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# Novel Techniques Tool in Cutting and Peeling Coconut: SWOT Analysis

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**Abstract:** Innovation is essential for small and medium-sized agricultural enterprises (SMEs) in Malaysia, as it improves productivity and competitiveness in the agricultural industry. It is essential to incorporate cutting-edge techniques and tools for processing coconuts, given the agriculture sector's objective of increasing productivity and sustainability. Since Malaysia aims to upgrade its agricultural methods, these advancements are relevant in Malaysia. The present study provides a thorough SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of CoCoCut's cutting and peeling procedures and tools for coconuts. The analysis is based on a single-case study. Furthermore, it evaluates the inherent advantages and disadvantages of these innovative approaches, together with the potential advantages and risks in the market. This study offers a thorough analysis of the innovative tool, i.e., CoCoCut's areas of expertise, which can help in identifying the numerous possibilities for expanding its business. Moreover, it offers a comprehensive comprehension of CoCoCut's vulnerabilities and discerns prospective hazards that pertinent stakeholders may encounter in the future. Having this comprehension is crucial for effectively navigating the intricacies of the market and taking advantage of advancements. To conclude, this study emphasizes the need for adopting creative methods in coconut processing and advancing a more competitive and sustainable coconut sector. The invention and utilization of this groundbreaking instrument have several substantial economic ramifications. This cutting-edge gadget enhances the efficiency of coconut peeling, resulting in a boost in output. It is advisable to utilize this instrument to enhance the distribution network by forming strategic alliances with industry and trade firms, thereby expanding its reach in the worldwide market.

**Keywords**: *Product Innovation*; *SWOT analysis; innovative tool, coconut processing*

## 1. Introduction and Background

In Malaysia's emerging market, small and medium-sized enterprises (SMEs) encounter many challenges in sustaining their operations amidst market volatility (Jalil, Ali & Kamarulzaman, 2022). Innovation is regarded as a catalyst for the growth and development of the economy, particularly for SMEs. The ability to innovate is a critical determinant of success for SMEs in developing countries (Afriyie et al., 2019; Dabic et al., 2019; Donkor et al., 2018). Therefore, implementing innovative strategies is essential for the growth and development of these enterprises (Korau et al., 2020). Within the SME landscape, innovative performance is closely related to creating innovative products or services, which are vital for adapting to evolving market conditions, competitive pressures, and technological advancements (Si et al., 2020). Consequently, the capability of SMEs to embrace innovation is a significant competitive advantage in the marketplace.

Innovation related to products involves the introduction of a new or significantly improved good or service, with enhancements in technical specifications, components and materials, incorporated software, user-friendliness, or other functional characteristics (Economico, 1997; OECD, 2005). Innovation is crucial for agricultural SMEs in Malaysia, as it enhances productivity and competitiveness in the agricultural sector. As consumer preferences evolve and environmental considerations become more pressing, fostering innovation capabilities can improve performance and resilience. The nature of agricultural innovation can be both technological, such as agricultural inputs, machinery, or crop management techniques, as well as institutional, for example, markets, policies, and new forms of social organization, or a combination of these (Schut et al., 2018; Fieldsend, Varga, Biró, Von Münchhausen & Häring, 2022). However, this sector's innovation level needs to be higher, highlighting the need for strategic initiatives to foster a culture of innovation and collaboration

among these enterprises (Kamalrulzaman, Ahmad., Ariff & Muda, 2021). Innovation in the agricultural sector is a continuous process of developing and enhancing products, processes, and technologies to improve efficiency, sustainability, and profitability. This approach seeks to create innovative solutions to enhance societal well-being, foster community engagement, and promote sustainable practices (Prihadyanti et al., 2023; Cattivelli & Hoffmann, 2020).

Incorporating product innovations in agriculture is essential for revitalizing rural economies and ensuring equitable access to resources and technologies. This multifaceted approach emphasizes the importance of collaborative efforts among stakeholders, including farmers, policymakers, and community organizations, to create sustainable solutions that benefit individuals and the broader community. The agricultural sector can play a pivotal role in achieving long-term social and environmental goals by fostering an environment conducive to social innovation.

