

THE IMPACT OF SKILLS, EDUCATION, AND TECHNOLOGY MASTERY ON ECONOMIC GROWTH: A CASE STUDY OF COCONUT WASTE MANAGEMENT IN INDONESIA

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ABSTRACT

This study investigates the impact of skills, education, and technology mastery on economic growth, focusing on the niche sector of coconut waste management in Kecamatan Kota Agung, Kabupaten Tanggamus, Indonesia. Utilizing a quantitative research design, the study employs multiple linear regression analysis to examine how these factors influence economic outcomes. The results indicate that skills and technology mastery have a significant positive impact on economic growth, as evidenced by increased productivity, income levels, and employment opportunities. In contrast, education did not show a direct significant effect on economic growth in this context. These findings highlight the critical role of practical skills and technological proficiency in driving economic development within specialized sectors.

The study suggests that targeted interventions, such as vocational training and technology transfer initiatives, are essential for enhancing local economic development and maximizing the potential of niche industries. The implications for policymakers include focusing on practical skill development and technology adoption to foster innovation and growth in similar contexts.

Keywords: *Economic Growth, Skills, Education, Technology Mastery, Coconut Waste Management, Indonesia, Vocational Training, Technology Transfer, Niche Sectors*

Introduction

The economic growth of emerging nations is a complex occurrence that is impacted by multiple elements, such as the improvement of human resources, technology advancements, and specialised expertise in specific sectors (Wirajing et al., 2023) (Wu & Pan, 2023) (Mawutor et al., 2023). Indonesia's sustainable economic development is now closely tied to its capacity to leverage its creative economy and incorporate technical breakthroughs in several sectors (Hidayat & Asmara, 2017; Indrawati & Kuncoro, 2021; Setiawan, 2018). Of all these factors, the handling of coconut waste offers a distinct chance to investigate how these components come together to stimulate economic advancement in nearby areas.

Coconut trash, commonly considered a byproduct of agricultural activity, can be converted into useful items using innovative methods. However, the level to which local economies may gain advantages from these chances depends on the skill level of the population, the quality of education provided, and the level of technological expertise (Barusman et al., 2020; Gaffney et al., 2019; Gardner, 1994; Haggblade et al., 2010; Raras et al., 2024). These characteristics jointly impact the ability of individuals and groups to generate new ideas, adjust to changing market needs, and contribute to the expansion of the economy.

Although earlier research has examined the general connection between skills, education, and technology in promoting economic growth, there is a significant lack of information in the literature regarding their specific influence in specialised areas such as coconut waste management (Barusman, 2018; Dos Santos, 2019). The potential of the sector to contribute to economic growth at the local and national levels in Indonesia has not been thoroughly investigated, especially in rural areas where economic activities are typically restricted and largely reliant on traditional methods (Nurdy F. L. et al., 2021; Purba & Saleh, 2018; Sapar et al., 2019).

This study aims to fill this void by specifically examining Kecamatan Kota Agung, Kabupaten Tanggamus, an area known for its substantial coconut production and the resulting trash output. This research

intends to provide a comprehensive understanding of the factors that drive economic growth in coconut waste management, specifically focussing on the mastery of skills, level of education, and application of technology. By analysing these aspects, the study seeks to uncover the intricate mechanisms at work in this field (Nurdy F. L. et al., 2021; Omar & Fatah, 2021). Furthermore, the research will determine tactics that can be utilised to improve local economic growth, therefore providing practical knowledge for policymakers and stakeholders that are interested in utilising specialised industries for wider economic advantages (Falihatdoost & Wang, 2022).

This research enhances the current knowledge by investigating the convergence of skills, education, and technology in the context of managing coconut waste in Indonesia. By implementing this approach, it emphasises the significance of sector-specific strategies in attaining sustainable economic growth and offers a structure for duplicating effective methods in comparable regions (Nurdy F. L. et al., 2021; Sapar et al., 2019; Wulandari & Alouw, 2021).

Methodology

This study employs a quantitative research approach and utilises multiple linear regression analysis to investigate the connections between skills, education, technology mastery, and economic growth. The selection of this research design is driven by the necessity to measure the influence of each independent variable and to establish a strong structure for evaluating the hypotheses of the investigation (Al-Khateeb et al., 2007; Odhiambo, 2021). The study seeks to utilise multiple linear regression to determine the significance and strength of the connections, providing significant insights into the processes that impact economic growth in the context of coconut waste management.

The study was carried out in Kecamatan Kota Agung, Kabupaten Tanggamus, with a sample size of 97 respondents who are actively involved in the management of coconut waste. The data was gathered using standardised questionnaires specifically created to evaluate the skill levels, educational backgrounds, and proficiency in key technologies of the respondents (Omar & Fatah, 2021; Wulandari & Alouw, 2021). The questionnaires were meticulously designed to capture the subtle distinctions of each variable, guaranteeing that the obtained data would be thorough and pertinent to the study's goals. The study examined economic growth, which is the variable that depends on other factors, by utilising a variety of indicators such as income levels, employment opportunities, and productivity measurements. The selection of these variables was based on their importance in accurately portraying the economic impact of coconut waste management on the local population (Kalavathi et al., 2020; Omar & Fatah, 2021).

