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Production and Promotion of Cocomesh and Cocofiber at PUT Manado State Polytechnic

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ABSTRACT

This study aims to increase the production and promotion of Cocomesh and Cocofiber products through innovation at the Center for Technology Excellence (PUT) of the Manado State Polytechnic. The focus of the study is on strategies for developing more efficient production and more effective promotion, considering the challenges faced by the local coconut fiber industry in terms of production process efficiency and product promotion appeal. This study uses the SWOT analysis method to identify strengths, weaknesses, opportunities, and threats, and involves data collection through interviews, field observations, and distributing questionnaires to consumers and business partners. The results of the study indicate that the application of innovative technology can increase the efficiency of Cocomesh and Cocofiber production, although existing promotional strategies still need strengthening, especially in the use of digital media. Collaboration with local industries and empowerment of coconut farmers have a positive impact on the scarcity of raw materials and the economic growth of the surrounding community. This study also contributes to the development of a national innovation system through collaboration between educational institutions and industry. It is hoped that through more innovative strategies and stronger promotions, Cocomesh and Cocofiber products can compete nationally and internationally, while providing significant social, economic, and environmental benefits

INTRODUCTION

Local industries need to continue to develop innovations to remain relevant and competitive. However, many local industries in certain areas still face challenges in adopting modern technology and improving the quality of their products. This problem is mainly related to the lack of adequate technological support, which hinders production efficiency and improves product quality. This often impacts the competitiveness of local industries in the global market. A study by Rahman et al. (2020) shows that "the application of modern technology and innovation in production is key to improving the competitiveness of local industries" (Rahman et al., 2020, p. 67).

Products such as Cocomesh and Cocofiber have great potential to meet these needs, especially in the construction and agricultural industries. Data from the Central Statistics Agency (BPS) shows that demand for these products continues to increase along with the trend of using natural materials.

The aim is to strategically increase the production and promotion of Cocomesh, Cocofiber through innovation at the Center for Technology Excellence (PUT) of the Manado State Polytechnic. Developing the production and promotion of Cocomesh and Cocofiber at the PUT of the Manado State Polytechnic has high relevance to the needs of the user community and local industry. By implementing modern technology and innovation in production, as well as strengthening promotional strategies, it is hoped that it can increase the competitiveness of local industry and make a positive contribution to the national innovation system.

METHODS

Cocofiber has also been found to have potential in the development of environmentally friendly textile products. This fiber can be used in the manufacture of fabrics, carpets, and other textile products as a more sustainable alternative to synthetic fibers such as polyester. The use of Cocofiber in the textile industry not only reduces

the carbon footprint, but also helps reduce plastic waste in the global textile supply chain.

"The use of Cocofiber as a reinforcing material in polymer composites has paved the way for innovation in the production of lighter, stronger, and more sustainable construction materials" Saminathan et al. (2020).

According to research by Kurniawan and Siregar (2021), "The potential of the coconut fiber industry in North Sulawesi has a significant contribution to the regional economy, by utilizing abundant natural resources and producing environmentally friendly products"

According to Fahmi (2014), the application of SWOT to a company aims to provide a guide so that the company becomes more focused, so that by placing a SWOT analysis it can be used as a comparison of thoughts from various perspectives, both in terms of strengths and weaknesses as well as opportunities and threats. Another purpose of implementing a SWOT analysis is that every product offered will definitely experience ups and downs or what is better known as the product life cycle.

The benefits or uses of SWOT analysis are as follows:

1. Able to provide an overview of an organization from four dimensions, namely strengths, weaknesses, opportunities, and threats. So that decision makers can see from these four dimensions more comprehensively.
2. Can be used as a reference for making long-term decision plans.
3. Able to provide understanding to stakeholders who wish to sympathize or even join the company in a mutually beneficial cooperation.
4. Can be used as a routine assessor in seeing the progress report of every decision that has been made so far.

To analyze SWOT in more depth, it is necessary to see external and internal factors as an important part of the SWOT analysis, namely:

1. External factors. These external factors influence the formation of opportunities and threats (O and T). where this factor

concerns the conditions that occur outside the company that influence the company's decision making. These factors include the industrial environment, economy, politics, law, technology, population, and socio-culture.

2. Internal factors. These factors will influence the formation of strengths and weaknesses (S and W) where these factors concern the conditions that occur in.