On a global scale, the coconut industry is an essential crop, as many smallholders depend on it for their livelihoods (International Coconut Community, 2024). Traditional methods for cutting and peeling coconuts are labor-intensive and time-consuming, leading to significant product loss. Given the agriculture sector's goal of improving production and sustainability, it is crucial to introduce innovative methods and equipment for processing coconuts. These innovations are particularly relevant in Malaysia, as it seeks to modernize its agricultural practices. Innovative techniques and tools are needed to improve production and sustainability. However, small-scale Malaysian farmers need help obtaining these technologies due to financial limitations and technical proficiency. This inequality in access can hinder the use of novel processing techniques that can improve productivity and sustainability. Additionally, new processing techniques must meet market demands and consumer preferences. However, there is often a disparity between inventive methodologies and market demands, posing obstacles in bringing these innovations to the commercial market. Understanding market dynamics and collaborating with stakeholders can improve the relevance and acceptance of innovative coconut processing products and tools.

In Malaysia, various coconut-cutting tools are available, catering to different needs from home use to commercial processing ranging from manual to electric and semi-automatic machines. These tools vary in price and functionality, making it easier for consumers to choose based on their specific needs, whether for casual home use or commercial coconut processing. However, existing tools are typically single-function and require separate devices for different tasks. To address this limitation, a novel 3-in-1 multifunctional coconut cutter tool, CoCoCut, was developed. This innovative device simplifies the process of opening, cutting, and dismantling coconuts within 10 seconds. Through the analysis of a single case study, this study presents a comprehensive SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of CoCoCut, innovative techniques and tools for cutting and peeling coconuts, and examines the internal strengths and weaknesses of these novel methods and the external opportunities and threats in the market. In conclusion, this study highlights the significance of embracing innovative approaches in coconut processing, promoting a more competitive and sustainable coconut industry.

## 2. Literature Review

This section presents literature evaluations on the significance of production innovation for economic growth and government initiatives toward encouraging research on innovations.

### The importance of product innovations in economic growth

Product innovation can foster the development of businesses and create competitive advantages. As markets become increasingly dynamic and competitive, companies are compelled to continuously seek out new ways to innovate and meet evolving consumer demands (Štreimikienė & Kačerauskas, 2020). Product innovations, i.e., the development and introduction of new or significantly improved goods and services, have long been considered a key driver of economic growth and prosperity. Successful product innovations can bring several benefits to companies, including longer growth trajectories, stronger financial performance, and greater shareholder attractiveness (Kozludzhova, 2023). In addition, innovation activities can have a positive impact on investment activity and promote general economic development. Innovation is often seen as one of the most important factors in economic progress, production, and management decision-making (Kogabayev &

Maziliauskas, 2017).

Sustainability has also emerged as a key consideration in innovation, as businesses strive to develop products and services that balance economic, environmental, and social factors. Technology innovation, in turn, is a critical enabler of sustainable development, as it can influence manufacturing processes, product performance, and waste reduction. The importance of innovation to economic growth cannot be overstated. Product, service, and business model innovations that introduce novel solutions can empower companies to gain a competitive edge in global markets, attract greater investment, and ultimately drive long-term economic prosperity. (Kogabayev & Maziliauskas, 2017). Furthermore, the interplay between technological innovation and governance institution quality has been shown to have a positive long-term impact on Malaysia's economic growth. Well-planned and relevant policies that boost technological progress can be instrumental in driving sustainable economic development in the Malaysian context. While Malaysia has made substantial strides in fostering a culture of innovation, ongoing efforts are needed to strengthen the country's innovation ecosystem further and ensure that the benefits of product innovations are widely distributed across the economy (Ngisau & Ibrahim, 2020).

Agriculture has long been a cornerstone of many economies, particularly in developing regions where it contributes significantly to employment, income, and food security. Among the numerous agricultural products, coconuts hold a special place due to their versatility and economic importance (Mahfud, & Purabaya, 2021). Coconuts are used to produce a wide range of products, including copra (dried coconut meat), coconut oil, coconut water, and various by-products such as coconut husk and shell. However, traditional methods of processing coconuts, especially cutting and peeling, are often labor-intensive and inefficient, leading to significant losses in productivity (Jusoh et al., 2020).

**Government Initiatives to Promote Innovation Efforts**

Governments worldwide have acknowledged the vital role of innovation in driving economic growth, enhancing standards of living, and addressing pressing challenges in society. One key aspect of government efforts to encourage innovation is the creation of an enabling regulatory framework. Policymakers must carefully navigate the balance between necessary oversight and control and allow for the flexibility and risk-taking that often characterize innovative activities (Bradley, et. al., 2021). As noted, the same regulations that may hinder innovation in one industry could potentially serve as a stimulus in another (Barr, 2017). Governments must therefore adopt a tailored approach, continuously evaluating the impact of their policies and adjusting accordingly.

