

Feasibility model study for Blumbangreksa product model based on lean startup method

A K Pakpahan¹, W S Dewobroto² and R Y Pratama³

Organization and Business Development Laboratory, Industrial Engineering,
Faculty of Industrial Engineering, Trisakti University, Jakarta, Indonesia

¹arnolt.pakpahan@trisakti.ac.id

Abstract. Based on the data from Ministry of Maritime Affairs and Fisheries in 2015, the productivity of shrimp farmers in Indonesia is still below China, India and Thailand, because of the low survival rate of shrimp seeds were planted in Indonesia. Water quality factors become a significant factor that increases the survival rate of shrimp seeds plantation, therefore team of PT. Atnic EkoteknoWicaksana create a tool called Blumbangreksa that able to monitor water quality of shrimp farms, measure temperature, salinity, pH, DO (dissolved oxygen), TDS (total dissolve solid) in water and moist air over the surface of the water and GSM -based and Internet of things. Based on the research results, unique value proposition of Blumbangreksa products is the measurement result of water quality are accurate, real-time measurements, based on Internet of things and have the ability measurements at once. Based on the feasibility study using the opportunity assessment of Marty Cagan, it can be seen that the product has fulfilled ten elements of assessment opportunity, so Blumbangreksa products are considered feasible. Initial investment fund of Blumbangreksa products is Rp 1,369,856,574, with profitability index of 1:51 and average breakeven products each year as many as 18 products are sold, and the payback period for 4 years and 2 months, therefore the business of Blumbangreksa product is feasible.

Keywords: Lean Canvas, Experiment Board, Opportunity Assessment, Blumbangreksa

1. Introduction

1.1. Background

The current area of shrimp in Indonesia is around 344.759 ha or around 39.78% from the potential lands roommates are available around 866.550 ha in Indonesia [10]. Based on the area of cultivated, 80% of the main problem of this farming business is low productivity of shrimps with 267 kg/ha, considered as low number if compared with China (538 kg/ha), India (750 kg/ha) and Thailand (2444 kg/ha).

This problem caused by low survival rate of shrimp seeds planted. Water quality factor become significant aspect of shrimp seed survival rate. Therefore, team of PT. Atnic EkoteknoWicaksana creates a water quality gauge called Blumbangreksa whose monitoring water quality of shrimps, measuring temperature, salinity, pH, DO (dissolved oxygen), TDS (total dissolve solid) in water and humidity of water surface based on GSM and Internet of things.



1.2. Scope of Issue

Based on the background, Blumbangreksa did not have a valid product design business model for customer needs, so it can be at risk of failing when it hits the market. [5] stated that innovation is feasible if 10 opportunity assesment is reached.

1.3. Research Purposes

The purpose of this research includes:

1. To design value proportion from Blumbangreksa product.
2. To design business model for Blumbangreksa product.
3. To create a business model based on the feasibility Blumbangreksa business model.

2. Theoretical Background

2.1. Lean Startup

The basis of the lean startup is minimizing waste to improve the frequency of contact with the customer, so that the trial could be done and to avoid false market assumption as early as possible. Lean Startup method could be done with creating business model using several tools, which are questionnaire, empathy map, experiment board, and lean canvas. Application in new business is to start with WHO hypotheses (candidate) customer, what are the demand, how much and etc. Next, the customer's hypotheses are validated toward customer to determine whether it fulfilled customer's demand [1].

2.2. Eight Quality Dimensions

This dimension is divided into 8 (eight) categories, those are performance, performance which related to basic operation characteristics of a product. Features is product characteristic which designed to improve function or increase customer's interests. Durability is the length of a product's life before that product must be replaced. Conformance is how far the characteristic of a product meets certain specification from customer. Reliability is possibility of a product to work smoothly within specific period of time. Serviceability is ease, speed, and ability to repair the product. Aesthetics is size, design, smell, and color of the product. Perceived Qualities is a customer's perspective about acquired product quality.

2.3. Empathy Map

Empathy Map was created because customer profile will determine the making of a better value proposition, a way of approach with the customer to be more comfortable and ways to engage with customer to be more appropriate. Where in the end will provide a deeper understanding of how customers get satisfaction on the value of products / services when compared with the price paid [8]. Here are four aspects of making an empathy map: Say (What the respondent says), Think (What respondents think), Feel (What respondents feel), and Do (What respondents do).

