



## Digital-Based Educational Strategies For Msmes In Border Areas To Implement A Green Economy

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### ABSTRACT

This research aims to describe effective educational strategies for digital-based MSMEs (Micro, Small, and Medium Enterprises) to implement a green economy in the border areas. The methodology used is a qualitative-descriptive approach. Data sources were collected through interviews employing 8 informants from 4 clusters of SMEs in the border areas. Data analysis was conducted through the processes of reduction, presentation, and conclusion drawing. It reveals the issues faced by SMEs in enhancing their knowledge, perceptions, and behaviors towards the green economy. The summarized data is then validated through FGD (Focus Group Discussion) activities based on PBL (Problem-Based Learning) involving all the informants. This PBL-based FGD process yields educational strategies aimed at developing digital technology-based literacy for the implementation of a green economy by SMEs in border areas.

### INTRODUCTION

The issue has triggered economic actors globally to increase awareness of implementing sustainable economies by prioritizing environmental sustainability, specifically the concept of a green economy in both business and industrial environments (Firmansyah, 2022). The practice of implementing a green economy can also be observed in border areas, which are often regions with deforestation issues and remain prone to illegal logging (Mamiloto, 2017). Not only in industrial environments, but the green economy is also developing in the tourism business sector with the goal of achieving environmentally friendly development (Multika Sari et al., 2014). The future will see the development of digital-based green economy integration in the digital models of modern socio-economic systems. This phenomenon supports the efficiency of information and mechanisms in learning and implementing digital-based green development (Karataev et al., 2020). The development of a digital-based green economy is expected to increase the efficiency of the green economy's implementation (Qiang et al., 2022).

One of the crucial steps in promoting a green economy is to involve economic and business actors, whether on a large or small scale such as Small and Medium Enterprises (SMEs) and to understand and apply the principles of a green economy. With the continuous growth of SMEs providing opportunities for economic development, this sector becomes an important indicator of Indonesia's economic health, especially in the development of a green economy (Windusancono, 2021).

Findings from research conducted by Rizka Zulfikar and Prihatini Ade Mayvita indicate that environmental knowledge significantly influences how small and medium-sized enterprises (SMEs) perceive and implement the concept of a green economy (Zulfikar et al., 2019). The study found that the views held by SMEs have a substantial impact on their actions in applying green economy concepts. Previous research analyzing the level of environmental understanding, perceptions, and behaviors of SMEs in border areas in implementing the green economy showed that SMEs in these regions have a basic level of understanding and knowledge about protecting their surrounding environment. This knowledge is influenced by cultural factors, media information, careers, and efforts to apply green economic principles. Business actors tend to consider the environmental impact of the products generated by their enterprises. SMEs are likely to act responsibly towards their environment and encourage the understanding and application of green economic principles among other SMEs in border areas. The understanding gained about the green economy is often derived from other SMEs, where the information obtained frequently does not align with the issues experienced by some SMEs in implementing the green economy in border areas (Atlantika et al., 2023). The current phenomenon also shows that an educational process regarding life is driven by the development of digital information in everyday life. The learning process embraces digital competence, digital mastery, and a sustainable digital mindset (Martzoukou et al., 2020). This research focuses on the educational strategies of SMEs in border areas in implementing the green economy. It is anticipated that this research will yield an effective educational strategy for implementing a green economy among SMEs in border areas

## LITERATURE REVIEW

### Green Economy

Research indicates that Europe and Asia are at the forefront of developing and implementing green economic policies. Many studies focusing on China and the United Kingdom highlight their significant contributions to green finance and sustainability practices. Additionally, emerging economies such as India, Cambodia, and Laos are increasingly being studied for their green economy initiatives (Zhu et al., 2023).

The green economy plays a crucial role in achieving the Sustainable Development Goals (SDGs). Policies that support the use of renewable energy, efficient resource management, and the reduction of environmental pollution are essential. The transition to a green economy aims to replace fossil fuels with renewable energy, thereby addressing economic and environmental challenges simultaneously (Mudalige, 2023). The green economy offers various benefits, including the creation of new product markets, improved efficiency in the use of natural resources, and providing solutions to energy problems. By replacing fossil fuels with green energy, the green economy can reduce the negative impacts of fossil fuel dependency and enhance energy resilience in developing countries (Wardana, 2023).

According to Aswir & Misbah (2018), the utilization of green economy as a short-term and long-term strategy aims to improve the social welfare of the community. In the green economy sector, there is a shift in the economic structure that pays more attention to social aspects and sustainable economic development. Additionally, the green economy does not only focus on the extractive sector but also expands into the processing and services sectors. Green development

is expected to contribute to the green economy as a strategy for global economic recovery in both developed and developing countries (Grubler et al., 2018).

