

Research Paper

Circular Economy Business Model in Integrated Waste Management to Encourage Self-reliance in Jongbiru Village

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Abstract.

The circular economy has been expected to be an effort to build a competitive and sustainable society. This study aims to develop a circular economy-based business model for waste management in Jongbiru Village, Kediri Regency. The research method used is descriptive-qualitative by developing a sustainable business model innovation framework. The model used is a development of the Business Model Canvas (BMC) by involving business aspects of the environment. The research data were collected through observation and interviews at the location of the research object. The results showed that the waste disposal site (TPS) in Jongbiru Village had implemented a circular economy business with the 3R principle (reduce, reuse, and recycle), which was managed independently. However, there are shortcomings in long-term planning and efforts related to the role of the community. Moreover, the findings in the field also show the potential that needs to be optimized through supporting facilities and social capital. The implications of this research encourage the role of stakeholders in planning the long-term development of business projects with a community engagement approach.

Keywords: village self-reliance, circular economy, social capital, business model canvas

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1. Introduction

Sustainable development in the village can be carried out with an independent household waste management program. The role of community groups in empowering households to implement environmental maintenance with the concept of zero waste. This concept can be implemented through circular economy activities involving village households and volunteer workers in household waste management. The village government can manage and utilize village waste by using the existing finances in the village budget. The implementation of the activity involves the university in

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assisting activities and program innovations in the use of household waste because in 2021, Indonesia will generate 28.654.799,96 tonnes/year of waste with 64% managed waste or 18.432.241,37 and 35.67% of unmanaged waste or 10.222.558,59 tonnes/year (Ministry of Environment and Forestry). Forestry, 2022).

TPS 3R (reduce, reuse, recycle) in Jongbiru, Kediri, Indonesia, is one of the efforts to deal with environmental problems in Kediri caused by waste. It has been ongoing for more than four months since it was established. This site has become an independent TPS (Waste Disposal Site) implemented the circular economy model for managing household waste. For instance, unused stuff like garbage, often wasted has now been successfully utilized and added more value. Gregson et al. (2015) stated that the circular economy extends the useful life of products, materials, or resources.

The current study of the circular economy has been fragmented into various disciplines. This is understandable because a circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment. The system can finally become an effort in community development that is economically competitive and sustainable because it involves business sustainability for the environment during its implementation. Barros et al. (2021) state that it is important for organizations to understand and accurately internalize the principles of circularity in their strategic plans. On that note, adopting circular thinking allows organizations to achieve more sustainable (economic) outcomes while reducing impact.

Meanwhile, the study by Donner et al. (2020) offers the first circular business model typology in the agricultural domain by revealing the interrelationships of six different business models. The implications of this research will be able to provide options for managers in positioning and adapting their business strategies. Based on this background, the urgency and purpose of the research carried out is to describe the application of sustainable village development based on a green economy with a circular economy model in the waste management system at Jongbiru Village, Kediri Regency. In addition, this study provides an analysis of performance evaluation based on the results of observations on efforts to implement sustainable community empowerment through TPS 3R Jongbiru. The results of this analysis will become a framework for developing program coverage that is capable of being managed by TPS 3R Jongbiru and having a significant impact on positive changes in the community environment. The preparation of the business model will be explained as the role of social capital in implementing the program in TPS 3R Jongbiru, the circular economy business model, and the impact on the community empowerment.

2. Literature Review

2.1. Rural Development

Rural development is a development effort with a focus on utilizing the resources owned by the village (Van Der Ploeg et al., 2000). Village empowerment formed from sustainable rural development can be achieved by strengthening innovation development from the potential economic sector that develops in the location (Adamowicz, 2021). This is believed to be able to make sustainable village development programs not have a negative impact on the stability of the dominant economic sector in the region. Villages can be said to be independent and competitive when they are able to make a major contribution to meeting the needs of their community (Mukhlis et al., 2021). However, rural development programs require external support, mobilization of resources from within the village, and adaptive development strategies (Adamowicz, 2021). This is reflected in the government's role in increasing social capital investment which will support quality village development efforts (Yuan et al., 2018). The combination of innovation and rural development supports the potential for developing new business models and identifying various models that can be implemented). (Nicolosi et al., 2021). Social innovation that can build bottom-linked governance will be a potential factor in supporting sustainable rural development (Castro-Arce & Vanclay, 2020).