2.4. Experiment Board

Experiment Board is a tool used to measure the validity of a measurement against a research or survey based on assumptions so that customer desires can be translated well [9]. Experiment board is used to validate customer needs and once validated will result in MVP (Minimum Viable Product).

2.5. Lean Canvas

Lean canvas is a template business model that is widely used for businesses that are just starting or usually called startup business. This tool cannot be used for business that has been developed and running. While in the business model canvas widely used to identify businesses that has been running because the method of business tools canvas model is very applicable to the business that has been running [6].

3. Research Method

Research methodology is a systematic thinking process consisting of research stages that must be done in order to find solutions to solving a problem. Research methodology is used as a guide during research to be more directed towards a solution and conclusion. The following are the steps in data processing:

3.1. Questionnaire

The research questionnaires were distributed to 100 respondents in 5 (five) regions: DKI Jakarta, D.I Yogyakarta, Karawang, Lampung and Pemalang to know the characteristics of potential customers and the importance of Blumbangreksa product attributes.

3.2. Interview using Empathy Map

Interviews using empathy maps were conducted to identify the problems of potential customers of Blumbangreksa, interviews were conducted on 10 prospective customers in 5 (five) areas: DKI Jakarta, D.I Yogyakarta, Karawang, Lampung and Pemalang.

3.3. Validation using Experiment Board

Validation using experiment board is done to test the results obtained from empathy map. At this stage, the experiment board validation was conducted on 10 (ten) prospective consumers of Blumbangreksa product in 5 (five) areas: DKI Jakarta, D.I Yogyakarta, Karawang, Lampung and Pemalang.

3.4. The minimum viable product (MVP)

This stage is done to determine the interest and opinion or feedback of potential customers of Blumbangreksa product that have a unique value proposition. Testing MVP conducted to 10 (ten) prospective consumers of Blumbangreksa products.

3.5. LeanCanvas

Lean canvas will explain the business model for Blumbangreksa product, in this business model there are 9 (nine) parts, namely: problem, solution, unique value proposition, customer segment, key metrics, channels, unfair advantage, cost structure and revenue stream. This lean canvas result is obtained through focus group discussion to Blumbangreksa development team and prospective customer of Blumbangreksa product.

3.6. Business Feasibility Study using Opportunity Assessment

Opportunity Assessment is a method used to test the feasibility of a lean canvas business model. The criteria worthy or not worth a product is based on the fulfillment of 10 (ten) questions that should be answered by the business idea, following 10 (ten) questions opportunity assessment:

1. What is the problem that Blumbangreksa product will solve? (Problem, Solution and Unique Value Proposition)
2. Who is the target market of Blumbangreksa product? (Customers Segment)
3. How big is the Blumbangreksa product opportunity? (Market Size)
4. What are the alternative product of Blumbangreksa? (Competitor)
5. What is the differentiator of Blumbangreksa product? (Unfair Advantage)
6. Why Now? (Window Market)
7. How to introduce Blumbangreksa product to market? (Go-to-Market Strategy, Channels)
8. How does the success of Blumbangreksa product make money? (Revenue Stream)
9. What are the key factors that measure the success of Blumbangreksa products? (Key Metrics)
10. Based on the 9 (nine) statements above, is Blumbangreksa product feasible as a business? (go-or-no go)

4. Result and Discussion

4.1. Questionnaire

4.1.1. *Introduction of Questionnaire.* Questionnaire preliminary questions about water quality measuring device attributes of Blumbangreksa, where each attribute is classified based on 8 (eight) quality dimensions.

Table 4.1. Blumbangreksa Questionnaire Attribute

No.	Attributes	Dimension
1	Gauge water quality improving living shrimp life.	Performance
2	Water quality measuring device can be used various types of shrimp.	Features
3	Gauge water quality indicators that are easy to understand.	
4	Gauge water quality has an affordable price.	Conformance
5	Water quality measuring device is easy to operate.	
6	Gauges are easy to obtain water quality in the market.	Reliability
7	Gauge water quality to provide accurate information.	
8	Gauge water quality based on in real time the Internet.	Serviceability
9	Gauge water quality has good sales.	
10	Gauge water quality come with manuals.	Durability
11	Gauge water quality can be used long term.	
12	Gauge water quality has materials that are not easily corroded	Aesthetics
13	Gauge water quality has a bright color for easy viewing or found	
14	The exterior gauge water quality with functional instructions use a tool (eg, the hint button operation)	Perceived quality
15	Gauge own water quality certificate ISO	
16	Gauge water quality has been licensed by the Ministry of Marine and Fisheries.	

