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Business Model Canvas for Kenaf Fiber Agro-industry Development in Upstream Supply Chain Networks

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ABSTRACT

Kenaf fiber is one of plant-based fibers used as an industrial raw material. The business model canvas in this study was an approach used to describe the business model of kenaf fiber agro-industry in the upstream supply chain network. This study aimed to identify value propositions, structural models of development strategies, and to design a business model canvas for the agro-industry. An Interpretative structural modelling method was used to construct a structural model for the development strategy, and the business model canvas was used to describe this agro-industry business model. BMC is a framework that helps business people describe the current business model. This approach is a static approach that uses past data. However, this approach becomes dynamic after being integrated with certain scientific methods so that it is able to describe its business model in the future. The structural model identified that the prominent element that had the significant influence on this business was seed suppliers, while the prominent element in development of this agro-industry strategy was an institution. This research is still limited to the upstream supply chain network, therefore, future research can be developed on the mid-stream and downstream supply chain networks.

Keywords:

business model canvas, kenaf fiber agro-industry, upstream supply chain network, interpretative structural modelling

Introduction

The industrial revolution 4.0 prompted the Republic of Indonesia government to issue a strategy for revitalizing the Indonesian's manufacturing sector to build a strong manufacturing industry. This revitalization strategy is included in Making Indonesia 4.0 which was initiated by the Ministry of Industry [1].

Kenaf fiber is one of the plant-based fibers needed as an industrial raw material. Kenaf fiber is widely used as a raw material for paper [2], composite materials [3], textiles and their derivative products [4]. Based on FAO statistical data processing, it is known that there is a gap between demand and supply of kenaf fiber in the world, by 91.41% [5]. Kenaf fiber imports in Indonesia reached 90.08% [5], since only 9.92% of demands could be fulfilled from the domestic kenaf fiber industry.

Performance measurement of the upstream supply chain network has been carried out in previous research [6], and therefore business development is recommended as an attempt to improve supply chain performance. The business model canvas (BMC) in this study is an approach used to describe the business model of kenaf fiber agro-industry in the upstream supply chain network. BMC has been successfully implemented previously in the aviation industry [7], the creative batik industry [8], the small food product industry [9], mushroom industry [10], the renewable electrical energy industry [11], the insurance industry [12], startup entrepreneurs [13], and social services [14].

BMC is a framework that helps business people describe the current business model [15]. This approach is a static approach that uses past data. However, this approach becomes dynamic after being integrated with certain scientific methods so that it is able to describe its business model in the future [16].

The objective of this research was to design a business model for kenaf fiber agro-industry in the upstream supply chain network. According to the previous research, root causes of problems identified on upstream supply chain performance measurement [6][17], among others, were low performance of raw materials, nonoptimal productivity of kenaf crops, inability to serve exports, and high cost of supply chain management. Development of the kenaf fiber agro-industry business in the upstream supply chain network is an essential recommendation in solving the identified problems. Business development is carried out with BMC because it is a very flexible business modelling tool approach to be implemented in various types of business models [18].

BMC is needed because the kenaf fiber agroindustri does not have a clear business model and there is no institution that regulates the business processes of the kenaf fiber agro-industry it self. And also, kenaf fiber agro-industry can identify the strengths, weakness, oppotunities, and threats that exist to select the required business strategy.

The phenomenon of volatility, uncertainty, complexity, and ambiguity (VUCA) that occurs in the industrial world has an impact on business changes [19]. Furthermore, business changes are affected by development in information technology, customer behaviour, market trends, and distribution channels [20]. This condition cannot be resisted by industry players, and therefore they have to be adaptive. This research would model the business of kenaf fiber agro-industry in the supply chain network with BMC.

Methods

This research initiated with value proposition identification of the kenaf upstream supply chain network, followed by establishment of an ISM structural model for strategy development [21][22], and completed with design of a business model canvas. The framework for this research is presented in Figure 1.