In the context of Malaysia, product innovation continues to play a pivotal role in driving both economic and social development. The Twelfth Malaysia Plan (12MP), covering the period from 2021 to 2025, emphasizes the importance of innovation as a critical enabler of the country's aspirations to become a high-income nation. A key strategy outlined in the 12MP is to foster an innovation-driven economy by strengthening the innovation ecosystem, enhancing the role of research and development (R&D), and encouraging the adoption of advanced technologies across industries. The plan also highlights the need for increased collaboration between the public and private sectors to promote the commercialization of innovative products. These measures are designed to accelerate economic growth and ensure that innovation contributes significantly to Malaysia’s sustainable development goals.

In response to this awareness, the Malaysian Innovation Foundation (YIM), established in 2008 under the Ministry of Science, Technology, and Innovation (MOSTI), aims to promote a culture of creativity and technology-based innovation in Malaysian society. YIM targets technology use at the grassroots level, encompassing school students, youth, women, rural residents, people with disabilities, and non-governmental organizations (NGOs) (Yayasan Inovasi Malaysia, 2024). To realize these objectives, YIM has provided grants in the form of financial and technical assistance to fund and support innovative technology-based projects (known as beneficiaries) until they successfully reach commercialization. In addition, YIM has established strategic collaborations with government research institutes (GRIs) and higher education institutions (HEIs) (referred to as collaborators) to obtain technical advice, ensuring that the technology transfer process runs smoothly using the latest technologies in line with current needs.

Recently, the Madani Economy framework, introduced in 2023, represents a comprehensive approach to

building a resilient and sustainable economy. It integrates economic prosperity with social justice and environmental sustainability, with innovation playing a central role. Under the Madani framework, the focus on transforming Malaysia into a knowledge-based, high-income economy is clear. The framework encourages the widespread adoption of digital technologies and supports the growth of high-tech industries (Narayanan, & Yew-Wah, 2018). Public-private partnerships are highlighted as essential mechanisms for driving innovation, enabling the commercialization of new technologies, and fostering entrepreneurship. The framework also prioritizes social innovation to tackle inequality and poverty. By promoting social enterprises and community-driven initiatives, the framework aims to ensure that economic growth is inclusive and benefits all segments of society (Narayanan, & Yew-Wah, 2018).

## 3. Research Methodology

**Case study: A single qualitative case study CoCoCut.** The research utilized a single case study approach to better understand the phenomenon (Yin, 2003). This method was chosen for its ability to provide detailed insights and a comprehensive view of the specific case being studied. By focusing on a single case study, the researchers could thoroughly explore the intricacies and unique aspects of the CoCoCut innovation. This approach allowed for an in-depth analysis of Mr. X's strategies, challenges, and successes, offering valuable lessons and implications. Additionally, the single case study facilitated a closer examination of the interactions and dynamics within the development team, shedding light on the collaborative processes and mentorship roles. Overall, this method provided a rich, contextual understanding of the factors contributing to the product's development and potential impact.

**Participant Selection and Profile**. Mr. X, an instructor at a college on the east coast of Peninsular Malaysia, was selected as the sole participant for this case study due to his significant contributions to developing the 3-in-1 Coconut Peeler innovation. To maintain confidentiality, a pseudonym, "Mr. X," has been used throughout the study to identify the innovator. Mr. X is in his mid-40s and holds a diploma in engineering, specializing in product design and development. With over 15 years of experience in academia and industry, he teaches engineering and product innovation courses at the college. Mr. X is known for his collaborative approach, working closely with students under his supervision to develop practical solutions to real-world problems.

**Interview Procedure.** The interview with Mr. X, the innovator was held at his house, which also served as his workshop, and lasted approximately two hours. The participant was informed about the study's objectives and provided informed consent before the interview. The semi-structured interview allowed for flexibility in exploring Mr. X's experiences and insights into the invention process. During the session, Mr X shared detailed accounts of his creative journey, including the challenges he faced and the strategies he employed. The conversation also delved into his collaborative efforts with students and how these interactions influenced the development of the innovative tool. This approach facilitated an in-depth understanding of the technical aspects and personal experiences that contributed to the invention's success.

**Ethical Considerations.** To ensure the ethical conduct of this research, the participant's confidentiality and anonymity were maintained throughout the study. The interview data was securely stored, and any identifying information was removed from the transcripts. The participant was informed of their right to withdraw from the study at any time without consequence.