4.1.2. *Questionnaire Research and Behavioral Characteristics of Respondents.* Based on questionnaire contains characteristics and user behavior gauge water quality can be concluded that:

- Works respondent is a collector ornamental shrimp 11%, 79% farmers, self-employed 9%, fisheries extension 1%.
- All respondents (100%) ever gauges water quality.
- Older respondents in the shrimp business is less than 1 year 15%, 1-2 years 30% 2-3 years 20%, and more than 5 years by 25%.
- Based on the age of the respondents that respondents aged under 20 years as much as 1%, aged 30-39 years were 48%, aged 50 years or more as much as 4%.
- For the ideal price, selected respondents showed 4% of respondents chose under IDR. 1,000,000. For the ideal price Rp 1,000,000 - Rp 9,000,000 selected by 21% of respondents, for the ideal price of USD 10,000,000 - USD 19,000,000 was chosen by 17% of respondents, for the ideal price of USD 20,000,000 - USD 29,000,000 was chosen by 49% of respondents, for the ideal price of Rp 30,000,000 - Rp 39,000,000 selected by 7% of respondents, and for the ideal price above Rp 40,000,000 selected by 2% of respondents.
- On the question questionnaire about the frequency change of the measuring instrument water quality, for respondents who have never made the turn as much as 1%, to turn the tool needed 55% of respondents, for the turn of the tool every month to do 10% of respondents, to turn the tool every 3 months carried out by 1% of the respondents, to turn the tool annually performed annually carried by 28% of respondents, for a turnover of measuring instruments over 3% a year, for respondents who did over 2 years as much as 2%.
- At the frequency of use of measuring instruments water quality of 15% of respondents take measurements 2 times a day, 30% of respondents take measurements once a day, 6% of

respondents take measurements once a week, and 46% of respondents take measurements of water every time,

4.1.3. Blumbangreksa Questionnaire Research Importance Attributes. Based on questionnaires attributes of users gauge water quality obtained the following results:

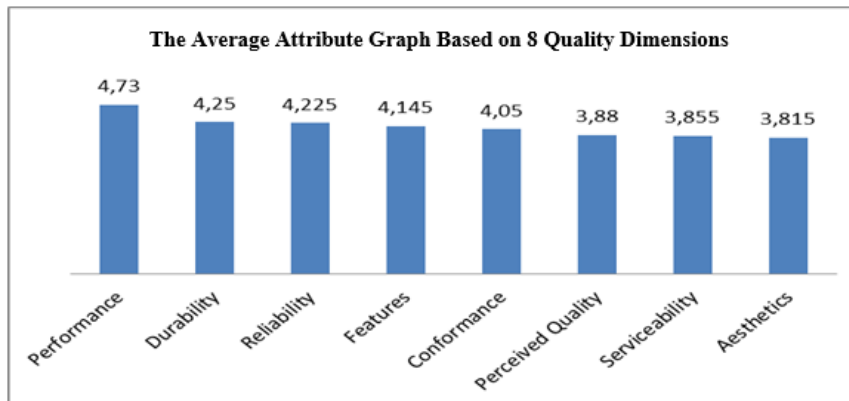


Figure 4.1 Questionnaire Graph Based On 8 (eight) Quality Dimensions

From these results can be seen that the dimensions of performance, durability, and reliability into dimensions that have the greatest average value of this is because the factors in these 3 (three) dimensions are considered respondents directly affect the shrimp seedling survival rate so that affect the productivity of the harvest. In the questionnaire results can be seen the average value of the performance dimension is 4.73. Furthermore, the durability dimension has the second highest average value with a value of 4.25. Next dimension reliability has the third highest average value with a value of 2.225.

While the dimensions of features, conformance, and perceived quality are considered important enough for the respondents because the factors in these three dimensions are considered to have an effect on the main function of the Blumbangreksa product. Furthermore, the features dimension has the fourth highest average value with a value of 4.145, the tool factor can be used on various types of shrimp and has an easily understandable indicator considered quite important on the water quality gauge. The conformance dimension has the fifth highest average value with a 4.05 value, the tool factor has an affordable price and is easily obtainable in the market. The perceived quality dimension has the sixth highest average value of 3.88.