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This study uses a qualitative and quantitative descriptive approach. The qualitative approach is used to deeply understand the challenges and opportunities in the production and promotion of Cocomesh and Cocofiber products at PUT Politeknik Negeri Manado, while the quantitative approach is used to measure production efficiency and the effectiveness of the promotional strategies implemented. SWOT analysis is used to evaluate the strengths, weaknesses, opportunities, and threats related to production and promotion in the coconut fiber industry.

Data Collection Stages

1. Literature Study
2. Interview
3. Field Observation
4. Questionnaire

SWOT analysis is used to evaluate strengths, weaknesses, opportunities, and threats in the development of the Cocomesh and Cocofiber industry at PUT Politeknik Negeri Manado. This analysis aims to identify internal and external factors that can influence the success of implementing innovation in production and promotion.

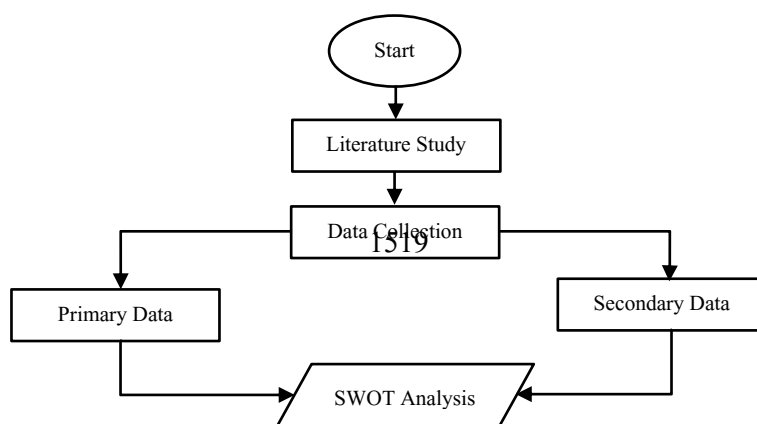


Figure 1. Research Flow Chart

RESULTS

Interview Results:

Based on the results of interviews with PUT management, coconut farmers, and coconut fiber industry players, several major challenges identified include limited production technology, lack of skilled labor, and suboptimal product promotion strategies. These challenges slow down the development of production and promotion of Cocomesh and Cocofiber at PUT Manado State Polytechnic.

To overcome these challenges, it is necessary to implement innovations that include the development of more efficient production technology, increasing workforce capacity through training, and implementing more targeted digital marketing strategies. Closer collaboration between educational institutions, farmers, and local industries is also expected to strengthen distribution networks and increase product competitiveness in a

Observation Results:

Based on the observation results, several recommendations to improve the efficiency and effectiveness of Cocomesh and Cocofiber production at PUT Politeknik Negeri Manado are as follows:

AND

1. Use of More Modern Technology

Investment in automatic machines for coconut fiber spinning and netting is needed so that production can run faster and more efficiently. Modern drying machines can also be used to overcome weather dependence.

2. Workforce Training

A training program is needed to improve workforce skills in the use of coconut fiber production technology. With adequate training, product quality can be improved, and production time can be shortened.

3. Optimization of Production Space

There needs to be an improvement in the management of production space, including storage of raw materials and finished products that are more organized and protected from the weather.

4. Increased Production Capacity

With increasing demand, increasing production capacity is very important. This can be achieved through the addition of production equipment and organizing a more efficient workflow.

With the implementation of these recommendations, it is hoped that the Cocomesh and Cocofiber production process at PUT

Politeknik Negeri Manado can run more efficiently, improve product quality, and expand market reach.

SWOT Analysis

The following SWOT analysis aims to evaluate the strengths, weaknesses, opportunities, and threats in the development of the Cocomesh and Cocofiber industry at the Center for Technology Excellence (PUT) of the Manado State Polytechnic, with a focus on internal and external factors that influence the implementation of innovation in production and promotion.

1. Strengths

- 1) Support from Educational Institutions: PUT of the Manado State Polytechnic has access to academic, research, and development resources that can be utilized to develop technological innovations in production and promotion.
 - 2) Local Raw Material Sources: Coconut as the main raw material for the production of Cocomesh and Cocofiber is abundantly available in North Sulawesi, which provides advantages in terms of raw material costs and production sustainability.
 - 3) Educated Workforce: There is access to an educated and skilled workforce from among students and staff of the Manado State Polytechnic, who can support the research and product development process.
- Environmentally Friendly Products:** Cocomesh and Cocofiber are products based on natural coconut fiber and are biodegradable, which are attractive to the environmentally conscious market.