### **Micro, Small, and Medium Enterprises (MSMEs)**

Currently, economic developments indicate that establishing micro, small, and medium enterprises (MSMEs) is an important economic strategy. In the modern era, MSMEs play a crucial role in supporting the national economic recovery process, especially during crisis situations (Atlantika et al., 2023). MSMEs have proven to be a robust sector in labor development, creating numerous job opportunities, actively participating in the training and development of new entrepreneurs, revitalizing the economy, and enhancing collaboration between MSMEs and large companies to face competition (Puspitasari & Astrini, 2021). Additionally, they improve the behavioral capabilities of business actors as part of their industrial environment (Atlantika et al., 2022).

In addition to emphasizing workforce development, SMEs also contribute to shaping the investment climate and funding system in Indonesia. Special loan facilities for SMEs facilitate investment and ensure the sustainability of their businesses. This substantial support helps SMEs manage their capital and finances more efficiently. As a result, SMEs can develop into economically strong organizations, enabling them to expand operations in the future while considering competition at both national and global levels. (Kim et al., 2024).

### **Digital-Based Education Strategies**

The initial approach to green economy education involves assessing comprehension, perceptions, and knowledge of the green economy. Previous research conducted by Atlantika et al. (2023) provides insights into the knowledge, perceptions, and behaviors of business actors in West Kalimantan, Indonesia, in implementing the green economy. Digital-based education has a significant impact on effective models for organizing various human activities involving technology (Fitria & Indra, 2020). In this increasingly advanced world, technology continues to undergo disruption to meet human needs. Applications have become some of the most widely used and easily accessible tools through digital platforms. Digital platforms represent a visual component of the Internet, structured similarly to multimedia magazine pages featuring text, images, and videos (Andriano, 2021). Social media has now become a widely used communication tool among the current generation. Platforms such as WhatsApp, Facebook, Instagram, YouTube, and TikTok are frequently utilized. Social media, integrated into modern life, holds great potential to be utilized as an alternative learning platform that is appealing to the current generation (Herdiyani et al., 2022).

Digital learning platforms play a crucial and strategic role in today's digital landscape. These platforms, which utilize machinery or technology, strategically apply knowledge to enhance the learning process. They can take the form of electronic media or internet-based learning devices. Over time, platform-based education has evolved into a strategy for improving digital literacy (Fitri et al., 2023), enhancing decision-making effectiveness within the economic sphere, and facilitating business communication (Oktaviani & Pratiwi, 2022). Additionally, it encourages attention and orientation towards the development of global issues, including advancements in the green economy (Kartika Nuringsih et al., 2022).

## **METHODS**

This research was conducted using a qualitative research method, with data sources obtained through observation, literature study, questionnaires, and in-depth interviews with respondents from four clusters of MSMEs in the border region. The MSME clusters include agriculture, livestock, services, and culinary. The technique for selecting respondents was based on purposive sampling from each MSME cluster, with criteria for MSMEs located in Bengkayang

Regency, West Kalimantan. The initial data obtained was then reconfirmed with all MSME clusters involved in a Problem-Based Learning (PBL) Focus Group Discussion (FGD). The PBL-based Focus Group Discussion (FGD) was conducted to confirm the data already gathered through the previous processes (Suhono & Al Fatta, 2021). A list of respondents who served as informants in this study is presented in Table 1 below.

**Table 1 Research Respondents**

No	Informant Code	MSME Cluster	Interview Date
1	P1	Agriculture and Corn Plantations	2024-06-03
2	P2	Agriculture and Palm Oil Plantations	2024-05-31
3	PR1	Farming	2024-06-18
4	PR2	Farming	2024-06-18
5	J	Services	2024-04-29
6	KR	Culinary	2024-05-14
7	KN	Confectionery	2024-05-24
8	P3	Agriculture and Vegetable Plantations	2024-06-04

Source: Data Processed, 2024

This research follows up on previous studies focusing on the knowledge, perceptions, and behaviors of MSMEs regarding the green economy in border areas (Atlantika et al., 2023). The focus of this study is on educational strategies for MSMEs in implementing the green economy in border regions, employing a problem exploration process and data collection methods that differ from previous research. The initial data collection involved observations, literature reviews, questionnaires, and in-depth interviews. Subsequently, the obtained data will be further confirmed through Focus Group Discussions (FGD) based on Problem-Based Learning (PBL). After the initial data is validated for authenticity through the FGD as a triangulation technique, the subsequent processes include data reduction, data presentation, and conclusion drawing (Sekaran & Bougie, 2016).