**Data Analysis.** The interview data was analyzed using narrative analysis to uncover the secrets of successful innovation and experience related to Mr. X's creative process, collaboration with students, and the development of the innovative tool. This study focuses on interpreting the personal stories shared by participants, allowing researchers to uncover underlying themes and meanings related to their experiences. Narrative analysis is a qualitative research method that emphasizes the importance of personal narratives in understanding human experiences. It involves collecting data through interviews, where participants recount their stories in a way that reflects their thoughts, feelings, and motivations.

Additionally, the Strength, Weaknesses, Opportunity and Threat (SWOT) analysis technique was employed to evaluate the strengths, weaknesses, opportunities, and threats of this novel coconut-cutting and peeling tool designed for individual use. Developed initially in business administration and organizations Pickton & Wright

1998), SWOT analysis was selected for its practicality and effectiveness in identifying key factors relevant to the tool's performance. This approach provided a structured method for gathering information on both internal and external factors, making it well-suited for assessing the tool's viability and potential market impact in this exploratory research.

## 4. Results

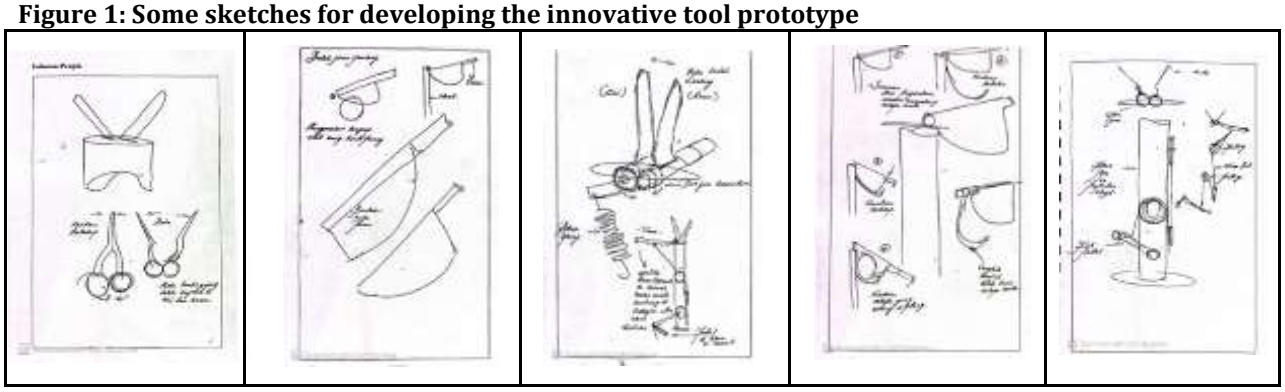
This section explains the development of the innovative product, CoCoCut, also referred to as Pengupas Kelapa. Following that, the SWOT analysis will be discussed.

**Development of the Innovative Product.** The innovator is an instructor at the TVET Education Institute, widely known as GIATMARA. He played a pivotal role in creating an innovative tool mainly used to process both mature and young coconuts, which can be referred to as the 3-in-1 coconut peeler project. This project has received funding from the MyIS Akar Umbi (MaGRIs) program by the Malaysian Innovation Foundation (YIM).

Under his supervision, a group of students collaborated to develop this innovative product, utilizing recycled materials such as metal pipes, hollow steel, and springs. Specifically, the materials utilized in constructing the tool include a 2-inch black pipe, ½-inch black pipe, 1-inch x 1-inch hollow steel, axle springs, tensional bearings, wire rods, stainless steel plates, 1-inch x ½-inch flat bars, and 7mm thick plates. Figure 1 shows a snapshot of the innovative tool prototype development sketches.

Based on observations of the difficulties involved in peeling coconuts, the innovator has been driven to develop an innovative product that addresses the challenges faced by traders and entrepreneurs in the coconut industry, such as young coconut vendors. The tool offers solutions to several problems, including (1) the ability to peel young coconuts quickly, taking approximately 8 to 10 seconds per coconut; (2) a safer, more ergonomic peeling process that requires minimal human effort; (3) ease of use, particularly for women; and (4) the flexibility to perform the peeling process using either hands or feet. For mature coconuts, the process requires no more than 40 seconds. This innovative tool is also designed to enhance user safety, with ergonomic features that reduce the physical exertion required, making the peeling process more manageable. It is portable and operates without the need for electricity. Weighing seven kilograms, this tool is durable, easy to transport, and designed with safety features in mind. This innovative tool allows the peeling process to be performed using feet or hands, providing a practical, efficient, and suitable solution for everyday needs.