2. Weaknesses

- 1) Limited Production Technology: The technology used in the current production process is still limited and semi-manual, so production efficiency is low and cannot meet large demand in a short time.
- 2) Inconsistent Product Quality: Based on the results of the questionnaire and observations, the products often do not have consistent quality, especially in terms of the durability

of the Cocomesh and Cocofiber nets, which can reduce consumer confidence.

- 3) Weak Promotion: The promotional strategy implemented is still ineffective, especially in terms of utilizing digital media. This results in low product visibility in the wider market.
- 4) Dependence on Weather: The coconut fiber drying process still depends on weather conditions, which can cause production delays, especially during the rainy season.

3. Opportunities

- 1) Growing Market for Eco-Friendly Products: Global awareness of the importance of eco-friendly products is increasing. This opens up great opportunities for natural and biodegradable Cocomesh and Cocofiber products, especially in the environmental engineering, land restoration, and agriculture sectors.
- 2) Collaboration with Local Industry: PUT Politeknik Negeri Manado has the opportunity to strengthen collaboration with local industry and coconut farmers, which can help increase production scale and expand market reach.
- 3) Government Support for Innovation and Local Industry: There is support from local and national governments for the development of coconut-based industries and innovation in the agribusiness sector, which can be utilized to obtain funding, training, and wider market access.
- 4) International Market Expansion: Cocomesh and Cocofiber products have the potential to be exported, especially to countries that have high demand for environmentally friendly products in land reclamation and restoration projects.

4. Threats

- 1) Competition from Similar Products: Similar coconut fiber products, both domestic and foreign, produced with more advanced technology can be a major threat to the competitiveness of Cocomesh and Cocofiber

- products from PUT Politeknik Negeri Manado.
- 2) **Fluctuation in Raw Material Prices:** Although coconuts are abundant in North Sulawesi, fluctuations in raw material prices due to climate change, natural disasters, or supply disruptions can affect the stability of production costs.
 - 3) **Infrastructure and Logistics Constraints:** Inadequate infrastructure, especially in terms of product distribution and delivery to a wider market, can hinder industry growth and slow down the expansion process.
 - 4) **Changes in Regulatory Policy:** Changes in government policies related to the agribusiness industry, whether in the form of taxes, subsidies, or environmental regulations, can impact production costs and product marketing.
 - 5) **SWOT Analysis Conclusion**
- 6) **Internal Factors:** The main strengths of the development of Cocomesh and Cocofiber at PUT Politeknik Negeri Manado lie in the support of educational institutions, access to local raw materials, and environmentally friendly products. However, weaknesses in inadequate production technology, inconsistent product quality, and weak promotional strategies need to be addressed immediately.
 - 7) **External Factors:** Great opportunities lie in the development of the environmentally friendly product market and government support for the coconut-based industry. However, threats from market competition, fluctuations in raw material prices, and logistical constraints must be taken into account in formulating development strategies.

Table 1. SWOT Strategy Matrix

<p>Internal Factors</p> <p>External Factors</p>	<p>Strengths (S)</p> <ol style="list-style-type: none"> 1. Support from educational institutions 2. Abundant local raw material sources 3. Educated workforce from students and staff 4. Environmentally friendly products (biodegradable) 	<p>Weaknesses (W)</p> <ol style="list-style-type: none"> 1. Limited production technology 2. Inconsistent product quality 3. Weak product promotion 4. Dependence on weather
<p>Opportunities (O)</p> <ol style="list-style-type: none"> 1. Developing market for environmentally friendly products 2. Collaboration with local industry 3. Government support for innovation and local industry SO 	<p>SO</p> <p>(Strengths- Opportunities)</p> <ol style="list-style-type: none"> 1. Innovation and Further Research: Using academic support from Manado State Polytechnic to accelerate innovation in production technology so that it is more efficient and supports increasing the scale of the environmentally friendly product market. 2. Human Resource Development: Empowering educated workforce to develop digital promotion strategies, including the use of social media to expand the product market. 3. Collaboration with Industry: Utilizing local industry networks to strengthen the distribution of raw materials and cooperation in promoting environmentally friendly products that are developing in the market. WO 	<p>WO</p> <p>Weaknesses- Opportunities)</p> <ol style="list-style-type: none"> 1. Production Technology Development: Leveraging government and industry support to overcome production technology limitations by investing in more modern tools and processes 2. Product Quality Improvement: Developing product quality improvement programs through collaboration between PUT, local industry, and government to ensure better and consistent quality standards. 3. Promotion Improvement: Leveraging growing market opportunities to increase product promotion efforts through digital platforms with stronger and more intensive marketing strategies.
<p>Threats (T)</p> <ol style="list-style-type: none"> 1. Competition from similar products 	<p>ST</p> <p>(Strengths - Threats)</p>	<p>WT</p> <p>(Weaknesses - Threats)</p>