In the aesthetics and serviceability dimensions these two dimensions have the lowest average value because they do not have a direct impact on shrimp seedling survival associated with shrimp harvest productivity. Dimensions of aesthetics with an average grade of 3.815 and serviceability with an average grade of 3.855.

4.2. Empathy Map

Empathy map obtained by an interview to 10 respondents who had used the water quality measuring device. There are four important aspects of Empathy folder that Say, Do, Think and Feel. These factors will support the results of the questionnaire as the map empathy mind of the consumer side can be known.

4.3. Experiment Board

Experiment board was made to validate the result of empathy folder following results of the experiment board prospective users gauge the quality of water (figure 4.3).

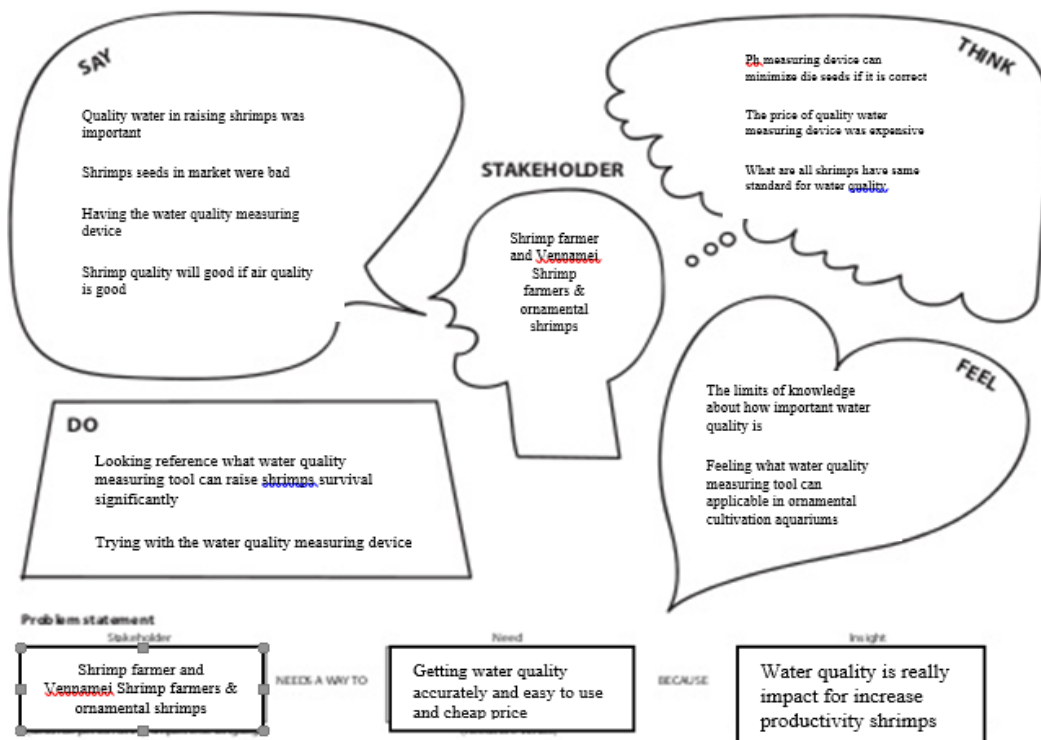



Figure 4.2. Empathy Map



Experiment Board

Project Name

Team Leader Name

Start here. Brainstorm with stickies, pull it over to the right to start your experiment.		Experiments	1	2	3	4	5
Who is your customer? Be as specific as possible.	Time Limit: 5 Min	Customer	Shrimp Collector	Shrimps Collector	Shrimps Farmer	Shrimps Farmer	Shrimps Farmer
What is the problem? Phrase it from your customer's perspective.	Time Limit: 5 Min	Problem	Ornamental shrimps color was bad	Ornamental shrimps color was bad	Low survival rate of shrimp seeds	Low survival rate of shrimp seeds	Low productivity
Define the solution only after you have validated a problem worth solving.	Time Limit: 5 Min	Solution		Protecting water quality consistently		Protecting water quality consistently and real time	Using more quality measuring device accurately and real time
List the assumptions that must hold true, for your hypothesis to be true.	Time Limit: 10 Min	Riskiest Assumption	Shrimps food was given not quality	Water quality was bad	Water was polluted	Water quality was bad	Not having water quality measuring device
Need help? Use these sentences to help construct your experiment.		Method & Success Criterion	7/10	7/10	7/10	7/10	7/10
To form a Customer/Problem Hypothesis: I believe my customer has a problem achieving this goal.	To form a Problem/Solution Hypothesis: I believe this solution will result in quantifiable outcome.	GET OUT OF THE BUILDING!					
To form your Assumptions: In order for hypothesis to be true, assumption needs to be true.	To identify your Riskiest Assumption: The assumption with the least amount of data, and core to the viability of my hypothesis is...	Result & Decision	40 % (Not valid riskiest Assumption)	70 % (valid)	30 % (Valid Riskiest Assumption)	70 % (valid)	80 % (valid)
Determine how you will test it: The least expensive way to test my assumption is...	Determine what success looks like: I will run experiment with # of customers and expect a strong signal from # of customers.	Learning	The experiment showed shrimp feed was the most not different	Water quality was good but impact for ornamental shrimp color	Water source was good, already checked by Fish Department	Water source was good but shrimp farmer didn't provide water quality	Protecting water source consistently and accurately more needed by farmer