**Figure 1: Some sketches for developing the innovative tool prototype**



In conclusion, the innovative CoCoCut tool is a classic instance of how innovation can promote sustainable practices by using recycled materials to increase production and efficiency in the agriculture industry dramatically. This novel innovation demonstrates creativity and acts as a basis for fostering local economic growth. CoCoCut has the potential to significantly improve Malaysia's agricultural sector globally and help the community in the long run with a clear strategy and ongoing support.

**SWOT Analysis.** Guided by the SWOT framework and informed by the available literature, this study provides

a comprehensive overview of Cococut's strengths, which can help identify its various opportunities for business growth. It also provides a clear understanding of the weaknesses of Cococut to highlight potential threats that relevant stakeholders (consumers, suppliers, competitors and investors) may face in the future. This understanding is essential for navigating the industry's complexities and capitalizing on innovation. Figure 1 presents the SWOT analysis of CoCoCut. The analysis consists of internal and external factors.

***Internal factors.*** Internal factors focus on the strengths and weaknesses of the innovative tool, i.e., CoCoCut. This section highlights the strengths identified in the interview with Mr. X, focusing on the key advantages of the CoCoCut innovation. These strengths demonstrate the product's unique qualities and the positive impact it can have on users and the environment. Recognizing these strengths can help position CoCoCut favorably in the competitive market.

**Figure 2: SWOT analysis of CoCoCut**

| | Helpful to achieve goals | Harmful to achieve goals |
|---|---|---|
| Internal factors | **Strength:**<br>● Innovative product<br>● Collaboration<br>● Safety features<br>● Social impact<br>● Creative and Active Innovator<br>● Environmental impact<br>● Efficiency | **Weakness:**<br>● Cost increase<br>● Limited production capacity and Limited Distribution<br>● Dependency on manual labour |
| External factors | **Opportunity:**<br>● Growing Demand and Market expansion<br>● Partnership<br>● Customer Demand for Customisation and Diversification | **Threat:**<br>● Intense Competition<br>● Economic downturn<br>● Rapid technological advancements |

The first strength is the product's innovation. CoCoCut is a unique 3-in-1 coconut peeler, specifically designed to peel efficiently, slice, and split coconuts. This innovative approach speeds up the processing procedure and enhances safety, making it easier and safer for users to handle coconuts. CoCoCut simplifies the coconut processing experience for users by combining multiple functions into one tool. Another strength lies in Mr. X's collaborative efforts. Mr. X leads a group of supervised students in a cooperative endeavor to create the CoCoCut, showcasing his mentorship and teamwork. This collaboration maximizes their combined abilities and inventiveness, fostering a learning environment that promotes creativity and practical problem-solving. Through this teamwork, the project benefits from diverse perspectives and skills, enhancing the overall quality of the innovation. The third strength is the product's safety features. CoCoCut prioritizes user safety through its durable design and foldable structure. These features give users confidence and peace of mind, knowing they use a well-designed and safe tool for coconut processing. The emphasis on safety protects users and encourages more comprehensive adoption of the product in various settings. The fourth strength is the product's positive environmental impact. The prototype of CoCoCut is made from recycled materials and does not require electricity, thus minimizing its environmental footprint. This eco-friendly approach aligns with sustainable practices and appeals to environmentally conscious consumers. By promoting sustainability, CoCoCut positions itself as a responsible choice in the market. Lastly, the innovation's efficiency is a significant strength for Mr X. CoCoCut enables quick and safe coconut peeling, significantly reducing the time and effort required. This efficiency makes the product highly practical for users, allowing them to complete the task swiftly and with minimal effort. As a result, CoCoCut enhances productivity and improves the overall user

experience.

The following section highlights the weaknesses identified during interviews with Mr. X, emphasizing the challenges that CoCoCut faces at its current stage. Addressing these weaknesses is crucial for the product's growth and sustainability. By recognizing these issues, the company can develop strategies to overcome them and thrive in the market.

One significant weakness is the rising cost of production and materials. Although the CoCoCut prototype utilized recycled materials, transitioning to commercial production has increased expenses due to more costly materials and manufacturing processes. This escalation in costs could render the product less accessible to consumers. Potential customers may seek more affordable alternatives if the price remains high, impacting sales. Another critical weakness, as noted by Mr. X, is the limited production capacity and distribution network.

Mr. X has partnered with a small local manufacturing company, which restricts production to just 30 units. As demand for CoCoCut increases, additional resources will be needed to enhance manufacturing capabilities and expand distribution channels beyond local markets. Without addressing these limitations, the company risks losing market opportunities and customer interest.