<p>2. Fluctuations in raw material prices 3. Infrastructure and logistics constraints 4. Changes in regulatory policies that can impact production costs</p>	<p>1. Strengthening Environmentally Friendly Product Branding: Using the advantages of environmentally friendly products to face competition from similar products and positioning Cocomesh and Cocofiber products as the best choices in the market.</p> <p>2. Optimization of Local Raw Materials: Maximizing the availability of local raw materials to overcome the threat of fluctuations in raw material prices, while maintaining good relationships with local suppliers for supply stability.</p> <p>3. Market Diversification and Penetration: Leverage local distribution networks to overcome logistical constraints and expand markets in areas underserved by competitors.</p>	<p>1. Production Infrastructure Improvement: Address weather dependency and infrastructure constraints by adopting modern drying technology and building a more reliable distribution system.</p> <p>2. Human Resource Capacity Building Program: Implement training programs to improve workforce skills so they can face competition from similar products and ensure product quality remains high.</p> <p>3. Deeper Market Research: Conduct regular market research to understand raw material price dynamics and regulatory changes that may affect production and distribution costs.</p>
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Development of the Cocomesh and Cocofiber industry at PUT Politeknik Negeri Manado. SWOT quadrant analysis helps in mapping the strategic position of an organization or project based on internal factors (strengths and weaknesses) and external factors (opportunities and threats). From here, we can identify which strategy is most appropriate.

SWOT Quadrants:

1. Quadrant I (SO Strategy): Growth-Oriented Strategy

In this quadrant, PUT Politeknik Negeri Manado has many strengths and opportunities that can be optimized to achieve growth. The focus is on maximizing internal strengths to capture external opportunities.

2. Quadrant II (WO Strategy): Turnaround-Oriented Strategy

WO strategy is used to overcome internal weaknesses by taking advantage of external

opportunities. This is a relevant strategy when there are significant weaknesses, but external opportunities remain large.

3. Quadrant III (ST Strategy): Defensive Strategy

ST strategy emphasizes protection from external threats using internal strengths. The goal is to maintain position or competitiveness in the face of challenges coming from the external environment.

4. Quadrant IV (WT Strategy): Survival Strategy

In this quadrant, internal weaknesses and external threats dominate, so the strategy focuses on minimizing weaknesses and avoiding threats to maintain the continuity of the project or organization.

Table 2. IFE Matrix (Internal Factor Evaluation)

Internal Strategy Factors	Bobot	Rating	Skor Akhir
Strengths			
1. Support from educational institutions	0,31	4,6	1,41
2. Abundant local raw material sources	0,28	4,6	1,28
3. Educated workforce	0,17	4,25	0,71
4. Environmentally friendly products	0,25	3,4	0,85
	1	16,9	4,24
Internal Strategy Factors	Bobot	Rating	Final Score
Weaknesses			
1. Limited production technology	0,31	4,2	1,32
2. Inconsistent product quality	0,14	3	0,34
3. Weak product promotion	0,33	4,8	1,58
4. Weather dependence	0,21	3,75	1,07
	1	15,8	-4,31

Based on the analysis results in Table 2 of the IFE Matrix, it is known that the main strength factors are strengths No. 1. Support from educational institutions and 2. Abundant local raw material sources.

Table 3. EFE Matrix (Internal Factor Evaluation)

External Strategy Factors	Bobot	Rating	Final Score
Opportunities			
1. Growing market for eco-friendly products	0,38	2,8	1,06
2. Collaboration with local industry	0,46	4,25	1,96
3. Government support	0,16	2	0,32
	1	9,05	3,34
External Strategy Factors	Bobot	Rating	Final Score
Threats			
1. Competition from similar products	0,16	1,6	0,25
2. Fluctuations in raw material prices	0,24	4,5	1,09
3. Infrastructure and logistics constraints	0,31	3,4	1,06
4. Changes in regulatory policies	0,29	5,00	1,47
	1	14,50	-3,86

Based on the results of the analysis of the EFE matrix, it is known that the main opportunities are in opportunities No. 1. Developing market for eco-friendly products and 2. Collaboration with local industry.

