
Analysis of the Commercialization Potential of SERENA Products as a Sustainable Innovation

Louista Cintya Az Zaahra¹, Alsa Anisa Ayu Damayanti², Nabila Fikriyadhifah³, Berlian Wahyu Satyafan⁴, Febrian Budi Cahyono⁵

¹⁻⁵Duta Bangsa University Jl Ki Mangun Sarkoro No. 20, Nusukan, Banjarsari District, Surakarta City, Central Java, Indonesia

Keywords

Commercialization; sustainable innovation; soap nuts; SWOT; local natural resources; eco friendly

***Correspondence Email:**
azzaahral@gmail.com

Abstract

This study examines product innovation based on local natural resources as a crucial strategy in supporting sustainable development in the small industry sector. The purpose of this study is to analyze the commercialization potential of SERENA (Scented Effective Refreshing Essence from Natural Lerak), an eco-friendly hand soap made from soapberry (*Sapindus rarak*). The study was conducted using the SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis method through a qualitative descriptive approach. Data were obtained from field observations, market tests at Duta Bangsa University Surakarta, and interviews with potential consumers and micro-business owners in Surakarta. The results indicate that SERENA has significant commercialization potential because it offers desirable value, utilizes local raw materials, and aligns with market trends toward eco-friendly products. The recommended development strategy is the SO (Strength-Opportunity) strategy, which utilizes product strengths and market opportunities to expand marketing reach and strengthen the product's positioning as a sustainable product.

1. Introduction

The issue of sustainability and environmental protection has become increasingly important worldwide. Climate change, pollution, and the excessive use of natural resources have caused significant impacts on human life. Consequently, industries are shifting toward greener practices through the concept of sustainable innovation. This concept not only considers economic profit but also maintains a balance between the environment and society. Indonesia, as one of the world's megadiverse countries, has more than 30,000 plant species that can serve as high-economic-value natural raw material (Subiyati *et al.*, 2024). This vast potential can be utilized to develop environmentally friendly products that support the achievement of the Sustainable Development Goals (SDGs), particularly Goal 12 on Responsible Consumption and Production and Goal 13 on Climate Action. Through innovations based on natural materials, society not only acts as consumers but also as active participants contributing directly to environmental conservation. The Small and Medium Enterprises (SMEs) sector plays a crucial role in driving the green economy (Mediaty *et al.*, 2023). Applying sustainability principles in the SME sector has the potential to deliver significant economic and ecological impacts. A tangible example of implementing sustainable innovation in this sector is the use of soap nuts (*Sapindus rarak*) as a raw material for environmentally friendly hygiene products.

Soap nuts contain natural saponins, compounds that produce foam and possess antibacterial and antifungal properties (Novitarini *et al.*, 2024). Utilizing soap nuts as a natural cleaning ingredient can replace synthetic chemicals, which often pollute water and soil. Moreover, the use of soap nuts supports the principle of resource circularity, as the raw material is locally sourced, renewable, and does not produce hazardous waste. Therefore, the development of lerak-based products exemplifies eco-innovation that promotes economic, social, and environmental sustainability.

Green innovation often faces obstacles during commercialization, such as limited resources, low consumer awareness of environmentally friendly products, and suboptimal marketing strategies. Strategic analysis is needed to help entrepreneurs determine the most effective and sustainable business development directions. One of the most relevant tools is SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats), which can identify internal strengths and weaknesses, market opportunities, and potential threats in the context of industry competition. This study focuses on SERENA (Scented Effective Refreshing Essence from Natural Lerak), a natural and environmentally friendly hand soap innovation using soap nuts as its main ingredient. This product is developed to meet the public's demand for safe, eco-friendly hygiene products that utilize local materials. The study aims to explore the commercialization potential of SERENA as a sustainable innovation, using a qualitative descriptive SWOT analysis approach. Data were collected through field observations, market tests at Universitas Duta Bangsa Surakarta, and interviews with prospective consumers and SME actors in the Surakarta area. The results are expected to identify optimal development strategies, strengthen the product's market position, and enhance the value of local natural resources. Furthermore, this study contributes to strengthening the green industry ecosystem in Indonesia and serves as a tangible example of implementing sustainable innovations based on local wisdom. Thus, SERENA not only functions as an economic product but also as a concrete solution to promote environmental sustainability and community empowerment.