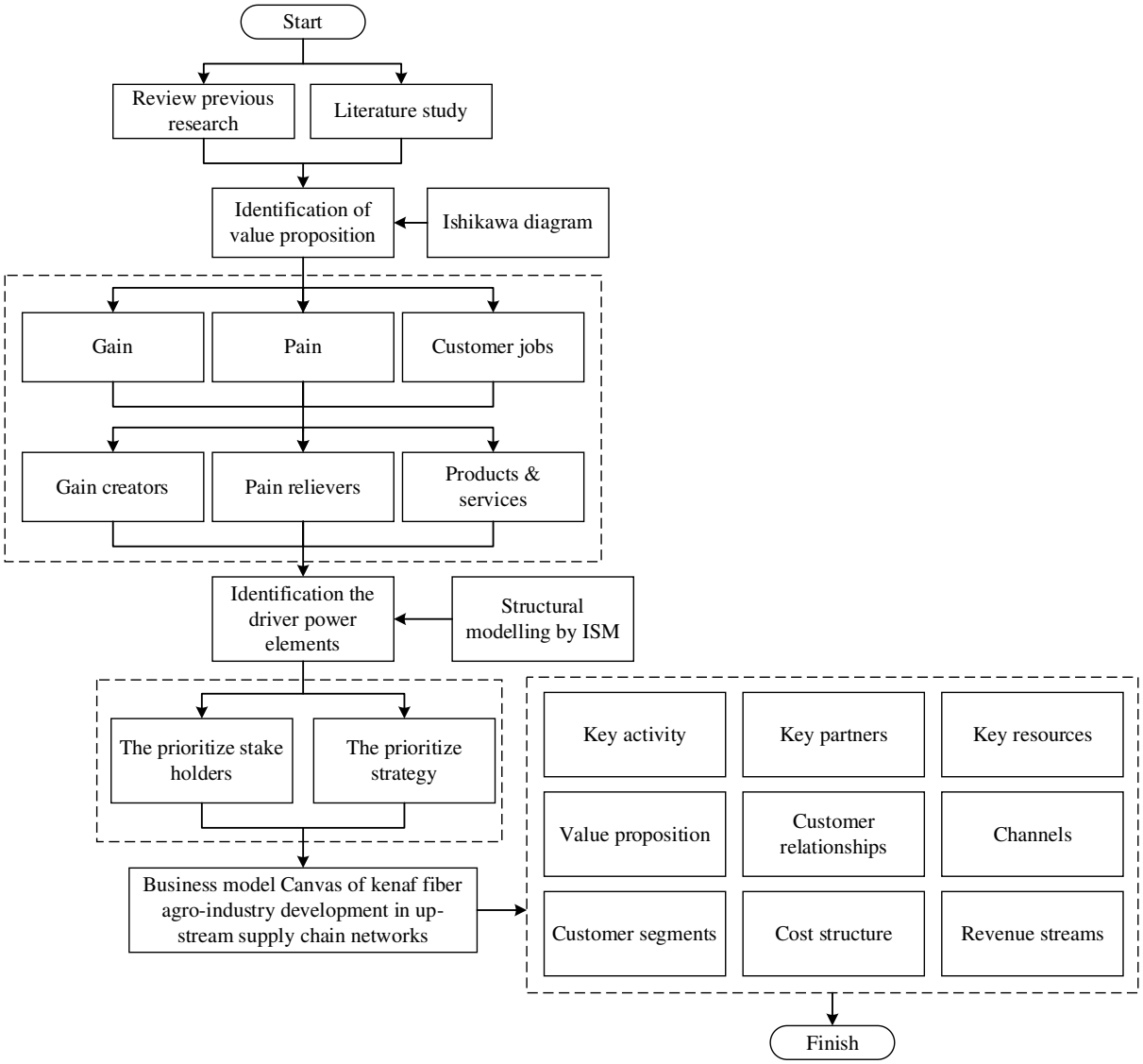

Figure 1. Research frame work

This research starts from reviewing previous research. then proceed with identifying the value proportion of kenaf fiber agro-industry using Ishikawa diagrams [23] taken from the problems faced by kenaf fiber agro-industry. And then, identifying gain, pain, customer jobs, gain creators, pain relief, and products & services based on the Ishikawa diagrams that have been identified previously. Next identify the driving force elements using structural modelling by ISM. The first model is to determine the important elements of the stakeholders that are affected in this development strategy. The second model is to determine the needs of the program that must be implemented by fiber in the development of kenaf agro-industry. And then, designing a business model canvas of kenaf fiber agro-industry in the upstream supply chain by defining 9 elements, key activities, key partners, key resources, value proposition, customer relationships, channels, customer segments, cost structure, and revenue streams.

Results and Discussion

A. Value proposition

Value proposition [24] of kenaf fiber agro-industry was carried out to identify pain, gain, and customer jobs. The 'pain' to be identified is 'pain' associated with causes or obstacles that had not developed and be able to compete with kenaf fiber agro-industry at the global level. The 'gain' to be identified is advantages currently possessed by this agro-industry. The 'customer jobs' identified here are businesses conducted by customers in relation to kenaf fiber products produced by this agro-industry.