CONCLUSION

Based on the results of research conducted related to the production and promotion of Cocomesh and Cocofiber at the Center for Technology Excellence (PUT) of the Manado State Polytechnic, the following conclusions can be drawn:

1. **Increasing Production Efficiency** The implementation of technological innovation in the production process of Cocomesh and Cocofiber has had a positive impact on increasing production efficiency. This is indicated by the optimal use of local raw materials, which has succeeded in reducing production costs and accelerating the product manufacturing process time.
2. **Promotion that Still Needs Improvement** Although Cocomesh and Cocofiber products have great potential in the environmentally friendly market, the promotional strategies implemented have not been effective in reaching a wider market. The use of digital promotional media needs to be maximized to increase product appeal and expand reach to international consumers.
3. **Collaboration with Local Industry** Collaboration with local industry has made a significant contribution to increasing production and empowering local communities, especially coconut farmers. However, further efforts are still needed to strengthen ongoing relationships and cooperation with industry players.
4. **Empowerment of Coconut Farmers** This study also shows that empowering coconut farmers through the use of coconut by-products such as coconut fiber (Cocofiber) can provide real economic benefits to the community. This has the potential to improve the standard of living of coconut farmers in the area.
5. **Contribution to the National Innovation System** The innovations produced in this study also contribute to the development of a national innovation system, where educational institutions such as PUT Manado State Polytechnic can play an active role in facilitating the development of local resource-based industries.

REFERENCES

- Fahmi, Irham. 2014. *Manajemen Strategis Teori dan Aplikasi*. Bandung: Alfabeta.
- Ferrel, O.C., dan Harline, D. 2005. *Marketing Strategy*. South Western: Thomson.
- Gunathilake, P., Senarathne, R. K., Gunawardhana, H. K. S., & Amaratunga, G. A. J. (2020). Coconut Coir Fiber Reinforced Cement Composites for Sustainable Construction. In *Key Engineering Materials* (Vol. 855, pp. 33-38). Trans Tech Publications Ltd.
- Gunathilake, P., Senarathne, R. K., Gunawardhana, H. K. S., & Amaratunga, G. A. J. (2019). Potensi Nilai Tambah dalam Industri Kelapa. *Jurnal Ekonomi dan Pembangunan*, 27(2), 65-78.
- Halim, A., & Wibowo, W. (2019). Peningkatan Efisiensi Produksi pada Industri Kecil dan Menengah di Indonesia. *Jurnal Ekonomi dan Manajemen*, 6(2), 80-95.
- Herlinawati, L. (2021). *Strategi Pemasaran dalam Meningkatkan Penjualan Pada CV Sebutret (Serat Sabut Kelapa Berkaret) Indonesia Desa Tambaksari, Wanareja, Cilacap*. Institut Agama Islam Negeri Purwokerto.
- Leni, P., Mulya, J., & Megawati. (2019). Meningkatkan Nilai Tambah Dan Daya Saing Produk Pada Usaha Arang Batok Kelapa “Mutu Hitam” Di Kabupaten Solok, Provinsi Sumatera Barat. *Journal of Community Service*, 1(1), 38–45. <http://idm.or.id/JCS>
- Marpaung, A. P., Hafiz, M. S., Koto, M., & Dari, W. (2021). Strategi Peningkatan Kapasitas Usaha Pada Umkm Melalui Digital Marketing. *Proceeding Seminar Nasional Kewirausahaan*, 294–300. <https://doi.org/http://dx.doi.org/10.30596%2Fsnk.v2i1>
- Kotler, P., dan Keller, K.L. 2009. *Manajemen Pemasaran*. Jakarta: Indeks.
- Kurniawan, A., & Siregar, B. (2021). Kontribusi Industri Serat Kelapa Terhadap Perekonomian Sulawesi Utara. *Jurnal*