After gathering the data, it underwent multiple linear regression analysis to ascertain the connections between the independent factors (skills, education, and technology mastery) and the dependent variable (economic growth). This analysis was conducted using statistical software to ensure the correctness and reliability of the results. This study aims to gain a comprehensive understanding of the impact of skills, education, and technology proficiency on economic growth, specifically in the context of managing coconut waste in Kecamatan Kota Agung.

Result and Discussion

The descriptive statistics offer a comprehensive overview of the respondents' levels of skills, education, and technology mastery, as well as the key economic indicators within the coconut waste management sector in Kecamatan Kota Agung, Kabupaten Tanggamus. The analysis revealed that a significant proportion of the respondents possessed moderate to high levels of skills and technology mastery. This indicates their capability to engage effectively in and contribute to the sector's activities, a finding that is consistent with previous studies that highlight the importance of human resource development and technology integration in economic growth (Mawutor et al., 2023; Wirajing et al., 2023; Wu & Pan, 2021).

However, educational attainment among respondents showed considerable variation, ranging from primary education to higher education levels. This disparity suggests that while education is crucial, it may not be uniformly accessible or prioritized in this region, echoing the challenges identified by Gaffney et al. (2019) regarding educational quality in rural areas.

Economic indicators such as income levels, employment opportunities, and productivity showed positive trends, reflecting the sector's growing contribution to the local economy. Specifically, there was a noticeable increase in income levels among respondents, likely attributable to the value-added processes involved in coconut waste management, a key factor highlighted by Indrawati & Kuncoro (2021) and Setiawan (2018) in their studies on sustainable economic development.

a. Regression Analysis

The regression analysis was conducted to quantify the impact of skills, education, and technology mastery on economic growth within the coconut waste management sector. The results indicated that both skills and technology mastery exerted a statistically significant positive influence on economic growth, as evidenced by their respective coefficients and p-values. Specifically, the skills variable exhibited a coefficient of 0.45 ($p = 0.0002$), indicating that an increase in skill levels is strongly associated with enhanced economic outcomes, consistent with findings by Hidayat & Asmara (2017). Similarly, technology mastery demonstrated a coefficient of 0.38 ($p = 0.001$), underscoring its critical role in driving productivity and innovation within the sector, as discussed by Nordy F. L. et al. (2021).

In contrast, education, while essential for foundational knowledge, did not show a statistically significant direct effect on economic growth in this context, with a coefficient of 0.15 ($p = 0.137$). This finding aligns with the observations of Dos Santos (2019), who noted that in certain sectors, practical skills and technology application may play a more crucial role than formal education in driving economic growth.

Table 1: Regression Analysis of the Impact of Skills, Education, and Technology Mastery on Economic Growth in the Coconut Waste Management Sector

Variable	Coefficient	Standard Error	t-Value	p-Value
Skills	0.45	0.12	3.75	0.0002
Education	0.15	0.10	1.50	0.137
Technology Mastery	0.38	0.11	3.45	0.001

b. Discussion

The results of this study underscore the critical importance of practical skills and technology mastery in driving economic growth within the niche sector of coconut waste management. The significant positive impact of skills and technology mastery on economic growth aligns with existing literature that highlights the role of hands-on experience and technological proficiency in enhancing productivity, fostering innovation, and creating employment opportunities (Gaffney et al., 2019; Gardner, 1994). The ability to apply technology effectively not only increases efficiency in waste management practices but also opens up new avenues for value-added products, thereby boosting income levels and contributing to broader economic development.

The lack of a significant direct effect of education on economic growth in this context may be attributed to the specific nature of the coconut waste management sector. Unlike other industries where formal education is necessary for technical knowledge, this sector relies more heavily on practical, job-specific skills and the ability to adapt and innovate using available technologies (Haggblade et al., 2010). This finding suggests that while education lays the groundwork for learning, it is the practical application of skills and technology that ultimately drives economic outcomes in this sector.

These insights have important implications for policymakers and development practitioners aiming to enhance the economic potential of niche sectors like coconut waste management. There is a clear need for targeted interventions that focus on improving skills and technology mastery among local communities, as recommended by Nordy F. L. et al. (2021). This could involve the implementation of vocational training programs tailored to the specific needs of the sector, technology transfer initiatives to facilitate the adoption of modern practices, and support for innovation through resources and incentives for entrepreneurial activities (Purba & Saleh, 2018; Sapar et al., 2019).

By concentrating on these areas, policymakers can help unlock the economic potential of coconut waste management, contributing to the overall development of rural areas in Indonesia. Furthermore, the study highlights the broader relevance of skills and technology mastery in driving economic growth in other niche sectors, suggesting that similar strategies could be applied to enhance economic outcomes in different contexts (Falahatdoost & Wang, 2022; Wulandari & Alouw, 2021).

Conclusion

This study demonstrates the significant impact of skills and technology mastery on economic growth in the context of coconut waste management in Kecamatan Kota Agung, Kabupaten Tanggamus. While education provides a necessary foundation, it is the practical application of skills and technology that drives economic outcomes. These findings underscore the importance of targeted interventions to enhance skills and technology

proficiency in local communities. Future research should explore the long-term impacts of such interventions and investigate other niche sectors to provide a comprehensive understanding of the factors driving economic growth in developing countries.

By addressing the gap in the literature, this study contributes to the broader discourse on economic development and provides actionable insights for policymakers and practitioners. Enhancing skills and technology mastery can unlock new economic opportunities, drive innovation, and improve the well-being of local communities, thereby fostering sustainable economic growth.

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