2.2. Circular Economy Model

Pearce & Turner (1990); Lewandowski (2016) explained that the circular economy model is an old contemporary idea. The circular economy concept offers a way to overcome the excessive use of resources. The circular economy shows a paradigm shift in thinking about met needs, accompanied by waste management for quality sustainability (Marchesi & Tweed, 2021). The circular economy changes the paradigm, which states that the current economy runs in a linear fashion where raw materials or resources are processed into a product that is then consumed and returned to waste, eventually disposed of. Therefore, the way to minimize the use of resources is to extend their life cycle. This is in line with the research of Donner, Gohier, & Vries (2020) which classifies how to recycle and defines six main circular economy business model patterns from 26 cases, namely: (1) repair and maintenance; (2) redistribution; (3) reuse; (4) recycle; (5) cascading and repurposing; and (6) organic raw materials. The purpose of implementing the circular economy model is to improve the quality of resource consumption accompanied by long-term economic, environmental and social considerations (Marjamaa & Mäkelä, 2022).

2.3. The Role of Social Capital in Community Empowerment

Capital is a set of relationships that involve the feelings of many people to create individual value in an organization. The stability of existing social capital in society can be supported by collaboration with government and structural institutions at a higher level (Pretty & Ward, 2001). Social capital can be one factor supporting forming a community social asset (Robison et al., 1999). The social dimension is also one of the main things that receive special attention in implementing the circular economy and aspects of sustainability (Padilla-Rivera et al., 2020). Other similar findings, social capital contributes positively to sustainable village development (Sabet & Khaksar, 2020). Social capital, in the form of policies and budgets, is able to support improving the quality of life of the community by being influenced by factors of leadership, participation, and village community planning (Hidayah et al., 2019).

2.4. Implementation of Circular Economy

The implementation of a circular economy is supported by the availability of a sustainable business activity supply chain system (Jayawati et al., 2020). Nevertheless, the circular economy still requires a gradual transition program by supporting the availability of quality resources and minimizing waste production (Khajuria et al., 2022). Thus, the circular economy implementation system includes efforts to manage waste production and sustainable environmental recovery (Kristianto & Nadapdap, 2021). The implementation of a circular economy through the concept of reducing, reusing, and recycling has been proven to be able to support village development (Corral et al., 2022).

The results of the literature review that has been carried out indicate that there have been no further development efforts in developing strategic programs carried out by waste disposal site or environmental management institutions at the village level. Therefore, this research will explore how to implement TPS 3R and planning efforts through the Sustainable Business Model Canvas as the basis for planning the core values program.

3. Method and Data

The method used in this research is a descriptive qualitative method by developing The Sustainable Circular Business Model Innovation Framework. This research was conducted in Jongbiru village, Kediri district, which is a place for integrated waste

management with 3R principles (Reduce, Reuse and Recycle) through observation and interviews. TPS 3R Jongbiru Village is one of the self-supporting waste disposal site by the community which was developed based on the concept of food security and sustainable environmental management. Several cultivation and waste management programs have been implemented, such as maggot, poultry and fish cultivation; manual segregation of organic and inorganic waste; and making compost from chopped organic waste. This shows that there is a process of changing the concept of independent community waste management at TPS 3R Jongbiru which supports ease of implementation in the formation of a competitive environment. This condition makes TPS 3R Jongbiru a different research object compared to the same waste disposal site in several previous studies. Osterwalder (2005) explains that the BMC model is a framework or management framework created to develop a business strategy into nine blocks and visualize it for optimal performance. The nine blocks are customer segmentation, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure. In addition to the nine main blocks in the BMC, Antikainen & Valkokari (2016) stated that there are several supporting indicators, including trends & drivers, stakeholder involvement, sustainability requirements, and sustainability benefits. The framework for developing BMC that will be used in this research is as follows:

The stages of the research carried out were identifying and compiling BMC in TPS 3R Jongbiru, identifying the value proposition, designing the BMC and designing it optimally. The first step the researcher did was to make observations and observations at TPS 3R Jongbiru to find out and get data in the preparation of the BMC. The second stage is to conduct in-depth interviews with TPS 3R Jongbiru processors. The third stage is to design the BMC based on the existing potential and add ideas that have not been realized. And the purpose of BMC use is helps provide a quick overview of the business model and does not have a the unnecessary details compared to a traditional business plan.