- Ekonomi dan Pembangunan Daerah, 9(1), 75-85.
- Marpaung, A. P., Hafiz, M. S., Koto, M., & Dari, W. (2021). Strategi Peningkatan Kapasitas Usaha Pada Umkm Melalui Digital Marketing. *Proceeding Seminar Nasional Kewirausahaan*, 294-300. <https://doi.org/http://dx.doi.org/10.30596%2Fsnk.v2i1.8273>
- Nguyen, T., & Tran, H. (2021). Sustainable Resource Management Practices in Coconut Plantations: Implications for Fiber Industry. *Journal of Sustainable Development*, 12(2), 80-95.
- Nugroho, B. (2020). Efisiensi dalam Produksi: Tinjauan Teori dan Implementasi pada Industri Manufaktur di Indonesia. *Jurnal Ekonomi dan Bisnis*, 15(2), 30-45.
- Pearce II, Jhon A., dan Robinson Jr, Richard B. 1997. *Manajemen Strategik: Formulasi, Implementasi dan Pengendalian*. Jakarta: Binarupa Aksara.
- Rachmat. 2014. *Manajemen Strategik*. Bandung: Pustaka Setia.
- Rahman, A., Subekti, A., & Wibowo, B. (2020). Enhancing Local Industry Competitiveness Through Technology Adoption: Lessons from a Case Study in Sulawesi Utara. *International Journal of Innovation Management*, 25(1), 65-78.
- Riadi, Muchlisin. (2020). *Analisis SWOT (Pengertian, Tujuan, Aspek, Kuadran dan Matriks)*. Diakses pada 3/30/2024, dari <https://www.kajianpustaka.com/2020/09/analisis-SWOT.html>
- Rodriguez, L., & Perez, M. (2019). Coconut Fiber Processing Techniques in Local Industries. *Journal of Natural Fibers*, 18(1), 30-45.
- Saminathan, S., Muthukumar, M., & Ramakrishnan, G. (2020). Recent Advances in Natural Fiber Reinforced Polymer Composites. In *Materials Today: Proceedings* (Vol. 33, pp. 85-91). Elsevier.
- Santoso, B. (2021). Implementasi Strategi Promosi Terpadu dalam Meningkatkan Penjualan Produk Konsumen di Pasar Indonesia. *Jurnal Pemasaran Indonesia*, 12(1), 45-60.
- Santoso, B., & Wijaya, A. (2020). Aplikasi Teknologi Sederhana dalam Produksi Cocomfiber di Industri Kecil Menengah di Daerah Pedesaan. *Jurnal Inovasi Teknologi*, 7(2), 45-60.
- Smith, J., & Johnson, A. (2020). The Role of Modern Technology in Coconut Fiber Production. *International Journal of Advanced Manufacturing Technology*, 15(2), 120-135.
- Soekarno, B., Santoso, A., & Utomo, W. (2020). Pemberdayaan Masyarakat dalam Pengembangan Industri Kelapa. *Jurnal Pembangunan Masyarakat*, 28(2), 110- 125.
- Sitohang, A. P., Salmiah, & Ayu, S. F. (2022). Analisis Finansial Dan Strategi Pengembangan Usaha Pengolahan Sabut Kelapa Menjadi Serat Kelapa (Coco Fiber) (Studi Kasus : Kecamatan Batang Kuis, Kabupaten Deli Serdang). *Program Studi Agribisnis Fakultas Pertanian Universitas Sumatera*, 2(2), 1-13.
- Suharto, B. (2019). Penerapan Total Quality Management dalam Meningkatkan Kualitas Produk: Studi Kasus di Industri Manufaktur di Indonesia. *Jurnal Manajemen Produksi*, 10(1), 45-60.
- Suryono, A. (2020). Implementasi Total Quality Management dalam Meningkatkan Kualitas Produk di Industri Manufaktur. *Jurnal Manajemen dan Bisnis*, 8(2), 75- 90.
- Wahyuni, R. T., Sari, R. P., & Susianti, E. (2022). Perbaikan Proses Produksi dan Pemasaran Melalui Penerapan Mesin Produksi , Pembuatan Label Kemasan , Materi dan Media Promosi Digital untuk Kelompok Masyarakat Nenas Berduri (PONARI). *Jurnal Pengabdian Untuk Mu NegeRI*, 6(2), 179-188. <https://doi.org/doi:https://doi.org/10.37859/jpumri.v6i2.4225> 179
- Wong, M., & Lee, K. (2018). Product and Process Innovation in Coconut Fiber Industry: A

Review. *Journal of Innovation Management*,
6(2), 45-60.