Determinant Factors to Optimize Processed Bamboo Products: A Systematic Review

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ABSTRACT. The potential in Petungsewu Village and Pandanrejo Village, Wagir District, Malang Regency is so large and promising in terms of processed bamboo products. Still, there are several obstacles to utilization such as processing or marketing that have not been maximized. Therefore, this research contributes to identifying factors to optimize processed bamboo products to be more developed and also help increase economic growth in the area itself. This research utilizes a systematic literature review method to answer the questions posed. In conducting this systematic literature review, this study adopted selected reporting items as systematic reviews and meta-analyses. Also, this method can provide a systematic display and flow diagram again to improve the review and accuracy of the literature review used. The fundamental reason supporting this finding is to try to analyze the appropriate and optimal strategy from the potential of bamboo products from both Petungsewu Village and Pandanrejo Village, Wagir District, Malang Regency.

KEYWORDS: optimization; bamboo processing; factors

1 INTRODUCTION

Bamboo plantations worldwide currently total approximately 30.5 million hectares. Most bamboo plantations are located throughout Asia, covering 65% of the world's forested bamboo area. Indonesia has recorded 176 bamboo species, of which 140 are considered native and 105 are recognized as endemic, and 20 bamboo species have not been scientifically described. However, only 108 bamboo species have been identified by the community for their uses, with 15 species considered the most useful and generally commercially traded. The number of bamboo species owned by Indonesia is utilized for harvesting both for culms and as a source of raw materials, with the bamboo shoots being used for bamboo products. Generally, bamboo has three categories: first, it is used for subsistence purposes, i.e. it is used in the construction of houses such as house materials, cages, agricultural tools, trellis poles, etc. Second, it is used in commercial production in the field of construction. The second is used in commercial production, construction, food, and the arts, and the third is used in ornamental, landscaping, and conservation.

In Indonesia, bamboo has been a part of the people's history, traditions, and social activities, as well as their livelihoods. Bamboo plantations are found in mixed gardens where bamboo grows with other flora such as trees, shrubs, palms, and understory plants. One of the areas in East Java, precisely located in the north-central Wagir District in Malang Regency, is one of the sub-districts that has the potential for bamboo growth or plantation. Bamboo itself is a typical plant that is found in many rural areas of Indonesia; bamboo is a type of grass that belongs to the Gramineae family and is part of non-timber forest product commodities. Bamboo has potentially a substitute for wood because bamboo plants can continue to produce as long as the harvest is controlled and planned. However, the community only utilizes it for daily needs, such as handicrafts, plaiting, and traditional building materials.

Bamboo has several advantages over wood: having a small shrinkage ratio, being curved, or having elasticity and high decorative value. Bamboo is a fast-growing plant with a relatively short cycle, namely 3 - 4 years can be harvested. Bamboo is one of the raw materials that is easily split,

shaped and easy to work with, besides that the price is relatively cheap compared to wood raw materials. Bamboo is a plant that contains lignocellulose and can be used for many purposes.

With the many benefits from bamboo, the community should be able to make modern utilization of bamboo on an industrial scale to add added value to bamboo to increase community income. This has been proven in China on how bamboo development increased farmers' income by 28.4%. Bamboo can play an important role in industrial development in rural areas in Anji County, Zhejiang Province. In a similar situation in Linan County, located in the southern part of Anji, bamboo sector reform and other initiatives it has significantly increased the role of the bamboo sector in the local economy. Income earned from bamboo has also played an important role in moving many households from the poor to the richer class. However, there has been no research on utilizing bamboo in modern products on a large scale.

In the process of utilizing bamboo in Wagir Sub-district, there are several obstacles, namely the large demand but without being followed by an increase in quality and appropriate prices, which is a consideration and reduces the community's interest in developing a bamboo processed product business (Arsad, 2015). Not only that, the marketing aspect of processed bamboo products is a problem because Wagir District is a sub-district that has a considerable distance from the city center and has rather difficult road access, besides that, with various processed bamboo products into several goods, it is quite difficult to distribute out of town because the goods are quite large, easily damaged and others. In addition to distribution problems in the process of making processed bamboo products is also a problem because the way the product is made is still limited to conventionally. With the number of consumer requests, producers cannot fulfill consumer desires. Therefore, the many benefits possessed by bamboo plants will be in vain. By optimizing bamboo plants, the community will have a very large impact, namely by increasing income, opening up new jobs, no need to buy expensive or difficult to find main ingredients. If the utilization of community bamboo plants can help increase economic growth in the region.