2. Literature Review

Sustainability is the main basis for implementing responsible management and provides direction for efforts to preserve the earth for the sake of future generations. Sustainable innovation includes developing new solutions that are able to respond to current challenges while maintaining resource sustainability, improving resilience for future generations, and integrating environmental, social, and economic aspects into product development, system improvement, and service provision processes. The concept of sustainable innovation is an important element in managerial discussions, as it encourages creativity and cross-sector collaboration, while also spurring the application of renewable energy, waste reduction strategies, and ethical business practices (Saxena *et al.*, 2024).

Excessive use of synthetic soap can have a significant negative impact on human health and the environment. The chemicals it contains can potentially cause skin irritation and redness, as well as reduce water quality through changes in odor and color, and trigger eutrophication due to excessive algae growth (Ainurofiq *et al.*, 2024). This condition causes a decrease in dissolved oxygen levels, which affects the survival of aquatic organisms. Soap residues that harden at low temperatures can also clog drainage channels. The use of lerak fruit as a base ingredient for liquid soap is a more environmentally friendly alternative that also provides socio-economic benefits. Through the development of micro, small, and medium enterprises based on local potential, communities can improve their welfare, reduce their dependence on chemical-based products, and contribute to environmental sustainability.

The abundant use of lerak fruit as a raw material for liquid soap production has great potential for development. Lerak fruit-based liquid soap products are environmentally friendly and have the potential to become a leading village commodity that can increase the economic value of lerak fruit among the community. The production of lerak fruit-based liquid soap on a household scale in rural areas can be a promising new business opportunity for residents. This effort also contributes to reducing dependence on the use of synthetic chemical soaps that are less environmentally friendly. Lerak fruit contains a fairly high level of saponin, making it a potential main ingredient in soap production. Studies on the use of lerak fruit as a base ingredient for liquid soap are still limited. Liquid soap products have a number of advantages over solid soap, including being more practical, easily soluble in water, having a neutral pH that is safe for the skin, and being able to be combined with additional ingredients such as vitamins, fragrances, and moisturizers to improve their quality and benefits (Efendy *et al.*, 2024).

SWOT analysis is a strategic planning method used to assess various factors that influence the achievement of objectives, both in the short and long term. This analysis is an important part of the planning process, which aims to formulate strategies to minimize risks and weaknesses while optimizing opportunities and strengths. Its application in strategic decision-making is closely related to the achievement of the company's vision, mission, strategy, objectives, and policies (Safitri *et al.*, 2024). The four components used in SWOT analysis include:

1. Strengths: the advantages possessed by the organization that can be controlled.
2. Weaknesses: the shortcomings possessed by the organization that need to be evaluated.
3. Opportunities: external opportunities that can be utilized for growth.
4. Threats: external risks that have the potential to cause harm or hinder progress.

Based on a combination of strengths, weaknesses, opportunities, and threats, SWOT analysis can be used effectively to formulate various strategic alternatives for a business. This approach systematically explains how strengths and weaknesses can be integrated with existing opportunities and threats. Through the identification of internal and external factors, managers can develop four types of strategies, namely SO (strengths-opportunities), ST (strengths-threats), WO (weaknesses-opportunities), and WT (weaknesses-threats). Based on research Benzaghta *et al.*, (2021), instruments such as the external factor evaluation (EFE) matrix, internal factor evaluation (IFE) matrix, and competitive profile matrix (CPM) can be used as a basis for developing a SWOT matrix. This is summarized in the points below:

- SO Strategy: Maximize strengths to take advantage of existing opportunities.
- ST Strategy: Use strengths to anticipate or avoid threats.
- WO Strategy: Reduce weaknesses by taking advantage of available opportunities.
- WT Strategy: Minimize weaknesses to avoid or reduce the impact of threats.

3. Research Methods

The research aimed to develop an eco-friendly hand soap made from lerak fruit (*Sapindus rarak*) as a natural and sustainable alternative to conventional chemical-based soap. This study employed an applied experimental research method, combining both product formulation and user testing. The research design was structured to ensure that each step—from raw material preparation to user feedback—could be clearly replicated and evaluated for its validity and reliability.