Identification of pain root causes in the proposition value of kenaf fiber agro-industry based on the Ishikawa diagram is presented in Table 1.

Table 1. Pain in the proposition value of kenaf fiber agro-industry

No	Pain
1	Inability to meet exports
2	Low seed supply
3	Nonoptimal productivity
4	Unavailability of inventory system
5	High supply chain cost

The gain or strength identified is that the agro-industry currently has owned regular customers, and therefore production of kenaf fiber is absorbed at a minimum of 500 kg. Table 2 presents the gain in the proposition value of kenaf fiber agro-industry.

Table 2. Production Cost Data

No	Gain
1	Regular customers
2	Good relationship with suppliers
3	Good relationship with suppliers
4	Production of Grade A kenaf fiber at 80%

Current customers can be categorized into regular and non-regular customers. The regular customer is PT Innatex who currently produces woven fabrics for local and export markets. This industry is located in Cikutra, Bandung City. Non-regular customers are those who randomly order kenaf fiber via telephone media or the WhatsApp messenger application. Identification of customer jobs is presented in Table 3.

Table 3. Customer jobs in the proposition value of kenaf fiber agro-industry

No	Customer jobs
1	Looking for a supplier of kenaf fiber (bast)
2	Purchasing kenaf fiber (bast) from marketplaces
3	Expecting kenaf fiber (bast) at Grade A
4	Expecting good quality of kenaf fiber (bast) at low prices
5	Expecting the ordered kenaf fiber (bast) to arrive on schedule
6	Expecting kenaf fiber derived from the core

Pain identification was followed by pain reliever identification. The identified pain relievers are presented in Table 4.

Table 4. Pain relievers in the proposition value of kenaf fiber agro-industry

No	Pain reliever
1	Optimization of export potentials
2	Optimization of order fulfilment activities
3	Efficiency of supply chain costs
4	Development of an inventory system

Gain identification was continued by gain creator identification. The identified gain creators are presented in Table 5.

Table 5. Gain creators in the proposition value of kenaf fiber agro-industry

No	Gain creator
1	Collaborating with regular customers
2	Producing kenaf seeds
3	Collaborating with suppliers
4	Assuring Grade A quality of kenaf fiber products

After pain, pain reliever, gain, gain creator, and customer jobs had been identified, product and service were also identified before identification and analysis of 9 elements of the business model canvas. Products and services in the proposition value are presented in Table 6.

Table 6. Products and services in the proposition value of kenaf fiber agro-industry

No	Products and services
	Products:
1	Producing all Grade A kenaf (bast) fiber
2	Producing kenaf fiber from the core
	Services:
3	Marketing kenaf fiber products through marketplaces
4	Distributing kenaf fiber products

According to the above discussion on pain, gain, customer jobs, pain reliever, gain creator, and products and services, Figure 2 presents the business process proposition value of kenaf fiber agro-industry in the upstream supply chain.

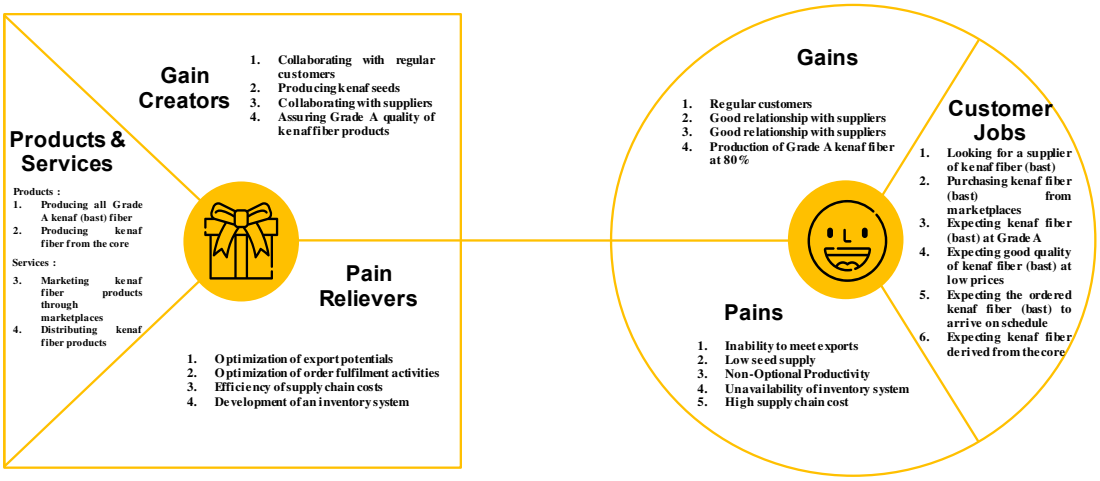

Figure 2. Value proposition of kenaf fiber agro-industry in the upstream supply chain