Figure 4.3. Experiment Board

From the experiment board result, the collector ornamental shrimp and the shrimp farmers obtain valid results, where as valid problem is the color of ornamental shrimp is not maximum, low survival rate shrimps, and low productivity because low survival rate of shrimp seeds. Valid solution must

protect water quality consistently and real time with the valid riskiest assumption is water quality is not maintained properly and the user does not have a measuring device water quality.

4.4. Minimum viable Product

MVP (minimum viable product) is a product concept with a minimum feature into the market for market testing [9]. MVP for Blumbangreksa product is gauge water quality with a high accuracy in measurement because it uses a sensor Dissolved Oxygen Sensors, Low Cost Epoxy Body Conductivity Sensor, Low Cost Submersion and In-Line pH Electrodes, EZO™ Dissolved Oxygen Circuit, EZO™ Conductivity Circuit, EZO™ pH Circuit, PWR-ISO, 1m Digital Thermal Sensor DS18B20 are all imported from the United States. In the video MVP Blumbangreksa product has few things to offer such as:

- Has the accuracy of height measuring kuat water.
- Based Internet of things so as to facilitate access to data.
- Based on GSM to areas not reached the internet yet.
- Have the ability to measure simultaneously.

MVP tried to be introduced to the 10 (ten) potential customers in regions : DI Yogyakarta Pemalang, Karawang and Lampung. 9 (nine) out of 10 (ten) people interested in the product potential customers of Blumbangreksa.



Figure 4.4. Figure Illustration of MPV Blumbangreksa

4.5. Lean Canvas

Leancanvas was created to describe a business model Blumbangreksa product and has an unique value proposition to attract customers (figure 4.5).

Lean canvas will used as a reference for the feasibility study of Blumbangreksa product by 9 (nine) blocks that customer segment, unique value proposition, channels, unfair advantage, key metrics, problem, solution, cost structure and revenue streams.

4.6. Business Feasibility Study Using Opportunity Assessment

In a feasibility study the business model product Blumbangreksa using the criteria of opportunity assessment by [5]. There are ten (10) questions or aspects that must be answered to decide whether the business model is mainly can be said to be proper or improper. In the following Blumbangreksa products opportunity assessment conducted based on the 9 (nine) statements whether the product Blumbangreksa feasible as a business? (Go-or-no go). Based on 9 (nine) answers from questions for the opportunity assesment of Blumbangreksa products criteria, this is conclusion from opportunity assessment of Blumbangreksa product (table 4.2)

