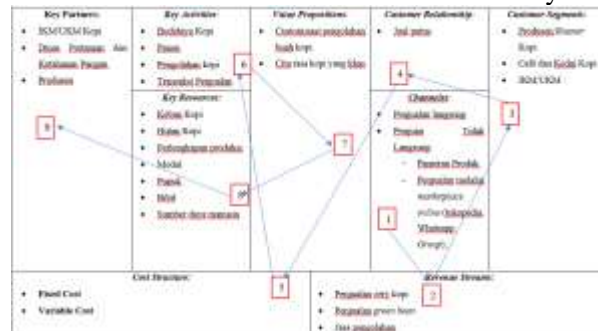
Figure 3: Hierarchy of Business Model Canva

Table 2: Farmer Level BMC Calculation Results

| Key | PETANI | IKM | DISTRIBUTOR | RETAIL/OUTLET | KONSUMEN | ROBOT |
|-----------------------|--------|------|-------------|---------------|----------|-------|
| Key Resources | 0,11 | 0,11 | 0,13 | 0,09 | 0,09 | 0,11 |
| Key Partnership | 0,08 | 0,11 | 0,01 | 0,12 | 0,09 | 0,08 |
| Key Activities | 0,05 | 0,38 | 0,01 | 0,12 | 0,09 | 0,13 |
| Value Proposition | 0,05 | 0,38 | 0,01 | 0,12 | 0,09 | 0,13 |
| Channels | 0,05 | 0,38 | 0,01 | 0,07 | 0,47 | 0,20 |
| Customer Relationship | 0,05 | 0,08 | 0,01 | 0,31 | 0,47 | 0,18 |
| Cost Structure | 0,05 | 0,08 | 0,01 | 0,06 | 0,47 | 0,14 |
| Revenue Stream | 0,06 | 0,08 | 0,01 | 0,31 | 0,47 | 0,19 |
| Customer Segment | 0,08 | 0,08 | 0,01 | 0,31 | 0,47 | 0,19 |

From the calculation results in table 2, it is obtained that the business segment of the canvas model that has the most influence at the farmer level is channels. So the business canvas model is depicted in the image below.

Figure 4: Nine Block BMC West Java Coffee Commodity at Farmer Level



Analysis of Alternative Calculations for SME level

Calculations using AHP obtained values in the form of importance weights as follows:

Table 3: SME Level BMC Calculation Results

| | PETANI | BKM | DISTRIBUTOR | RETAIL-OUTLET | KONSUMEN | BOBOT |
|-----------------------|--------|------|-------------|---------------|----------|-------|
| Key Resources | 0,58 | 0,58 | 0,05 | 0,45 | 0,45 | 0,53 |
| Key | | | | | | |
| Partnership | 0,10 | 0,56 | 0,37 | 0,61 | 0,45 | 0,48 |
| Key Activities | 0,05 | 0,58 | 0,37 | 0,61 | 0,68 | 0,87 |
| Value | | | | | | |
| Proportion | 0,05 | 0,38 | 0,37 | 0,61 | 0,45 | 0,37 |
| Channels | 0,05 | 0,38 | 0,37 | 0,33 | 0,38 | 0,28 |
| Customer | | | | | | |
| Relationship | 0,05 | 0,08 | 0,11 | 0,03 | 0,28 | 0,11 |
| Cost Structure | 0,05 | 0,08 | 0,11 | 0,41 | 0,28 | 0,18 |
| Revenue | | | | | | |
| Stream | 0,06 | 0,06 | 0,11 | 0,03 | 0,28 | 0,11 |
| Customer | | | | | | |
| Segment | 0,06 | 0,08 | 0,11 | 0,03 | 0,28 | 0,11 |

From the calculation results in table 3, it is obtained that the business model canvas that has the most influence at the SME level is key resources. So the business canvas model is depicted in the table below.