4. Result and Discussion

4.1. The Role of Social Capital

At the ecosystem level, two important indicators serve as a reference for program implementation: Trends & Drivers and Stakeholder Involvement. The results of these two indicators show that there is a role of capital and social structure that has an impact on the developed business model.

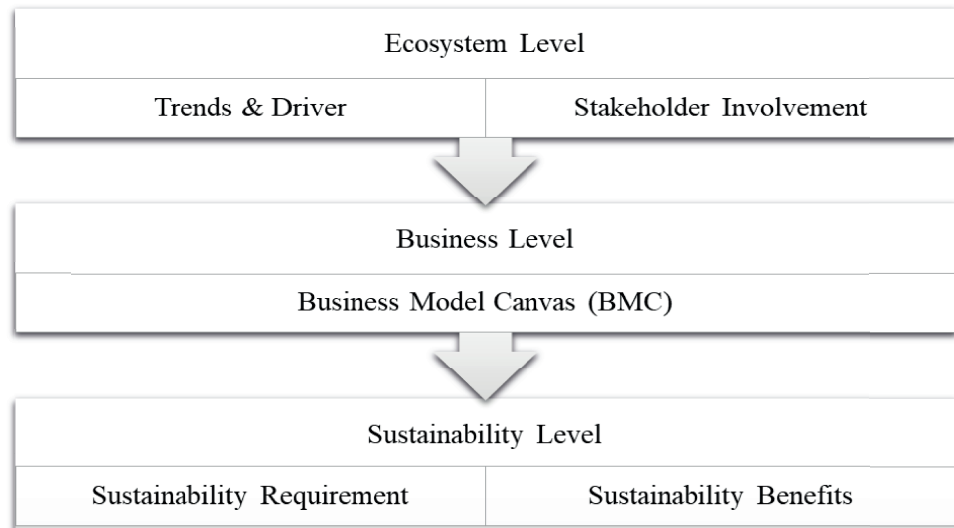


Figure 1: SEQ Figure ARABIC 1 - Research Framework.

TABLE 1: Role of Capital and Social Structure in TPS 3R Jongbiru.

Ecosystem Level	
Trends & Drivers	Prohibition of disposing of waste in rivers A large amount of household waste Development of a simple circular economy implementation
Stakeholder Involvement	Involvement of BUMDES as the manager The Jongbiru Village Government

The local law or village regulation policy will encourage households to be involved in the waste sorting process. The establishment of BUMDES as a business institution based on law will facilitate media introduction to the community. This will affect the input of resources needed in the waste sorting process. It was recorded that more than 640 family heads were registered as TPS 3R Jongbiru members or still at the level of 50% of the total family heads in Jongbiru Village. BUMDES also contributes to human resources through the absorption of local workers. As a formal institution, the BUMDES Institution will make it easier to get financing for business development from TPS 3R Jongbiru.

4.2. Circular Economic Business

The circular economic business model developed in community empowerment through a circular economy refers to the sustainable business model innovation framework model. A circular economy that will be developed by utilizing existing social capital in the community. The role of social capital will shape the structure that supports the

operations of TPS 3R Jongbiru. The following BMC model will show how the findings in the field are described through a circular economy business model approach.

TABLE 2: Business Model Canvas (BMC) of TPS 3R Jongbiru.

Business Level	
Customer Segmentation	Fish and poultry farmers - Plastic collectors Farmers & agricultural shops
Key Activities	Household management based on circular economy and sustainability Compost and cassava production Cultivation of maggot, fish and poultry as output units Sales of sorting and aquaculture products in consumer segment Cultivation of food crops
Value Propositions	Sustainable development of the environment Self-sustaining food security and production of agricultural resources Involvement of the younger generation as partners and labor Products as an alternative input to the agricultural sector
Key Resource	Human resources - Waste sorting Cultivation equipment - Transportation
Key Partner	Members TPS - PKK Karangtaruna - NGO
Customer Relationships	Scheduled household waste pick-up Registration of TPS 3R Jongbiru members through BUMDES
Channel	Marketplace - Farmers forum Social media - Village social activities
Revenue Stream	Cultivated & pesticide business sorting waste Community service funding Cost of TPS member fees
Cost Structure	Operational & maintenance costs of facilities Purchase of new seeds & tools Wages of TPS employees