2 LITERATURE REVIEW

Currently, there are more and more new businesses, which can make competition between entrepreneurs. Therefore, the government is planning an optimization strategy based on local economic development looking at the superior potential of the area with the involvement of the local community in the hope of improving the community's standard of living (Adi, 2012). To achieve the expected goals, it is necessary to have synergy with other parties such as institutions and organizations under the auspices of the government and the private sector as an effort of collaboration, participation, and coordination to encourage the optimization of the local economy and the welfare of local communities.

Product Optimization

Optimization is making a product more functional and effective by actions and procedures. To achieve these optimal results, a mature or structured strategy is needed to achieve the desired goals. In a business, individual and group entrepreneurs who produce goods or services must consider several things when preparing a product optimization strategy. Such as paying attention to human resources, quality control. For the product to develop optimally, it is also necessary to look at market share. According to Browne & Cudeck, (1993) when the community's need for goods and services increases, and the provider of goods and services can provide the community's needs, this will be an opportunity for entrepreneurs to increase their business development.

One way to achieve production optimization is by increasing productivity, which can increase efficiency and affect the number of products produced. So that the production target is achieved appropriately. Heizer and Render classify several strategies in aggregate planning. The first group consists of five capacity options because these options do not attempt to change demand. The second group consists of three further options called demand options. In this group, the company seeks to reduce changes in demand patterns during the current planning period. Demand options include influencing demand, borrowing orders during the period, and non-market products and services (Nizami, 2019).

Local Economic Development

Local Economic Development is a participatory process encouraging local stakeholders to improve local competitiveness and create jobs and sustainable economic activity. Local Economic Development is a concrete manifestation carried out as an effort to improve the economy and the standard of living of local communities. This effort does not escape the cooperation of government and private parties to the role of local communities. Local Economic Development is concerned with organizing businesses through local potential, creating jobs, and sustainability.

There are several aspects related to local economic development, namely synergy, target groups for local economic development, location factors, and sustainable development seen from social, ecological, and economic aspects. Furthermore, governance consists of streamlining regulations and collaborative private and public sector partnerships. As well as management aspects, local economic development is based on implementation planning, a diagnostic foundation, and overall monitoring and evaluation. Based on these six aspects, it becomes the benchmark for implementing local economic development. One local economic development program is developing micro, small, and medium enterprises (MSMEs). (Huda, 2020).

3 METHODS

This study used a systematic literature review to answer the previously asked questions. In conducting a systematic review by adopting a preferred reporting system for systematic reviews and meta-analyses. In addition, this method can provide a systematic display of repetitions and flowcharts to improve the review and accuracy of the literature review. The advantage is that it can produce a high element of transparency, consistency, and standards that can later produce research reports through a fairly detailed process. With the following stages:

1. Search Criteria and Database
   The search criteria adopted include possible terms by the concept of local economy-based development optimization strategies. The search was conducted on leading databases, Web of Science and Scopus.
2. Selection Process
   The protocol for writing this research is to ensure quality and transparent outputs. There are appropriate criteria, including:
   a) Scientific work related to product potential optimization strategies published in academic journals
   b) Scientific work that has empirical findings
   c) Scientific work written in international language and under ten years old.

4 RESULT

There are 202 articles filtered from the data search on Scopus conducted between 2017-2022. This study used the PRISMA strategy with the WATASE UAKE software to identify relevant articles to answer the previous research problem. A total of 5 articlesthe requirements for data analysis related to the optimization of processed bamboo.