B. Determining the structural model for the development strategy

This study established two structural models for the development strategy of kenaf fiber agro-industry using an ISM approach. The first model was to determine stakeholder's important elements that were affected in this development strategy. There are seven stakeholders whose structural model has been made, i.e.:

1. Seed supplier (Balittas)
2. Fertilizer suppliers
3. Kenaf farmers
4. Consumers from the marketplace
5. Textile industry
6. Ministry of Industry
7. Fiber farmers

Determination of stakeholders who were affected by development of this agro-industry was carried out by combining three expert opinions. Data processing with the Eximpro software showed positions of driving power and dependencies of seven interrelated elements as shown in Figure 3.

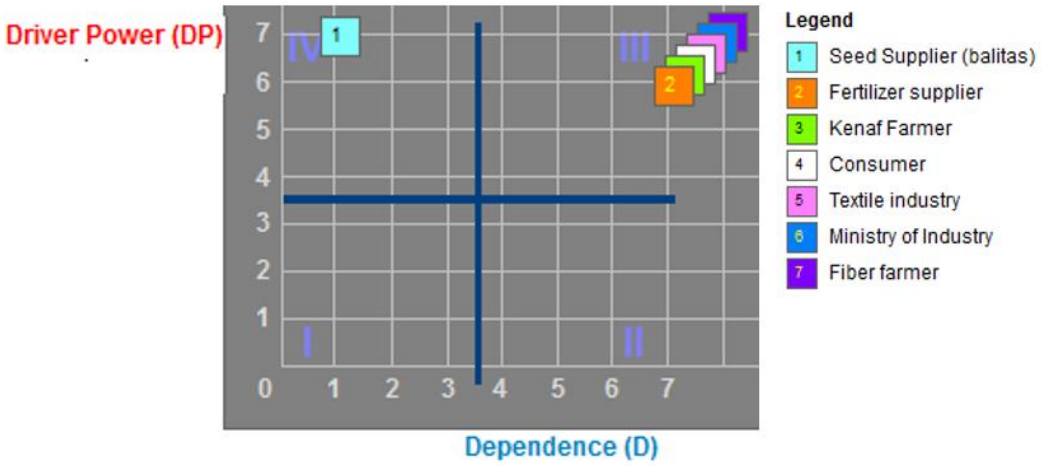

Figure 3. Digraph Of Kenaf Affected Group

In the matrix, it appeared that the one that showed the driving power of these seven elements was the first element, the seed supplier (Balittas). This showed that seed suppliers

played a prominent role in development of kenaf fiber agro-industry. They were considered as driving power in the sustainability of this agro-industry. Kenaf fiber productivity is highly dependent on the availability of kenaf seeds. Currently, certified seeds in Indonesia are only owned by Balittas.

Accordingly, the other six elements is dependent on Balittas who serves as the first element. High quality seeds will produce Grade-A kenaf fiber. This will have an impact on an increase in productivity and value added of kenaf fiber in Indonesia.

The matrix of thrust and dependence on the seven elements was derived into a structural model diagram for development of kenaf fiber agro-industry. The ISM structural model diagram is presented in Figure 4.

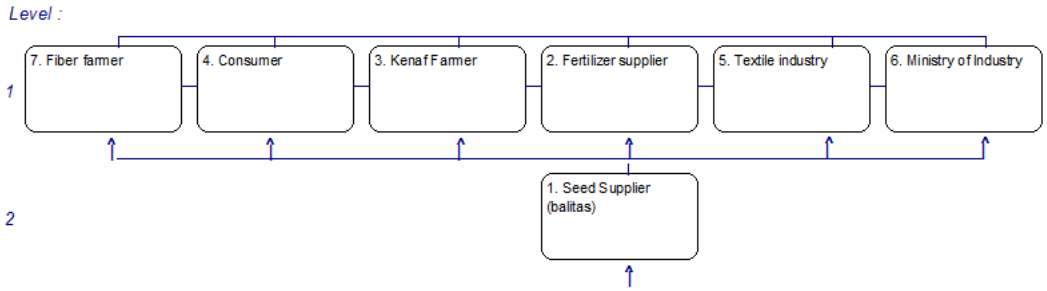

Figure 4. Structural Diagrams Of Kenaf Affected Group

The second ISM structural model was designed to determine program requirements that have to be implemented in development of kenaf fiber agro-industry. There were six elements identified as driving power and dependency factors, as presented in Figure 5.