The findings in the field through the BMC model also show how circular economic activities can be fulfilled. The cultivation of maggots and livestock, consisting of poultry and fish, is the key to producing optimal waste products and contributing to the livestock sector. In addition, cassava and compost produced are products that can be used for sale or given to food crops managed independently by TPS 3R Jongbiru.

Applying for membership in waste disposal site operations is a form of implementing the community's role in circular economic activities. This membership will facilitate TPS 3R Jongbiru in mapping waste collection schedules and measuring the impact of circular economic activities. The involvement of BUMDES in the entire TPS 3R Jongbiru circular economic business chain will make members not only social capital, but also a means of marketing waste disposal site processed products for members on a small scale. This membership can also be interpreted as a form of trust and support to be referred to as social capital for circular economic activities at TPS 3R Jongbiru.

4.3. Impact on Community Empowerment

A sustainable circular economy program requires the contribution and role of related parties to achieve the optimal level of benefits. The sustainability aspects are described in the following table.

TABLE 3: Sustainability Aspects of TPS 3R Jongbiru.

Sustainability Impact	
Sustainability Requirement	Environment Quantity and quality of processed Waste processing infrastructure Social Rules and business by-laws that are mutually agreed upon Institutional structure and business SOPs Business Partnership cooperation agreements with market segments Recording of financial and operational performance
Sustainability Benefits	Environment Decreased level of pollution The amount of food waste can be optimized Social Labor absorption Increased social capital and public trust Business Increased production capacity Development of new business units through capital

A sustainable business concept will require adequate physical and non-physical facilities. This is also supported by how the rules serve as operational standards that support quality improvement and optimization. Through optimal standardization, the impact of negative externalities will be reduced and will result in social, environmental, and implementation benefits for the waste disposal site business model. Consistent and sustainable activities will also facilitate evaluation activities by relevant stakeholders and funding plans for developing new business plans that can be applied. Reducing the waste generated in the process can generate both economic and environmental benefits. A comprehensive modeling framework is needed in dealing with waste problems as part of a complex circular economy, besides that this will ultimately provide added economic value and other multiplier effects for society.

5. Conclusions

Environmental problems are caused by several factors, especially the development of public consumption and the degradation of the use value of consumer products. These environmental problems occur at various structural societal levels, including the village. Sustainable development based on a green economy can be started from the smallest scope of a government, namely the village. With the existence of sustainable development in the village, one of the goals of *sustainable development* that is achieved is to eradicate poverty and improve human resources. The implementation of the circular economy model and the 3R principle (*Reduce, Reuse, and Recycle*) has reduced the

environmental damage impact. The application of *The Sustainable Circular Business Model Innovation Framework* at the TPS 3R Jongbiru Village, aims to determine how much success can be achieved based on the target by doing maggot livestock and sorting waste. Inorganic waste is recycled and managed in an environmentally friendly manner, while inorganic waste is processed into maggot feed and compost. In support of this, the processors also produce livestock breeds of catfish, flies and poultry that are managed independently to increase income with economic value.

The results of this study indicate the potential for sustainability in integrated waste management at TPS 3R Jongbiru. In addition, to maximize this potential, the value of business sustainability needs to be the main development, including human resources. Cooperation between stakeholders is needed to implement the circular economy properly. For academics, it is hoped that they can channel the transformation of knowledge and skills in the form of training, especially on waste issues, so that people can differentiate based on type and source. In the community, support is needed to dispose of waste in a segregated manner which aims in future to be able to carry out a better life. Meanwhile, the government should start providing support by facilitating the needs needed to support the smooth running of the program. The implications given in this research for the community are the need for an active role of the community in the management of TPS 3R Jongbiru Village as part of BUMDES. This is because the role of the community as a contributor in operations, management and development will support the business development of TPS 3R Jongbiru Village as a new environment-based business model and has prospects for social, economic and environmental benefits that can be felt by the community.

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