## RESULTS

The development of border areas in Bengkayang Regency plays a significant role in empowering MSMEs (Micro, Small, and Medium Enterprises), as the regency hosts 5,701 active MSME actors. This environment facilitates socio-economic exchanges, including currency, raw materials, market share, and infrastructure (Budiaman & Herkulana, 2021). With the growth of MSME actors and supported by geographical advantages, Bengkayang Regency possesses the potential for the development of innovative MSMEs, including the implementation of a green economy.

### Knowledge, Perception, And Behavior Of Smes Regarding The Green Economy

The results indicate that micro, small, and medium enterprises (MSMEs) in border areas are contributing to the green economy by transforming unsellable products into useful goods. This phenomenon is expressed by informant P1, who stated that: "The concept of a green economy is more commonly understood by us in the local community as waste recycling. For a long time, I have often utilized waste from corn harvests as fertilizer; in fact, corn waste can also be used as a substrate for cultivating edible mushrooms. Additionally, it is undeniable that corn husks can be processed into herbal tea. We are aware that there is currently a phenomenon of environmental issues arising in our region."

The opinion of informant P1 is also supported by informant P2, who expressed that: "This seems to have become a part of the local culture. For instance, animal waste is utilized as

manure, while household consumption leftovers are repurposed as feed for catfish or tilapia, which are later sold back to consumers. There may also be local entrepreneurs who resell shrimp shells to be converted into charcoal."

The phenomenon experienced by informants P1 and P2 is also corroborated by informant KN, who stated that: "Since 2021, I have indeed focused on this area, although I have not fully implemented it yet. I also began processing the waste generated from my garment production into other products. For example, fabric remnants are reused again into door matting. Additionally, I provide eco-friendly packaging that can be reused for each product I sell. Although production costs have increased, it is a trend that we must inevitably follow."

Based on the information presented by both informants, it is evident that knowledge of the green economy is initially driven by culture, the social life of the community, and the impact of environmental issues occurring in the surrounding area. Previous research indicates that environmental management grounded in cultural values can serve as a competitive advantage (Hendriyana et al., 2020). Furthermore, the green economy has developed into an urgent necessity for realizing an economy based on sustainable development, propelled by environmental quality that is intertwined with economic activities and the social life of the community (Hasibuan, 2024). Informant J, who operates a traditional clothing rental business, stated that: "Indeed, one of the most challenging aspects is obtaining the necessary materials. Therefore, considering this difficulty, I must be more creative in seeking alternative materials. In this context, digital information media play a significant role, as they provide me with information about substitute materials that can be utilized."

Different statements were expressed by informants PR1, PR2, and P3 regarding the reprocessing of production waste. The digitally based knowledge acquired essentially serves as supplementary information, yet it remains grounded in experience. Informant KR stated that: "I have read several news articles on social media regarding industrial waste processing in the food industry as a form of long-term economic behavior. So far, in my experience, I have primarily processed vegetable waste and fruit peels into compost."

The informants in the study believe that digital experience and information, as components of collaboration, play a crucial role in implementing the processing of generated industrial waste. Experience is vital in developing knowledge that influences an individual's readiness to utilize previously learned information to enhance creativity (Rahmi & Hapsari, 2021). The initial data processing results regarding informants' knowledge of digital-based green economy are based on several factors: environmental issues, digital information, social community, and culture.

Based on the initial data set from the interview process regarding the informants' perceptions of green economy implementation, it is illustrated that the form of perception in implementing the green economy involves producing new products from used materials, which subsequently hold economic value. This phenomenon is exemplified by informant KN, who stated that: "Often, during clothing production, leftover fabric remains, which I reuse into door mats, masks, aprons, gloves, and booties for babies. Additionally, I provide consumers with environmentally friendly packaging."

Agreeing with informants KN, informants P1, P2, and P3. Informant P1 stated that: "I personally, after implementing waste management thus far, have driven by necessity. In practice, I have indeed utilized electronic/digital media, but this has only been recent"

In line with this, informant P2 stated that: "I utilize agricultural harvest waste for producing liquid compost, which I then sell to other farmers. Therefore, I only sell it when there is demand; otherwise, I use it for my own purposes."

A similar opinion was expressed by informant P3, stating that: "Based on the experience of processing agricultural waste into useful products such as fertilizers and growing media, I learned about using corn cob waste as a growing medium for edible mushrooms. I acquired this knowledge through YouTube."

The informants' opinions reveal that perceptions of the green economy are formed from knowledge gained through experience, combined with information obtained from the surrounding environment and electronic or digital media. Additionally, informant PR1 stated that: "I have the perspective that a green economy is easy and cost-effective to implement in my business. Therefore, livestock waste can be transformed into other useful products quickly, easily, and affordably."

