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Market Survey of Utilization Durian Skin Waste into Economic Value Fiber Sheets

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Abstract: Durian from Medan is well known throughout the archipelago. The tourists who visit Medan will always look for Durian to be able to enjoy its deliciousness. According to research from the Central Statistics Agency in 2014 - 2021, North Sumatra is the largest producer of durian fruit in Indonesia; the average durian production in North Sumatra is 1195,308 tons. Durian that we enjoy is only the flesh while the skin will become garbage. Annually, North Sumatra produces 332,712 tons of durian skin. If the durian skin is left alone, it will accumulate and can cause problems for the environment. The durian skin can be processed into fibers that have economic value. This study aimed to obtain suggestions on processing durian skin waste into environmentally friendly products with monetary value. The method used is Green Manufacturing to minimize the impact of waste and see if the product is environmentally friendly. From the results of the study that utilizing the durian skin is by processing it into a fiber. This durian skin fiber will be used as a substitute for cloth or leather for making bags. The fiber from durian skin waste can reduce the amount of durian skin waste that can damage the environment and become an entrepreneurial opportunity for the community.

Keywords: Strategic Management, Durian Skin Waste, Market survey, Environmentally Friendly

INTRODUCTION

Indonesia is a tropical country that has a diversity of fruits. Durian is one of the most popular fruit crop commodities in Southeast Asia, especially in Indonesia. Consumption of durian fruit in Indonesia is relatively high and includes the upper middle class and lower middle class (Pratiwi, 2015). According to research from the Central Statistics Agency in 2014 - 2021, the largest durian fruit producer in Indonesia is North Sumatra. The average durian production in North Sumatra is 1195,308 tons (Sinuhaji et al., 2014).

Table 1. North Sumatra Durian Production

Years	Total Production (Ton)
2017	180,067
2018	167,887
2019	213,715
2020	276,687
2021	356,952
Total	**1195,308**

Durian traders in North Sumatra, especially in Medan City, can be easily found because many large and small traders trade in various places in Medan City. The biggest durian traders in Medan include Ucok durian, Pelawi durian and Si Bolang Durian. The biggest durian trader in Medan City can sell quite a lot of Durian per day.

In terms of the structure, Durian consists of three parts, namely part of the durian flesh about 20-30%, durian seeds about 5-15%, and the durian skin about 60-75%(Arlofa, 2015). Generally, the skin and seeds become waste which only a tiny part is used; most of it is just thrown away.

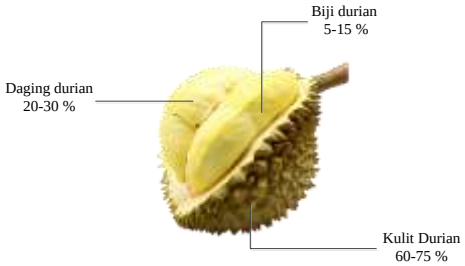

Figure 1. Durian Section Structure

According to research by Agriculture, Technology, Nuriana, & Anisa (2013), durian seeds have a reasonably high starch content. They have the potential as an alternative substitute for materials that require starch properties. Starch is a carbohydrate that comes from plants due to photosynthesis, which is stored in certain parts of the plant as a food reserve.

According to Prasetyaningrum's (2010) research, raw durian seeds cannot be eaten because they contain toxic cyclopropene fatty acids. A small number of people consume the seeds by burning, steaming, or boiling them. The fermented durian seeds can be processed into soy sauce, and the durian seed pulp is the raw material for crackers.

Durian seeds have been used as products that are beneficial to human life. Durian seeds as waste are no longer a problem for the environment, while the utilization of durian skin has not been maximized, causing problems for the environment. The percentage of durian seeds is smaller than that of durian skin waste. Based on these facts, this research is more focused on durian skin waste.

Annually, North Sumatra produces 332,712 tons of durian skin (Sinuhaji et al., 2014). So that during the durian season, environmental pollution will occur as a result of durian skin waste which is considered to have no economic value (Arlofa, 2015). Leather waste will cause an unpleasant odor if allowed to accumulate and cause air pollution if burned (Pratiwi, 2015).

The results showed that durian skin proportionally contains high cellulose elements (50-60%) and lignin content (5%), and low starch content (5%) so that it can be indicated that these materials can be used as a mixture of processed food raw materials and products. Others are used. In addition, durian skin waste contains fibrous cells with long dimensions and thick fiber walls so that they will be able to bond well when given synthetic adhesives or mineral adhesives (Kurniawan W, Arifan M, & Adim, 2013).