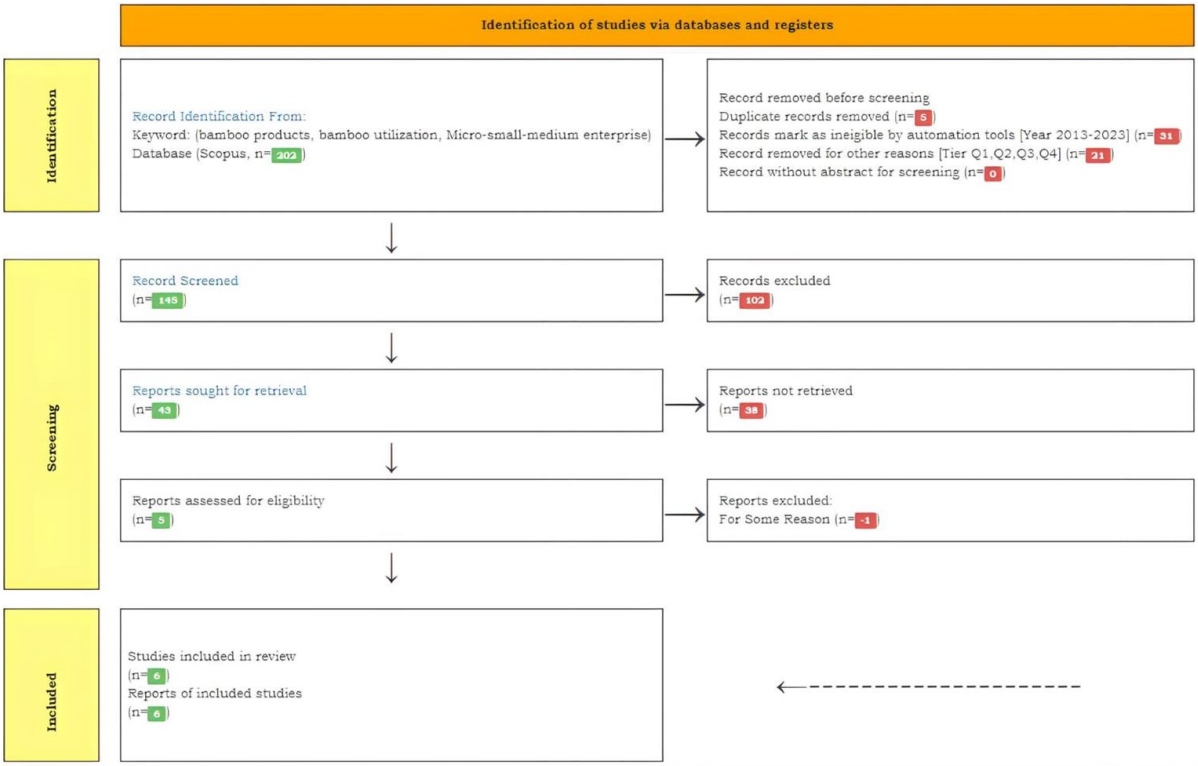

Figure 1. Prisma Meta-Analisys

Based on these criteria, the authors screened the articles in two steps. The first step was to screen the titles and abstracts of the identified articles by applying the filters above. Articles identified in the first screening stage that were deemed relevant after the initial review underwent a second check in the form of a full-text review to determine article eligibility. Only articles describing factors that may influence toxic masculinity were included.

The following is a collection of articles that have fulfilled the requirements, especially in this study:

Table 1. Eligible Articles

No	Tahun	Penulis	Judul
1.	2018	Xinxin Ma et al.	Long creep-recovery behavior of bamboo-based products
2.	2016	Amanda Thompson et al.	Factors influencing college students' purchase intention towards Bamboo textile and apparel products
3.	2021	Rudy Pramono et al.	Hybrid Bamboo and Batik Handicraft Development as Creative Tourism Product
4.	2022	Desy Ekawati et al.	Drivers, Barriers, and Strategies in the Community-Based Supply of Bamboo for Industrial-Scale Bamboo Utilization in Ngada Regency, East Nusa Tenggara, Indonesia
5.	2022	Sonali M. Mohapatra	Export performance of micro, small, medium, and large enterprises of Indian manufacturing sector

Table 2. Country and Number of Studies

Country	Number Of studies conducted
India	1
Jepang	1
Italy	1
Switzerland	1
United Kingdom	1

1. **Data Distribution**
   The distribution of the screened articles based on Table 2. consists of 5 countries. Then, the most published articles on this theme were seen in 2022 (n=20%), with several variations studied. In addition, research was conducted in five countries focusing on optimizing bamboo preparations.
2. **Micro, small and medium-sized enterprises (MSMEs)**
   One of the contributions to a country's economic growth and exports is through Micro, small, and medium-sized enterprises (MSMEs). The MSME sector plays an important role in the industrial aspect, where the turnover of industrial trade transactions runs fast. In addition, MSMEs are an aspect of regional economic development. To maintain the existence of MSMEs, it is necessary to have policies that focus on product promotion and business protection. (Mohapatra, 2020).
3. **Bamboo resources**
   Bamboo resources in Indonesia are abundant. Bamboo is also an environmentally friendly resource because bamboo growth is very fast and, during the growth process, does not require special care. (Ma et al., 2018). However, many people still consider bamboo less valuable and underutilize bamboo as a commercial product that can be globally competitive. (Ekawati et al., 2022). However, many types of bamboo are found in Indonesia, such as asper bamboo, yellow bamboo, peeing bamboo, spiny bamboo, and others. The cultivation of bamboo resources is not only financially beneficial but can improve the local environment and can characterize the environment. (Pramono et al., 2021).
4. **Product optimization**
   Optimization is optimizing the effectiveness of resources to achieve the desired target output. One way that can be done to optimize products is by marketing with promotions and creating product innovations. For example, bamboo processed product innovation in bamboo craftsmen. Bamboo innovation is currently considered more promising because there are more and more enthusiasts. Buyers consider bamboo products to have aesthetic value, be environmentally friendly, and be quality. Consumers with a shopping hobby tend to be highly interested in new products. (Thompson & Tong, 2016).