The statement from informant PR1 was also expressed by informant PR2, who stated that: "I find that the livestock waste management I carry out, specifically composting, is indeed easy. This process is simple, cost-effective, and does not require a long time."

Not only in livestock farming but also in the culinary business conducted by Informant KR, who stated that: "The processing has been straightforward, and the result can be used to create liquid fertilizer for the herbs I grow around my house, so I actually experience the benefits firsthand."

Based on the interview excerpt above, informants PR1 and PR2 describe that the perception of the green economy developed within livestock farming often leads informants to primarily focus on waste processing from the livestock. However, a different phenomenon is expressed by informant J, who states that: "Based on what I know about green economy, it is not inexpensive. I have to source materials from other regions because the production materials are difficult to obtain, resulting in higher production costs."

Based on the informants' statements regarding MSMEs' perceptions of the green economy in border areas, several factors influencing these perceptions can be identified. The informants perceive that the green economy leads to the creation of new products that add value, increases production costs, raises product selling prices, and meets the needs of business actors. However, some informants believe that the implementation of the green economy can be achieved at low costs, quickly, and simply.

Based on initial data regarding the green economy behavior of MSMEs in border areas, it illustrates that business actors are required to produce and utilize environmentally friendly products. Informant KR stated that: "Initially, I started by producing processed fertilizer from the production waste of my business, which consists of leftover vegetable and fruit materials. I use this for cultivating herbs around my area. Therefore, the chili harvest is reused in the food production that I sell."

In line with the opinion of informant KR, informant P1 stated that: "In the processing of agricultural waste, I often utilize the leftover harvest as compost and solid fertilizer. I also use corn cobs as a growing medium for edible mushrooms. Additionally, the corn husks are processed into herbal tea."

In the agricultural endeavors conducted by informants P2 and P3, a similar phenomenon is also revealed. Informant P2 stated that: "So, I first assess the type of waste. The cassava leaves or taro leaves that I use for feeding catfish or tilapia. The palm oil waste is directly utilized as fertilizer."

In line with informants P1 and P2, informant P3 stated that: "I create a space for composting and then separate solid and liquid outputs. I often use the liquid by-products for fast-growing crops such as chili, tomatoes, and bell peppers. Meanwhile, I use the solid fertilizer for eggplants, guava, and cucumbers."

Another phenomenon regarding green economy behavior in livestock enterprises is that business actors are more focused on processing the livestock waste produced. Informant PR1 stated that: "Sometimes consumers purchase directly without it being processed into compost. I personally use the processed results for my own plants. If anyone wants to buy it, I can also provide it."

In line with informant PR1, a similar sentiment was expressed by informant PR2, who stated: "I keep it simple, like composting. Although I am aware that there are many methods for processing livestock waste beyond just composting. There have also been instances where

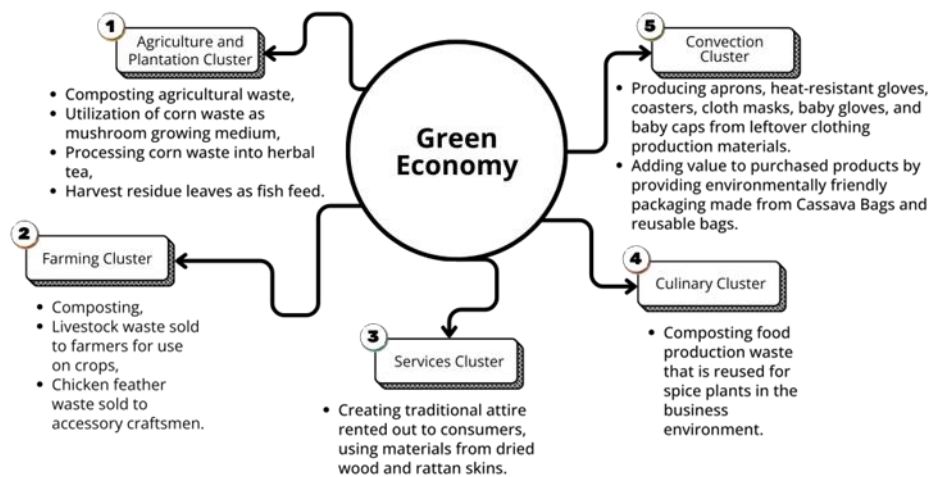
leftover chicken feathers were purchased by consumers to be reused in creating other products, such as clothing accessories."