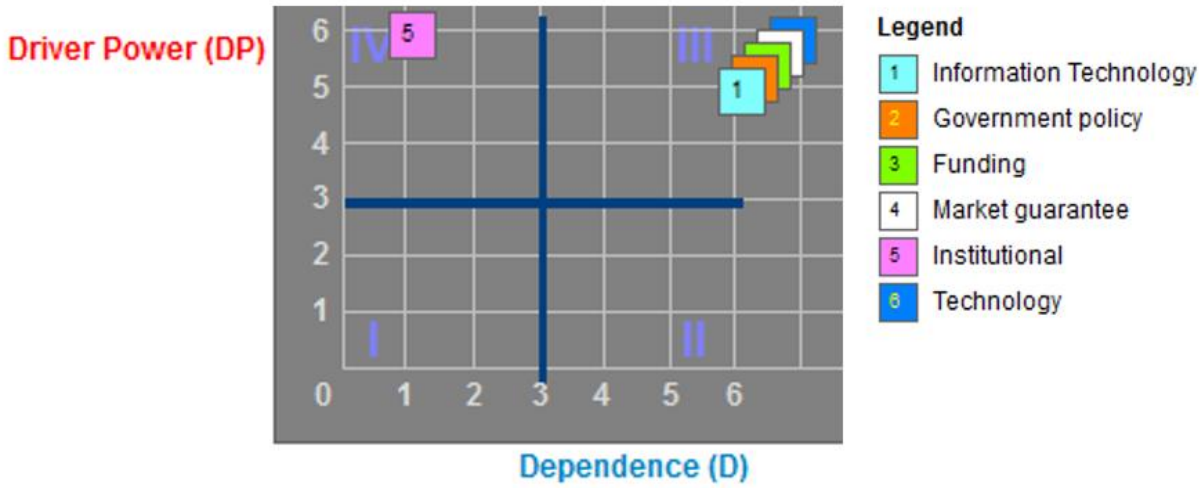

Figure 5. Digraph Of Program Needs (Need, Requirements)

The ISM structural model diagram for the strategy development program consists of six elements. Those six elements includes (1) Information technology, (2) Government policies, (3) Funding, (4) Market assurance, (5) Institution, and (6) Technology. Information technology is a development strategy program as currently, the kenaf fiber agro-industry has not owned industrial technology tools that are able to support its business processes. In the sales process, this agro-industry only utilizes media of telephone and whatsapp messenger application. Despite the fact that foreign buyers have asked for kenaf fiber products, the agro-industry has not been able to fulfil their demand. Therefore, information technology is

important to be used as an element in the ISM structural model for strategic development programs.

At present, government policies have not fully supported this agro-industry. Accordingly, many kenaf fiber users in the intermediate industry have not received information regarding local suppliers who can supply kenaf fiber to their industries. The Ministry of Industry is currently supporting the sustainability of the kenaf fiber agro-industry. Thus, government policy is included as an element in the ISM structural model.

Kenaf fiber agro-industry have not has strong funding, leading to limited production activities. This has an impact on inability to fulfil consumer demands despite the fact that kenaf derivative products may gain high value added [6].

Farmers in Indonesia have not prioritized kenaf cultivation, since the market is perceived to be not fully assured. Moreover, this occurs as kenaf farmers have limited relationship with the industry.

Further research is still required on this agro-industry, particularly that related to retting process technology [25]. The retting technology currently being used is a wet process through immersing the kenaf in a pond. However, the waste water used for soaking produces an extremely pungent gas odor. This is one of reasons for farmers to be less interested in planting kenaf. The existence of absorption technology potentially increases farmers' income and reduce the yield of wastewater.

Based on expert opinions collected, institution is placed as an element that becomes driving power. Meanwhile, the other six elements become factors that have dependency. This shows that institution is an element that occupies the top priority to support implementation of the other six elements that depend on it. This condition is represented in the ISM structural model diagram in Figure 6.