3.1 Sampling

The research was conducted at Universitas Duta Bangsa Surakarta, where the product testing took place. The sampling population consisted of students, university staff, and nearby community members who voluntarily participated in using the lerak-based hand soap. The sampling technique used was random and voluntary sampling, as the soap was placed in several campus bathrooms and made available for anyone to try. This sampling method was chosen to capture diverse user experiences and preferences across different age groups and skin types. Such diversity allowed for a more comprehensive evaluation of the soap's acceptance, effectiveness, and comfort in daily use. The total number of respondents included users from both the student population and staff, along with a few external users such as friends and relatives, who provided practical insights about the soap's usability outside the academic setting.

3.2 Data Collection

Data collection in this research involved two complementary methods: field testing and laboratory testing.

1. Field Testing and User Feedback

The soap was distributed for trial use in several university bathrooms. Users were invited to share their experiences through an online Google Form questionnaire. The questionnaire was designed using a Likert scale (1–5), where respondents evaluated aspects such as fragrance, foam quality, texture, cleaning effectiveness, and skin comfort. Open-ended questions were also included to collect specific suggestions and criticisms.

2. Laboratory Testing:

Laboratory tests were conducted to ensure the safety and quality of the soap. The main physical property

analyzed was pH level, measured using a digital pH meter. The pH test was crucial to verify that the soap was within the safe range for human skin (pH 7–9). A pH value within this range indicates that the soap is non-irritating and suitable for regular hand washing. All collected data—both quantitative and qualitative—were compiled and analyzed descriptively. The user feedback was then used to make improvements to the soap’s formula, including adjusting fragrance concentration, consistency, and cleansing power.

3.3 Measurement

The study evaluated several measurable aspects to ensure the product’s functionality, user safety, and market potential:

- **pH Level:**
Tested using a digital pH meter to confirm that the soap met standard skin safety levels. This measurement ensured that the formulation would not cause irritation during long-term use.
- **Cleaning Effectiveness and Foam Stability:**
Observed through user experiences and direct testing during handwashing. These aspects were qualitatively analyzed by noting the duration and consistency of foam as well as the soap’s ability to remove light dirt and oil.
- **User Satisfaction:**
Collected from the Google Form questionnaire responses. Participants rated various sensory and functional attributes of the soap, including scent, foam, smoothness, and overall performance.
- **Environmental Impact Consideration:**
Since the main ingredient, lerak fruit, contains natural saponins, it acts as a biodegradable surfactant that does not harm aquatic environments. This makes the soap a sustainable and environmentally friendly product compared to commercial chemical detergents. The combined data from laboratory results and user feedback were used to refine the product formulation. Continuous improvements were made to balance cleansing performance, safety, and ecological sustainability.

4. Result and Discussion

The results of this study indicate that SERENA, a hand soap made from soap nuts (*Sapindus rarak*), has strong commercial potential as an innovative and environmentally friendly product. The findings were obtained through laboratory tests, field usage tests, and a SWOT analysis that identified internal and external factors influencing product development.

4.1 pH Test Results

The pH test showed that SERENA has a pH level in the range of 7.8–8.5, which is considered safe for human skin. This value aligns with the ideal pH standard for liquid soap (pH 7–9), so the product can be used for daily handwashing without causing irritation. The natural saponin content of soap nuts also provides effective antibacterial and cleansing effects without the addition of synthetic chemicals.

4.2 Field Usage Test Results

Dozens of respondents, including students, campus staff, and the surrounding community, tried the SERENA product at the handwashing facility at Duta Bangsa University, Surakarta. Through a Likert :

- 55.6% of respondents stated that SERENA was practical to use.
- 64.4% of respondents rated the foam quality as good, although not as good as synthetic chemical soaps.
- 68.9% of respondents felt their hands were softer and less dry after use.
- 73.3% of respondents said SERENA soap has potential for commercial sale.

Feedback from respondents indicated that SERENA was well-received, primarily due to its superior natural ingredients. Some suggestions for improvement included strengthening the fragrance and adjusting the viscosity to make it more commercially attractive.