The final weakness is the reliance on manual labor. While CoCoCut minimizes the need for manual intervention in coconut processing, it still depends on human operation. This reliance could pose challenges in environments that prioritize full automation, potentially limiting the product's scalability. To remain competitive, CoCoCut may need to explore automation options that can reduce labor dependency and improve efficiency.

*External factors.* This section focuses on external factors, which focus on identifying and evaluating trends and events beyond the control of the social innovator, Mr X. The external assessment aims to develop a finite list of opportunities that could benefit the product and the threat that should be avoided or mitigated (David et al., 2023). Figure 2 illustrates how the external environment fits into the strategic management process. Key opportunities and threats of CoCoCut are described as follows.

The first opportunities are growing demand and market expansion. The product's increasing popularity on social media has attracted orders from regions beyond Bachok Kelantan. The innovator, Mr. X, reported receiving orders from across Malaysia and international interest, particularly from neighboring Brunei. This surge in demand signifies a significant opportunity for market expansion, with the potential to tap into global sales and establish a broader market reach. The second opportunity related to CoCoCut is access to resources and expertise through partnerships. Strategic alliances with distributors or retailers can enhance market penetration and sales while cooperating with businesses can effectively meet increasing demand and expand production capacity. Mr. X's insights provide valuable insights into how partnerships can efficiently tackle growing demand and increase production capacity. Finally, the opportunity for CoCoCut is customer demand for customization and diversification. Offering personalized options and adaptations for CoCoCut is a strategic approach to expanding the customer base. By catering to diverse applications, user preferences, and changing market needs, the innovator can create a versatile and customizable product that appeals to a wide range of customers. Besides that, Mr X could explore diversifying the product line or improving existing features to cater to a broader range of needs within the coconut industry. The innovator's experience and insights are crucial in understanding how product customization can be leveraged to expand the customer base for the 3-in-1 coconut processing tool, CoCoCut.

The first threat of CoCoCut is intense competition. The presence of existing or potential competitors poses a threat to CoCoCut. This competition, whether from similar products or traditional methods, can influence market dynamics and the positioning of coconut processing tools within the agricultural industry. Additionally, interviews indicate that CoCoCut still needs to secure a patent, creating a risk that others could easily replicate the product. The second threat of CoCoCut is the economic downturn. Economic downturns or fluctuations in raw material prices could impact production costs and profitability. According to the innovator, the rising cost of raw materials has put significant pressure on production costs. During the interview, the innovator described the difficulties they have faced due to the significant increase in the price of raw materials such as plastics and metals. Finally, the last threat of CoCoCut is rapid technological advancements. According to the interview,

rapid technological advancement could seriously risk CoCoCut's position in the market. More advanced, effective methods of processing coconuts will eventually make the CoCoCut product outdated. Innovators must closely monitor technology advancements and industry trends to keep CoCoCut competitive and flexible enough to meet shifting market demands.

**Discussion**

This discussion chapter explores the critical strengths and weaknesses identified during interviews with Mr. X regarding CoCoCut's current stage. By addressing these challenges namely rising production costs, limited production capacity, and dependency on manual labor strategies can be developed to ensure CoCoCut's growth and sustainability.

The development of CoCoCut, a multifunctional coconut processing tool, represents a significant advancement in coconut processing technology. The integration of peeling, slicing, and splitting functions into a single device is a novel approach that enhances operational efficiency and addresses common issues associated with traditional methods (Alehosseini et al., 2021; Wang et al., 2021). This innovation aligns with recent trends in the coconut agroindustry supply chain, where there is a growing need for innovative products that can streamline processing and add value to coconut-derived products (Jayasekhar, S., Thomas, 2024). The collaborative effort between Mr X and his students in developing CoCoCut is evidence of the power of teamwork in fostering creativity and innovation. Similar studies have highlighted the importance of collaboration in product development, as it combines diverse expertise and perspectives to overcome complex challenges (Ayodeji et al., 2024). The mentorship aspect of this collaboration is particularly valuable, as it contributes to the professional development of the students involved and promotes a culture of shared learning (Putnam et al., 2024).