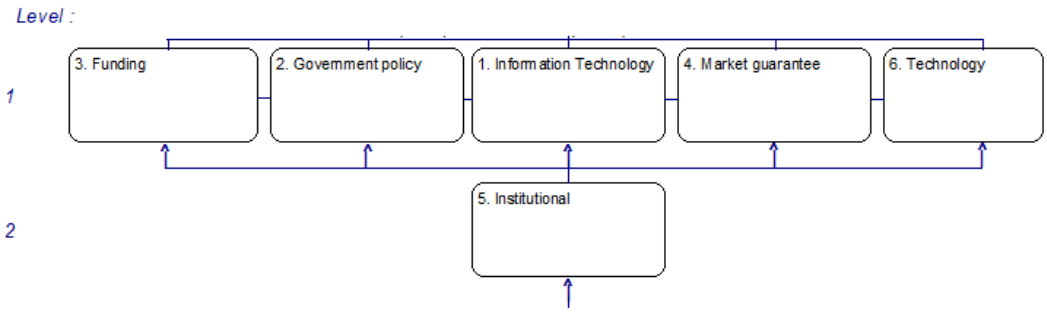

Figure 6. Structural Diagrams of Program Needs (Need, Requirements)

C. Business model canvas

At this stage, business model identification and analysis of Kenaf fiber agro-industry at the current condition were performed with a business model canvas for 9 elements. The business model is presented in the canvas as shown in Figure 7.

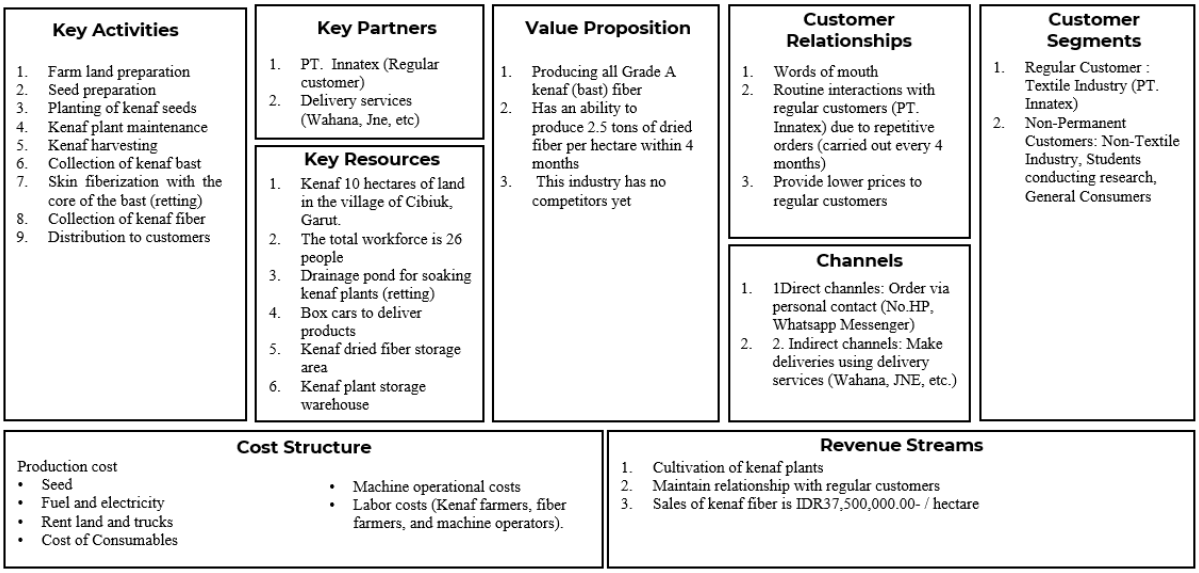

Figure 7. Business model canvas of kenaf fiber agro-industry on up-stream supply chain network

From the results of the integration of BMC and ISM, Kenaf fiber agro-industry can develop an upstream supply chain with a business model canvas that has been designed. With the advantages of being able to know the strengths, weaknesses and opportunities of kenaf fiber agro-industry. Knowing the stakeholders that have the most influence on the kenaf fiber agro-industry and the strategies needed by the kenaf fiber agro-industry. With the limitations, this research is still limited to the upstream supply chain network, therefore further research can be developed on the mid-stream and downstream supply chain networks. With these advantages and limitations, suggestions for future research are to improve kenaf fiber productivity in production and achieve the efficiency of supply chain cost in upstream network.

Conclusion

The canvas business model for development of kenaf fiber agro-industry in the upstream supply chain network has been successfully designed. On the canvas, nine elements of the business model have been successfully visualized. In the first ISM structural model, it was identified that the main element that had the highest driving power was Balittas which acted as a supplier of seeds in this supply chain. In the second ISM structural model, it was identified that institution was the most influential elements in the development of kenaf fiber agro-industry.

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