4.3 SWOT Analysis

The results of the SWOT analysis indicate the following:

- **Strengths:**

- a) Made from natural and environmentally friendly ingredients.
- b) Safe for various skin types.
- c) Uses local ingredients, resulting in lower production costs.

- **Weaknesses:**

- a) Foaming is not as good as synthetic chemical soaps.
- b) The natural aroma quickly disappears if not scented.

- **Opportunities:**

- a) Public trend toward eco-friendly products.
- b) Soap nuts are an abundant and affordable local commodity.
- c) Potential to enter the UMKM, hotel, and home industry markets.

- **Threats:**

- a) Dominance of large commercial products with strong marketing strategies.
- b) Lack of public education about natural soap.

Based on the combination of SWOT factors, the SO (Strength-Opportunity) strategy is the most relevant, namely maximizing product advantages to capitalize on the growing green market opportunity.

4.4 Potensi Komersialisasi

The results of this study indicate that SERENA has high commercial value because it meets market demand for natural hygiene products, supports the eco-friendly and sustainability movement, and has significant potential for use in the hospitality and home industries. Furthermore, this product can be produced with relatively low capital costs through the use of sustainable local raw materials. With formula refinements and the implementation of appropriate marketing strategies, SERENA has the potential to reach a wider market and develop as a superior product based on local wisdom.

5. Conclusions

In conclusion, SERENA is a natural, eco-friendly hand soap made from soapberry (*Sapindus rarak*) with strong commercial potential. User feedback indicates that it is practical, safe for various skin types, and leaves hands feeling softer, although its foam quality is slightly inferior to synthetic soaps. The product benefits from its natural ingredients, low production costs due to local raw materials, and alignment with market trends toward sustainability. SWOT analysis highlights its strengths, such as environmental safety and affordability, as well as opportunities in the growing green market, despite challenges like limited foaming and low public awareness. Overall, with strategic marketing and product refinement, SERENA can effectively compete in the eco-friendly soap industry and contribute to sustainable development.

6. References

Benzaghta, M. A., Elwalda, A., Mousa, M., Erkan, I., & Rahman, M. (2021). SWOT analysis applications: An integrative literature review. *Journal of Global Business Insights*, 6(1), 55–73. <https://doi.org/10.5038/2640-6489.6.1.1148>

Efendy. (2024). *Inovasi Sabun Cair dari Buah Lerak yang Aman dan Berkualitas*.

- Ainurofiq. (2024). *Pemanfaatan Sumber Daya Alam Lokal dalam Peningkatan Produktivitas Industri Rumah Tangga di Ingasrejo, Gondangrejo, Kabupaten Karanganyar*.
- Mediaty, Diza Kurnianty Jamal, & Abdul Hamid Habbe. (2023). Green Innovation for Small-to Medium-Sized Enterprises (SMEs): Systematic Literature Review. *Indonesian Journal of Economic & Management Sciences*, 1(6), 791–804. <https://doi.org/10.55927/ijems.v1i6.7274>
- Novitarini, N., Kresnapati, I. N. B. A., & Akmi, A. M. (2024). Ekstrak Buah Lerak (Sapindus rarak) sebagai Sabun Antibakteri yang Ramah Lingkungan. *Jurnal Biotek*, 12(2), 186–197. <https://doi.org/10.24252/jb.v12i2.51245>
- Saxena, P. K., Seetharaman, A., & Shawarikar, G. (2024). Factors That Influence Sustainable Innovation in Organizations: A Systematic Literature Review. In *Sustainability (Switzerland)* (Vol. 16, Issue 12). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/su16124978>
- Subiyati, Retnoningsih, A., & Rahayu, E. S. (2024). Diversity of Mangrove Plants in Karimunjawa National Park. *Jurnal Penelitian Pendidikan IPA*, 10(12), 10745–10758. <https://doi.org/10.29303/jppipa.v10i12.9212>
- Zianah Safitri, Wendi El, Viona Paskreyanti Sitorus, & Indah Noviyanti. (2024). Analisis SWOT terhadap Pengembangan Strategi Bisnis Pada Warung Makan Asyik Desa Balunijuk. *Jurnal Manuhara : Pusat Penelitian Ilmu Manajemen Dan Bisnis*, 2(3), 140–153. <https://doi.org/10.61132/manuhara.v2i3.967>