One of the critical strengths of CoCoCut is its emphasis on safety through a durable and foldable design (Kusunoki et al., 2024). This feature addresses a critical concern for users and aligns with best practices in product design and user well-being (Sheth et al., 2024; Stray et al., 2024). Recent studies have emphasized the importance of prioritizing safety in product development, as it enhances consumer confidence and reduces the risk of injuries (Awaysheh et al., 2024; Qian et al., 2024). Using recycled materials and eliminating electricity requirements in CoCoCut's design reflects a commitment to environmental sustainability (Elfahmi et al., 2024; Michael et al., 2024). This focus on sustainability is becoming increasingly important in the coconut agroindustry as consumers and regulatory bodies demand more eco-friendly solutions (Elfahmi et al., 2024). By minimizing its ecological footprint, CoCoCut differentiates itself from competitors and appeals to a growing market of eco-conscious consumers.

Finally, the efficiency of CoCoCut in streamlining the coconut peeling process is a significant strength that supports its adoption and long-term success. Recent studies have highlighted the importance of operational efficiency in product development, as it enhances productivity and overall user experience (Ayodeji et al., 2024). By reducing the time and effort required for processing, CoCoCut offers tangible benefits to users, making it an attractive option in the market. CoCoCut's transition from using recycled materials in the prototype to more costly commercial production materials has increased expenses. This issue is common in product scaling, as discussed by (Bohan et al. (2024), who emphasize the need for strategic cost management to maintain affordability and competitiveness. CoCoCut must adopt similar strategies to ensure its price point remains attractive while covering production costs.

Due to CoCoCut's partnership with a small local manufacturer, the limited production capacity and distribution network restricts production to just 30 units. (Tochukwu et al., 2024) Note that limited production capabilities can significantly hinder market penetration and growth. CoCoCut must focus on securing additional resources and partnerships to enhance manufacturing capabilities and reach broader markets. Despite reducing manual intervention in coconut processing, CoCoCut still relies on human operation (Whittle et al., 2024) highlighted that such reliance can limit scalability and efficiency, proposing semi-automation as a transitional strategy. For CoCoCut, exploring automation options to reduce labor dependency and improve operational efficiency will be crucial for maintaining competitiveness and scalability.

CoCoCut's innovative design and collaborative development align with research by Liczmańska-Kopcewicz

(2020) and Wagner (2024). However, CoCoCut faces unique challenges related to rising production costs, limited production capacity, and reliance on manual labor. Liczmańska-Kopcewicz (2020) and Oloruntosin and Vincent (2024) emphasized that addressing practical limitations and operational challenges is essential for sustained growth. CoCoCut must adopt a strategic approach to overcome these challenges while leveraging its innovative strengths.

As previously stated, external factors refer to identifying and evaluating trends and events beyond the innovator's control. The objective of the external assessment is to develop a list of opportunities that could benefit the product and identify threats that should be avoided or minimized. This section discusses future strategies and directions for the innovator to capture the opportunities and mitigate threats for CoCoCut.

Based on the findings, several potential opportunities could benefit CoCoCut's business prospects. As the product has been receiving local and international orders, the growing demand for CoCoCut creates opportunities for market expansion. The innovator should take these opportunities to market and showcase the unique features and benefits of CoCoCut to reach diverse audiences by utilizing social media platforms for marketing. Findings from previous studies reported the effective use of social media to promote agricultural-related products enhances the product's overall success in diverse markets (Al-Shaikh, Al-Gharagher & Alshohaib, 2023; Saikia, Kumari & Choudhary, 2021; Karle & Mishra, 2022). With the right strategies, innovators can leverage social media to achieve sustainable growth, enhance their market presence and achieve long-term product success by selecting the right social media channel.

Moreover, since Mr. X is actively involved in local and international innovation and invention competitions, he should capitalize on this opportunity to promote and find strategic alliances to improve the production of CoCoCut. These competitions often attract industry leaders, investors, and potential collaborators who can contribute to the product's development and market reach. To maximize these opportunities, Mr. X should join the International Coconut Community (ICC), which operates under the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) based in Jakarta, Indonesia. The ICC provides a robust platform for promoting products, allowing Mr X to present CoCoCut to a broader audience and establish links with key industry participants. Interacting with the ICC can help access valuable resources and collaborations crucial for promoting innovation and expanding the market presence of his product. Research has shown that networking and forming strategic alliances can increase market penetration and expand production capacity (Fieldsend, Varga, Biró, Von Münchhausen & Häring, 2022).