Responding to durian skin waste that is still not utilized, it is tried to process it into something useful and can help the community's economy. An alternative to using durian skin waste is to process it into environmentally friendly products with economic value. A green manufacturing concept is needed to create a quality and environmentally friendly product from durian skin waste. Green Manufacturing is a method that uses inputs with relatively low environmental impact, is very efficient, and produces little or no waste or pollution. Green Manufacturing is also considered an innovative process due to its potential and beneficial reasons such as waste minimization, pollution prevention, energy conservation, and health and safety issues (Soedarmadji, Surachman, & Siswanto, 2017).

Based on the facts and thoughts that have been expressed, the researchers tried to provide solutions to utilize durian skin waste in something useful for human life. In addition, the utilization of durian skin waste is expected to be an entrepreneurial innovation that can help the community's economy and create jobs for the surrounding community.

METHODS

The object the researchers observed was durian skin waste. The variables contained in this study are:

1. The dependent variable is a variable whose value is influenced or determined by another variable. The dependent variable in this study is an environmentally friendly product with a green manufacturing method variable Independent
2. The independent variable is a variable that affects the value of the dependent variable. The Independent Variables in this study were Indonesian Durian Production, North Sumatran Durian Consumption, Durian Skin Percentage.
3. Intervening Variable (Intervening Variable) is a factor that theoretically affects the observed phenomena (the relationship between the dependent variable and the independent variable becomes indirect). The intervening variable in this study is durian skin waste that pollutes the environment

The conceptual framework in research is the main foundation that describes how researchers assess a phenomenon about other models and explain why researchers believe the variables used are interrelated. The conceptual framework of this research can be seen in Figure 2.

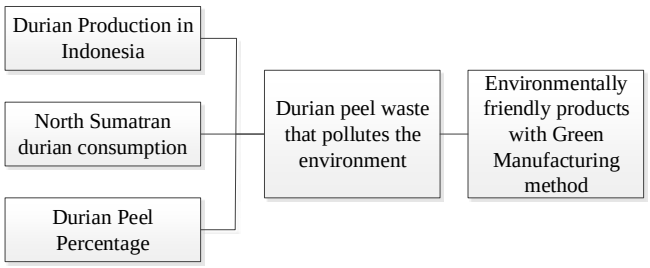

Figure 2. Research Conceptual Framework

Researchers conducted this research systematically and measurably. Descriptive qualitative research is used in this study. Descriptive qualitative research uses scientific studies, literature reviews from several articles, journals, and books. It utilizes deductive reasoning supported by valid data and information, then processed and analyzed based on research principles. This type of research is a type of research whose results are not obtained from a procedure or form of calculation but are descriptive and use an inductive approach to analysis.

The data collection technique in this research is documentation of product manufacture. The data analysis technique in this research is descriptive qualitative. This technique is used because it can support the achievement of research objectives, namely to understand how important it is to protect the environment and utilize waste as a business innovation opportunity. This study uses a systematic literature review method, including describing research questions, search strategies, inclusion criteria, data extraction, and evaluation criteria (Chen et al., 2016).

RESULT AND DISCUSSION

From the process described above, the final product is an environmentally friendly durian skin fiber sheet that is ready to be processed into various products, as shown in Figure 4.

Figure 3. Durian Leather Fiber Sheet Products

The calculation of the cost of production is the sum of all expenses incurred in producing durian skin fiber sheets. The cost of production for manufacturing durian skin fiber sheets is the sum of raw materials, labor costs, equipment costs, and overhead costs. Can be seen in Table 3.

Table 3. Cost of Production of Durian Leather Fiber Sheets

No	Cost breakdown	Total
1	Raw material cost	972,75
2	Labor costs	7.424,56
3	Overhead cost	220,05
4	Machine and equipment cost	12,62
	Total	8629,98

Based on Table 3, it is obtained that the cost of production of durian skin fiber sheets is Rp. 8629,98,- Rp. 8,630,-/production.

Determination of the selling price of durian skin fiber sheet products is obtained from the total cost multiplied by a margin of 15% of the total production cost, namely:

Product Selling Price = (Total cost + Margin 15% x Total cost)
= (Rp 8.630 + 15% x Rp 8.630)
= (Rp 8.630 + Rp 1294,5)
= Rp 9.925,-/meters

The production of durian skin fiber sheets has a price of Rp. 9,925, - / meter. Calculation of Net Value can be seen with the following results:

Net Value = Selling price – Cost of goods sold

= Rp 9.925– Rp 8.630

= Rp 1.295,-

So, the net value or net profit of the durian peel fiber sheet industry is Rp. 1,295,-

EEI calculation to know the affordable and sustainable value of the production of durian skin fiber sheets. The EEI calculation can be seen with the following results:

$$EEI = \frac{\text{Price-Cost}}{\text{Cost+Eco Cost}} = \frac{9.925 - 8.630}{8.630 + 210{,}7193} = 0{,}15$$

From the calculations that have been carried out, the EEI value of durian skin fiber sheets is obtained with a value of 0.15. So it can be said that durian skin fiber sheet products are affordable and sustainable.