5 DISCUSSION

This literature review research aims to identify and explore how to optimize the advantages of bamboo plants in the Wagir Sub-district. Most of the previous studies identified were related to the concept of optimization of bamboo processing. In the process of screening articles, out of 202 articles, 5 of them met the criteria. based on the analysis results, most author contributions came from India, Japan, Switzerland, the United States, and Italy and were published from 2016 to 2022. Therefore, it can be said that articles that carry the concept of Bamboo Processed Optimization are still limited and can be something new for the productivity of new entrepreneurs in East Java.

Ekawati et al. (2022) conducted research on 119 questionnaires from respondents of bamboo owners and bamboo farmer groups. the number of questions in the questionnaire consisted of 20 questions related to the role, resources, and utilization of bamboo. The questionnaire results showed that more than 89% of the respondents agreed that bamboo plays an important role in socio-cultural life and serves to maintain water sources and improve environmental quality. The feasibility study of bamboo business potential provides recommendations that show that the available bamboo has an

excellent opportunity to be utilized in modern products such as the laminated bamboo industry and construction.

Many think bamboo can only be used or processed with the same products. Padala bamboo has many benefits, namely, the manufacture of wood pellets, because bamboo is a plant that contains lignocellulose. Bamboo is one of the potential natural resources. Bamboo has favorable properties such as being strong, resilient, easy to split, shape, and easy to work with, besides that the price is relatively cheap compared to wood raw materials. Besides that, bamboo is a fast-harvesting plant. In general, the manufacture of wood pellets comes from sawmill industry waste, logging waste, and other forest products, including bamboo. The opportunity to develop wood pellets is wide open, considering Indonesia's huge forest product waste. Some research on wood pellets has been done; according to Wang & Yan, (2005), the utilization of wood pellets can reduce CO2 emissions and produce heat efficiency of 80%.

Bamboo can also be used for lamina because bamboo has small and hollow stems, so if it is used for more comprehensive, longer and thicker, or flat purposes, it is necessary to do gluing or lamination technology, for example, if it is used to make furniture, floors and walls of buildings. Bamboo lamina is made from raw bamboo materials formed into strips with a length according to the ability of the press tool the width of the strip according to the state of the bamboo used to make the desired bamboo lamina or coated bamboo.

Besides being processed, bamboo can also be used as a tourist spot, one of which is that in mountainous areas, there is generally flowing water. If the rainy season arrives, the river, apart from being used as transportation, can also be used for tourist attractions/rafting. These activities usually use bamboo as a means called lanting bamboo for river transportation and other purposes. (Arsad, 2015).

Bamboo has part of its body that can be used for food namely, bamboo shoots can be used as food, such as for processing chips, as an ingredient for vegetables, and can also be made into flour for other foodstuffs after drying and processing flour. According to Krisdianto, (2007) Bamboo shoots are now an international commodity in the global market. It is proven that the demand for bamboo shoots via e-mail such as Japan, England, South Korea, Hong Kong and Slovakia. Bamboo can also be used as a tool or decoration in the house, adding attractiveness to the home's beauty.

In the process, there are obstacles, namely distribution and reproduction of production. when viewed in that aspect, the role of the government should be present in increasing production and marketing. If bamboo plants are utilized appropriately and optimally, it will impact the economic level of the people in Wagir District.

6 CONCLUSION

This research has systematically identified how to optimize processed bamboo with the various products described, in addition, we also reviewed the literature on optimization of processed bamboo. The articles were analyzed using the prime method with watase uake software. As a result, many things can be utilized from the bamboo plant whether it is used for decoration, tourism work, use and bamboo fibers, sambai one part of the bamboo can be eaten. of the five articles that used several factors, they found many factors that can be done to utilize processed bamboo. But it cannot be denied that every utilization must have obstacles, with the existence of obstacles, the government and the private sector must work together in building a bamboo processing industry that can improve the welfare of the community in Wagir District.

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