The paper also highlights the opportunity for CoCoCut related to customer demand for customization and diversification. For example, CoCoCut can capitalize on the growing customer demand for specialized and diverse products by diversifying its offerings to appeal to a wider customer base. By catering to diverse applications, user preferences, and changing market needs, the innovator can create a versatile and customizable product that appeals to a wide range of customers. This finding is supported by Rismanto and Latif, (2024) that customization will likely lead to increased customer retention and market share. The opportunity to offer customization and diversification is critical for CoCoCut's growth strategy and to differentiate itself from competitors. Mr. X's background and experience will help him to create versatile products that appeal to customers by focusing on personalized options and flexible product design. Moreover, Mr X can implement a modular design approach, enabling customers to select features or components that suit their specific needs and requirements. This unique selling proposition can attract and retain new customers, as consumers will likely choose brands that acknowledge and cater to their specific needs.

Based on the findings, the innovator needs to address several threats to maintain a competitive edge in the market. The primary threat facing CoCoCut is the presence of existing and potential competitors. To mitigate this risk, it is highly recommended that the innovator pursue patent registration. Prior research has demonstrated that obtaining a patent is an essential and crucial stage in the innovation process (Argente, Baslandze, Hanley & Moreira, 2020). This legal protection will safeguard the product from being replicated by competitors, preserving its unique market position.

The next threat of CoCoCut is the economic downturn, which has put significant pressure on production costs and profitability. Rising raw materials costs present significant challenges for the CoCoCut. Several strategies

can be adopted by the innovator to mitigate this issue such as diversification of suppliers, incorporating sustainable practices and embracing new technologies that can improve production efficiency and reduce waste (Wilson, 2024) to overcome the threats and maintain competitiveness in an increasingly volatile environment. It cannot only withstand the pressures of cost increases but can thrive in a competitive marketplace.

Rapid technological advancement could seriously risk this product's position in the market. Due to rapid technological development and more diversified customer needs, the innovator may no longer dominate the market with their innovation. To adapt to the technological advancement and rapid changes in the market, the innovator has to capitalize not only on internal expertise but also from outside through technological exploration, which refers to a practice that enables firms to acquire new knowledge and technologies from outside through customer involvement, external networking, external participation and through R&D (Varadarajan, 2009; Lee, Cha & Park, 2016).

Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis is essential matching tools that help the innovator develop four types of strategies: ST (strengths-opportunities) strategies, WO (weaknesses-threats) strategies, ST (strengths-threats) strategies and WT (weaknesses-threats) strategies (David et al., 2023). By considering these factors, the innovator can better understand the strengths and weaknesses of CoCoCut, identify growth opportunities, and mitigate potential threats to the product's success.

## 5. Managerial Implications and Recommendations

The development and use of this innovative tool present several significant economic impacts. This innovative tool contributes to increased productivity by enabling the coconut peeling process to be carried out more quickly and efficiently, reducing the time required to peel each coconut to just eight to ten seconds. This enhancement in productivity allows small traders and entrepreneurs in the coconut industry to process more coconuts in a shorter period, ultimately boosting their output. By reducing the time and effort needed for coconut peeling, this tool helps traders lower operational costs, including labor expenses. Subsequently, the tool offers substantial cost savings. Moreover, the tool operates without the need for an electrical power supply, further decreasing energy costs. Consequently, this can lead to significant savings in both operational and labor costs.

The effectiveness of the tool also has the potential to create new business opportunities. Its production can generate employment in the manufacturing, marketing, and distribution sectors. Traders can also offer coconut peeling as an additional service using this tool, further expanding their business offerings. Overall, the adoption of this innovative tool, i.e., CoCoCut, can positively impact the economy by driving efficiency, reducing costs, and improving product quality. The tool has progressed from the conceptual stage to the testing stage, undergone rigorous testing, and received positive feedback from users and local stakeholders. It is recommended that this tool for expanding the distribution network through strategic partnerships with industry and trade entities be crucial for broadening global market penetration.

## Conclusion

In conclusion, the development of this innovative tool, i.e., CoCoCut, significantly aids and simplifies the operations of farmers, entrepreneurs, and coconut processors in the peeling of both mature and young coconuts, making the process more effective and efficient while reducing the need for manual labor. With the introduction of CoConut, stakeholders can optimize productivity and improve outcomes without spending excessive time or resources. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis is essential matching tools that help the innovator develop four types of strategies: ST (strengths-opportunities) strategies, WO (weaknesses-threats) strategies, ST (strengths-threats) strategies and WT (weaknesses-threats) strategies (David et al., 2023). By considering these factors, the innovator can better understand the strengths and weaknesses of CoCoCut, identify growth opportunities, and mitigate potential threats to the product's success. It also demonstrates the substantial potential for market success.

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