Figure 5: Nine Block BMC West Java Coffee Commodity at the SME Level Distributor Level Alternative Calculation Analysis

Calculations using AHP obtained values in the form of importance weights as follows:

Table 4: Distributor Level Canvas Business Model Calculation Results

| | PETANI | BKM | DISTRIBUTOR | RETAIL-OUTLET | KONSUMEN | BOBOT |
|-----------------------|--------|------|-------------|---------------|----------|-------|
| Key Resources | 0,11 | 0,11 | 0,13 | 0,09 | 0,09 | 0,11 |
| Key | | | | | | |
| Partnership | 0,53 | 0,11 | 0,67 | 0,92 | 0,27 | 0,20 |
| Key Activities | 0,37 | 0,88 | 0,87 | 0,92 | 0,27 | 0,16 |
| Value | | | | | | |
| Proportion | 0,43 | 0,88 | 0,87 | 0,92 | 0,27 | 0,17 |
| Channels | 0,47 | 0,88 | 0,87 | 0,47 | 0,38 | 0,24 |
| Customer | | | | | | |
| Relationship | 0,45 | 0,88 | 0,11 | 0,04 | 0,38 | 0,17 |
| Cost Structure | 0,45 | 0,88 | 0,11 | 0,41 | 0,38 | 0,24 |
| Revenue | | | | | | |
| Stream | 0,58 | 0,88 | 0,11 | 0,04 | 0,38 | 0,19 |
| Customer | | | | | | |
| Segment | 0,38 | 0,88 | 0,11 | 0,04 | 0,38 | 0,16 |

From the calculation results in table 4, it is obtained that the business model canvas segments that have the most influence at the distributor level are channels and cost structure. So the business canvas model is depicted in figure 6, below.

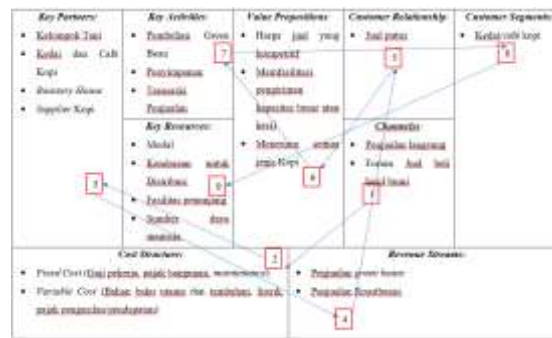


Figure 6: Nine Block BMC West Java Coffee Commodity at Distributor Level
Analysis of Alternative Calculation at Retail/Outlet Level

Calculations using AHP obtained values in the form of importance weights as follows:

Table 5: Retail/Outlet Level BMC Calculation Results

| | PETANI | DKM | DISTRIBUTOR | RETAIL/OUTLET | KONSUMEN | BOBOT |
|-------------|--------|------|-------------|---------------|----------|-------|
| Key | | | | | | |
| Resources | 0.11 | 0.11 | 0.04 | 0.09 | 0.09 | 0.09 |
| Partnership | 0.04 | 0.11 | 0.02 | 0.12 | 0.09 | 0.18 |
| Key | | | | | | |
| Activities | 0.47 | 0.08 | 0.52 | 0.12 | 0.09 | 0.26 |
| Value | | | | | | |
| Proposition | 0.43 | 0.08 | 0.52 | 0.12 | 0.09 | 0.25 |
| Channels | 0.45 | 0.08 | 0.52 | 0.07 | 0.09 | 0.23 |
| Customer | 0.45 | 0.74 | 0.74 | 0.31 | 0.09 | 0.40 |
| Cost | | | | | | |
| Structure | 0.45 | 0.74 | 0.74 | 0.08 | 0.09 | 0.41 |
| Revenue | | | | | | |
| Stream | 0.31 | 0.74 | 0.74 | 0.31 | 0.09 | 0.43 |
| Customer | | | | | | |
| Segment | 0.5 | 0.74 | 0.74 | 0.31 | 0.09 | 0.08 |

From the calculation results in table 5, it is obtained that the business model canvas segment that has the most influence at the retail level is customer relationship. So the business canvas model is depicted in the table below.