The EVR calculation is obtained by dividing the eco-cost value by the net value.

$$EVR = \frac{\text{Eco-cost}}{\text{Net Value}} = \frac{210{,}7193}{1.295} = 0{,}16$$

From the calculations that have been carried out, the EVR value of durian skin fiber sheets is 0.16.

This EER value indicates the level of eco-efficiency of the durian skin fiber sheet production process.

$$\text{EER Rate} = (1\text{-EVR}) \times 100\%$$

$$= (1 - 0{,}16) \times 100\%$$

$$= 84\ \%$$

From the calculation above, it can be seen that the EER value of the durian skin fiber sheet is 84%.

Fiber sheets produced from durian skin waste can be used as raw materials for various products that humans can use. The production results of durian skin fiber sheets can be processed into wallets, bags, boxes, and others. The product results from durian skin fiber sheets can be seen in table 4.

Table 4. Durian Leather Fiber Sheet Products

Picture	Product Name	Information
	Purse	This wallet can be used as a typical souvenir from Medan, as a wedding souvenir, etc
	Bag	This bag can be used as a choice of leather bags because the price of leather is high
	Box	This box made from durian skin can be a solution to replace the cardboard

Products produced from durian sheets and skins have economic value that can increase the welfare of the people who process them. Durian peel waste can be obtained from durian traders for free because it helps traders overcome their waste problems. If it is produced into durian skin sheets, the cost is also not too expensive. One meter of durian skin sheet can be produced at the cost of Rp. 9,925,-/meter while one meter of the sheet of cloth costs between Rp. 21,000 to Rp. 37,000,- per meter. So if you produce goods using durian skin sheets, the cost will be cheaper than using cloth.

Market segmentation is done to group the market based on the similarity of the characteristics of the group so that the market group becomes homogeneous. The main variables in market segmentation are as follows:

1. Segmentation by geographic
   Province : Medan, Deli Serdang, Pematang Siantar, Parapat, Balige
2. Segmentation by demographic

Age: 15-23 (Education), 24-65 (Young Worker), 46-65 (Advanced Worker)

3. Segmentation based on psychographics
   Social class: upper, middle, and lower.

Targeting is done to select and reach the market from the market segment that will focus on marketing. Segments that are considered potential or become market tags (targeting) for product sales are as follows:

1. City: Medan
2. Age: 15-23
3. Social Class: Middle and Lower

Positioning is done to create a product image in the minds of consumers so that consumers remember the products being marketed better. Product positioning activities are carried out in three stages, namely as follows:

1. Target identification
   The main target of product marketing is in the city of Medan to residents aged 18-23 and middle and lower social classes.
2. Formulating the point of differentiation
   Product advantages are as follows:
   a. Environmentally friendly products, which can be used as a substitute for cloth or leather.
   b. Products can be innovative business solutions
3. Carry out a strategy in carrying out positioning
   The strategy carried out in positioning is through the 4P process, namely product, price, promotion, and place.
   a. Product strategy
      The product strategy makes the product design more attractive and elegant with various colors and beautiful designs.
   b. Price strategy. The price strategy is to provide affordable prices and can compete with similar products.
   c. Promotion strategy
      Promotion strategies utilize social media such as Instagram, Path, Facebook, Online Shop Shops, Messengers, and Blogs.
   d. Place strategy
      The place strategy is carried out using a zero-level channel, which means producers distribute their products directly to consumers. There are three ways to make this direct channel: door-to-door sales, mail sales, and store sales or cooperatives.

CONCLUSIONS

Based on the results and discussion above, it can be concluded that:

1. Products produced using the Green Manufacturing method from processing durian skin waste are fiber sheets processed into various products such as souvenir wallets, bags, and gift boxes.
2. The calculation of the eco-efficiency value of durian skin fiber sheet products includes: (a) Cost of Production (HPP) of Rp. 8,630,-/ (b) Net Value of IDR 1,295 (c) Calculation of Eco-Efficiency Index (EEI) of 0.15 (d) Calculation of Eco-Costs Value Rate (EVR) of 0.16 (e) Calculation of Eco-Efficiency Ratio (EER) of 84%. Based on the calculation of eco-efficiency, it can be said that the durian skin fiber sheet product is affordable and sustainable.

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Place any acknowledgement here. The IOP format to be used for references. If possible reference management sofware such as zotero or mandeley.

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