Regarding the utilization and use of natural materials and industrial waste in clothing, informant J stated: "I have indeed used materials such as dried bark, rattan, and animal fur to create traditional clothing products. For other production leftovers like fabric scraps, beads, or dried bark, I process them into small accessories if they can still be repurposed."

The phenomenon of repurposing clothing production materials by informant J is also practiced by informant KN. Informant KN stated that: "The leftover fabric from clothing production is usually turned into household products, such as aprons, heat-resistant gloves, doormats, masks, and even gloves and hats for babies. Indeed, I have been using environmentally friendly products, such as packaging made from cassava bags and reusable bags."

The results of the initial data processing on informants regarding the behavior of green economy implementation, which arises from digital knowledge-based motivations and perceptions held about the green economy. This phenomenon is illustrated in Figure 1.

**Figure 1 Green Economy Behavior**



Source: Data Processed, 2024

Based on the initial data analysis regarding the knowledge, perspectives, and behaviors of MSMEs (Micro, Small, and Medium Enterprises) in responding to the green economy, several issues faced by MSMEs in the process of enhancing knowledge, perceptions, and behaviors related to a digital-based green economy in border areas have been identified. The issues encountered by MSMEs include:

1. The unpreparedness of MSMEs in border areas to adapt to digital developments, as the focus of MSME actors remains on the implementation of a simple, fast, and cost-effective green economy.
2. MSME actors still closely adhere to the social culture present in their communities, leading some entrepreneurs to struggle in fully integrating digital information with local culture when implementing the green economy.
3. Insufficient literacy regarding the utilization of digital information, which hinders the ability of some MSME actors in border areas to effectively use, seek, and manage digital information related to the implementation of the green economy.
4. Difficulties in implementing the digital information they possess concerning the green economy.

5. The utilization of digital information is limited to a small number of MSME actors in adopting developments in the implementation of the green economy within their businesses.

The issues identified were derived from interviews with informants and subsequently validated through focus group discussions (FGD) based on problem-based learning (PBL).

### **Digital-Based MSME Education Strategies In Border Areas For Implementing Green Economy**

The results of data identification obtained through interviews illustrate the issues faced by SMEs in border areas related to the green economy. The identified problems were subsequently validated through focus group discussions (FGDs) using problem-based learning (PBL) methods with all informants. Several strategic developments were formulated based on the emerging issues, aimed at enhancing digital-based green economy literacy for SMEs in border regions, including:

1. Standardizing perceptions regarding the depth of literacy and information related to the use of electronic digital media for knowledge in implementing the green economy.
2. Enhancing digital-based insights related to the development of green economy implementation with a local wisdom approach for SMEs in border areas.
3. Improving digital information management literacy concerning the implementation of the green economy in border regions.
4. Aiding assistance in the skills of using digital information media for SMEs related to the development of the green economy.
5. Planning concrete actions in a workshop activity with local government or relevant agencies regarding the implementation of the green economy by SMEs in border areas.
6. Planning follow-up actions, particularly in utilizing information systems for SMEs in border regions, with the aim of expanding and enhancing literacy regarding the implementation of sustainable economic concepts based on digital technology in border areas.

### **DISCUSSION**

The knowledge possessed by small and medium-sized enterprises (SMEs) regarding the implementation of a green economy will foster perceptions and behaviors aligned with green economy principles in their operations. Furthermore, this knowledge is a combination of experience and information obtained from rapidly evolving digital media. The phenomenon observed in this study illustrates strategies for digital-based education in implementing a green economy.

Consistent with previous research, the behaviors that emerge to implement a green economy within their businesses are driven by the knowledge acquired. This knowledge is gained through self-directed learning processes that indirectly alter perceptions of the importance of running businesses grounded in environmental sustainability (Atlantika et al., 2023). By integrating experiential learning methods with digital multimedia, individual understanding of the subject matter is enhanced; this approach also serves as an effective learning strategy in the era of Industry 5.0 (Musyafak & Subhi, 2023).

### **CONCLUSION**

Based on the discussion results, it can be shown that MSME actors possess knowledge that shapes their perceptions and behaviors in implementing a green economy within their ongoing business environments. Along with the development of digital information perceived by MSME actors as new knowledge, there are challenges faced by MSME actors in border areas when implementing a green economy.



In response to these emerging issues, the research generates a digital-based education strategy for MSME actors in the region to facilitate the implementation of a green economy. The formulated strategy is developed through a Problem-Based Learning (PBL) focus group discussion (FGD) with informants, with the expectation that the strategy aligns with the business actors' environmental conditions, allowing for effective implementation.

## LIMITATION

The limitation of this study is the absence of a description regarding the regulations and support from local governments in facilitating the implementation of a green economy by SMEs in border areas.

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