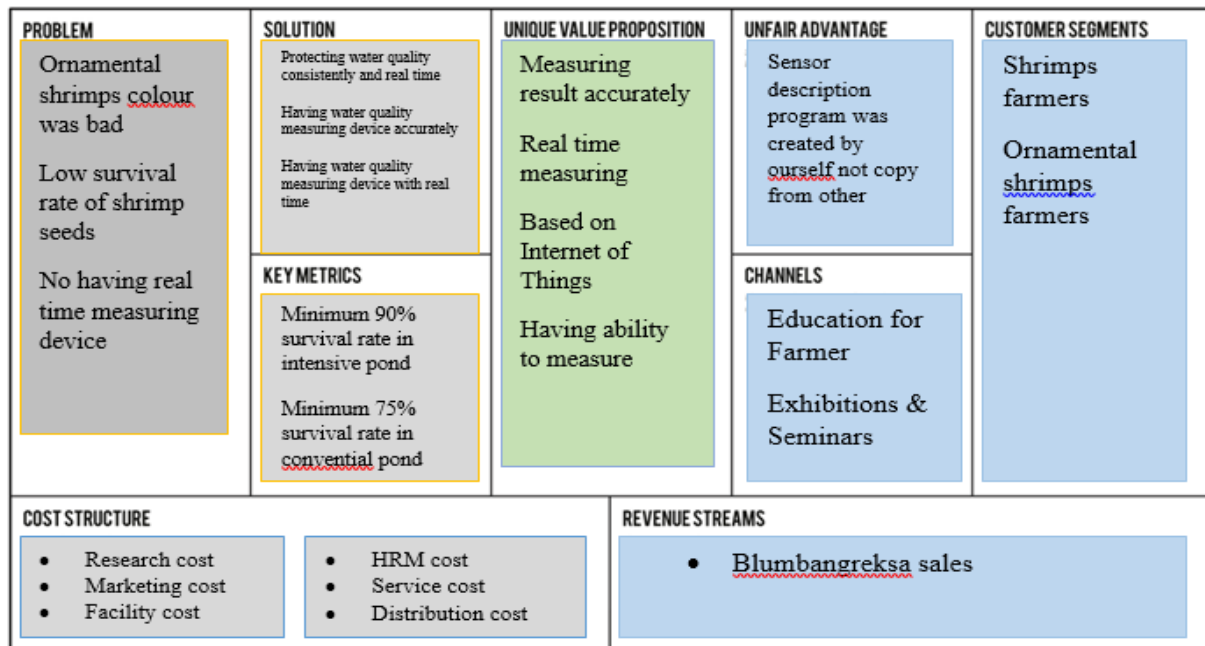


Figure 4.5. Lean Canvas Blumbangreksa Product

Table 4.2. Table Conclusions Opportunity Assessment

No.	Statement	Go or No Go?
1	Unique Value Proposition	Has 4 unique value
2	Customer Segments	Shrimp Farmers and Ornamental Shrimp Farmers
3	Market Size	866.550 ha
4	Competitor	Sensor less and manual measurements
5	Unfair Advantages	Program sensor
6	Market Window	It takes
7	Go to Market Strategy	Education, seminars and pilot
8	Cost Structure & Revenue Stream	Worthy
9	Key Metrics	90% survival rate (intensive), 75% (traditional) and 37% increase in sales each year
10	Business Model feasible Go or No Go?	Go / Eligible

5. Conclusion

In Blumbangreksa product research concluded 3 (three) conclusions as follows:

1. The unique value proposition of Blumbangreksa product is the result of water quality measurement was accurate, water quality measurement with real time, water quality measurements based on internet of things, the measurement can be done once at the same time.
2. The lean canvas of Blumbangreksa product has the customer segments are shrimp farmers and collector ornamental shrimps. This product has a unique value proposition that has a water quality measurement results are accurate, real-time measurement, Internet-based of things, have the ability to measure time. Blumbangreksa product had key metrics in the form of survival rate a minimum of shrimp seeds to 90% for shrimp farms with intensive systems, survival rate the shrimp seedling of at least be 75% for shrimp farms the traditional system, and increased

product sales by 37% per year. The cost structure of Blumbangreksa product is was used include initial investment costs, raw material costs and fixed costs of products, so the initial capital investment for Blumbangreksa product business is Rp 1,369,856,574. Revenue stream company's revenue through sales of products Internal Rate of Return of 33.29% and Profitability Index itsof 1.51, which means decent. So the Payback Period of Blumbangreksa product business is 4 years 2 months and break event point in the first year is 15 units, the sales of second year is 16 units, the sales of third year is 18 units, the sales of fourth year is 19 units and the sales of fifth year is 21 units.

3. In a feasibility study for a Blumbangreksa product business model has opportunity assessment criteria was stated in the Blumbangreksa product business model are feasible base on 10 (ten) assessment opportunity criteria's.

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