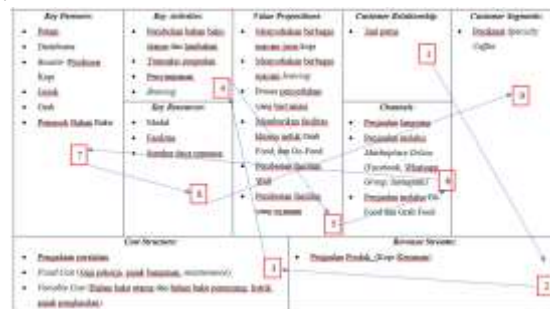


Figure 7: Nine Block BMC West Java Coffee Commodity at Retail/Outlet Level
Analysis and Discussion of Analytical Hierarchy Process (AHP)

The results of the influence of farmers are worth 0.15 or 15%, SMEs are worth 0.29 or 29%, Distributors are worth 0.20 or 20%, retail/outlets are worth 0.30 or 30%, Consumers are worth 0.07 or 7%, which means that retail/outlets are very influential on the supply chain West Java.

Analisa Supply Chain

In figure 4.2 the red line (←) depicts financial flows from downstream to upstream, blue lines (→) depicts product flow from upstream to downstream while the black line (↔) explains the flow of information from upstream to downstream or from downstream to upstream.

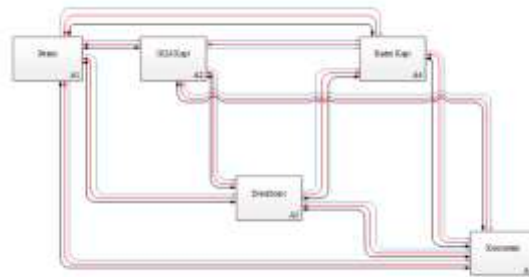


Figure 8: Product flow, information flow, and supply chain financial flow in West Java

4. CONCLUSION

Based on the results of research that has been carried out for coffee commodities in West Java, with the aim of solving the problems in the introductory chapter, the following conclusions can be drawn: Business Process in the coffee commodity supply chain in West Java. Consists of several sequences starting from upstream to downstream. The business process is as follows: From Figure 1, the coffee commodity process business in Cianjur sub-district, West Java is as follows: Farmer At this level farmers carry out the process of planting coffee seeds. Then the farmers carry out the harvesting process. The results are then sold to coffee SMEs in the form of grain logs for processing. Coffee SMEs in this research carry out coffee processing. The processing is carried out by IKM in the form of grain into greenbeans/roastbeans. After that, the results of the IKM processing will be accommodated by distributors or coffee shops. Distributors who distribute processed products from SMEs or farmers which will then be sent or sold to coffee shops and consumers. The coffee shop accepts produce from coffee farmers, distributors or SMEs. Then the coffee shop carries out the processing of ready-to-drink coffee . The processing results will be sold to final consumers. Consumers in this research can receive products from farmers in the form of logs or grain, from SMEs and distributors in the form of green beans/roast beans and from coffee shops in the form of ready-to-drink coffee. The results of the business model canvas comparison matrix for each element of the business model canvas at each level can be seen as follows: From the results of data processing in chapter four, the calculation results for the supply chain are obtained as follows: At the farmer level, the ones that have influence are channels with a value of 0.20. At the SME level, the one that has influence is key partnership with a value of 0.46. At the distributor level, the influences are channels and cost structure with a value of 0.24. At the retail/outlet level, the influence is customer relationship with a value of 0.46. At the consumer level, the influence is key resources with a value of 0.09. From the results of research that has been carried out, it is known that there are several coffee supplies originating from upstream to downstream in West Java, as follows: Farmers – SMEs/SMEs – Distributors – Coffee Shops – Consumers, Farmers – Distributors - Coffee Shops – Consumers, Farmers - Coffee Shops – Consumers, Farmers – Consumers, SMEs/SMEs – Distributors - Coffee Shops – Consumers, SMEs/SMEs – Coffee Shops – Consumers, SMEs/SMEs – Consumers, Distributor - Coffee Shop – Consumer, Distributor – Consumer, Coffee Shop – Consumer.

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