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Environmentally Friendly *Waqf* Model: A Response to Sustainable Economic Development and the Presence of a Circular Economy

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ABSTRACT

The excessive utilization of natural resources and the accumulation of waste pose serious challenges to sustainable development. The circular economy has emerged as a viable solution by emphasizing the reuse and recycling of materials. This study explores the significance of sustainable development and the necessity of a circular economy in achieving it. Effective waste management plays a crucial role in environmental protection and enhances living standards. In this context, *waqf* can contribute to environmental sustainability through the concept of green *waqf*. This study employed the literature review method to identify, review, evaluate, and synthesize relevant research on the phenomenon of interest and related research questions. By implementing the literature review approach, journal articles were systematically reviewed, and each process followed predetermined steps and procedures. The findings revealed that the proposed green *waqf* model consisted of five stages. First, the *waqif* transfers cash *waqf* to a *waqf* institution *(nazir)*. Second, the *nazir* allocates *waqf* funds to establish a training center equipped with waste management technology to enhance human resource development. Third, the *nazir*, through the training center, provides skill development programs to empower beneficiaries *(mauquf 'alaih)*. Fourth, beneficiaries are expected to secure employment and increase their productivity after completing the training. Fifth, continuous monitoring and evaluation must be conducted to ensure ongoing improvements. Ultimately, the proposed green *waqf* model is expected to contribute to both economic and environmental sustainability.

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INTRODUCTION

Sustainable development has become an increasingly important topic in the modern era. As time progresses, new challenges and obstacles continue to emerge in the pursuit of sustainability. Environmental balance and economic stability are two essential aspects that must be preserved for future generations. One of the most pressing issues is the inefficient use of natural resources and excessive waste generation. Efforts to create a healthier living environment while promoting economic sustainability are crucial. The circular economy is an approach that emphasizes the reuse and recycling of materials. Additionally, it fosters innovation and technological advancements to develop eco-friendly products and minimize waste. This model not only reduces the overexploitation of natural resources but also mitigates the environmental burden caused by waste accumulation (Czerwińska et al., 2022).

Sustainable development expert and practitioner Alan AtKisson has emphasized the significance of sustainable development, defining it as a model that meets present needs without compromising the needs of future generations. Furthermore, he has highlighted that natural resources play a pivotal role in achieving sustainability. Effective environmental protection requires multidisciplinary collaboration to optimize resource utilization and minimize waste. The implementation of a circular economy serves not only as a waste management strategy but also as a driver for sustainable industrial development and a more efficient allocation of natural resources. Additionally, economic revenue generated from circular economic systems is significantly higher than that of linear economic models, which primarily focus on immediate material consumption without considering long-term sustainability (Ardhistira, 2020).

The degradation of ecosystems has become an unavoidable consequence of extreme weather conditions, which are further exacerbated by unsustainable human activities. Excessive consumption patterns, driven by short-term economic interests, have led to severe environmental impacts. In the business sector, sustainability principles are often overlooked, leading to irresponsible practices that contribute to ecological damage. Thus, efforts to integrate sustainability into business models must align with the Sustainable Development Goals (SDGs), particularly Goal 17, which promotes partnerships for sustainable growth. Businesses should adopt environmentally responsible strategies that align with global

sustainability standards to minimize ecological harm and ensure the protection of natural ecosystems (Rivai & Anugrah, 2020).

The circular economy is an economic model that prioritizes sustainability by minimizing waste and maximizing resource efficiency. Within this framework, products, materials, and resources are designed to be reused, recycled, or maintained within the production cycle for as long as possible. A more specific extension of this concept is the circular carbon economy, which focuses on managing carbon within economic systems. According to Calicioglu & Bogdanski, (2021), the circular economy provides a pathway for advancing sustainable development by establishing an economic model that decouples growth from resource depletion. This approach emphasizes the reuse of materials before disposal, ensuring that resources remain in circulation while reducing environmental harm. Circular economy-based businesses also contribute to sustainability by minimizing the use of primary materials, preserving natural resources, and lowering carbon emissions.

The concepts of sustainable development and the circular economy exhibit a mutually reinforcing relationship. Companies that integrate circular economy principles enhance resource efficiency, reduce waste, and increase the market demand for eco-friendly products. This, in turn, strengthens consumer confidence in environmentally responsible goods. As consumers become more conscious of sustainability, they tend to favor products that are competitive in quality and price while adhering to circular economy principles. Consequently, businesses are incentivized to develop eco-friendly products that align with market demands. In response to these environmental challenges, waste management has emerged as a critical economic strategy for both environmental conservation and improved living standards. Modern waste management techniques are increasingly integrated with energy generation technologies, offering innovative solutions for waste treatment, chemical processing, and sustainable energy production. Among the various available approaches, carbonization technology has gained significant attention in recent research. This method effectively processes both wet and solid waste, converting organic materials into activated carbon and other environmentally safe byproducts. The process captures the potential energy within waste and transforms it into thermal energy, reducing the overall environmental footprint of waste disposal (Sharma et al., 2020).

Carbonization technology represents a strategic initiative for renewable energy production, aligning with SDG 7 affordable and clean energy while also contributing to SDG 13 (climate action) by mitigating climate change. Moreover, its implementation fosters economic development by creating job opportunities, thereby supporting SDG 1 no poverty and SDG 2 (zero hunger). Economic growth should be the result of environmental preservation efforts rather than being pursued at the expense of nature. This principle forms the foundation of the green economy, which promotes sustainable development through ecological stewardship. Environmental conservation holds a central place in Islamic teachings, as the religion emphasizes stewardship *(khilafah)* of the Earth as a fundamental duty of believers (Yue et al., 2019). The Qur'an and Hadith provide extensive guidance on the responsible use of natural resources, the prohibition of waste *(israf)*, and sustainable land and water management. Islamic ethical principles such as *amanah* (trust), *'adl* (justice), and *husn al-khulq* (good conduct) reinforce the moral obligation to protect the environment and safeguard all living beings. Islamic jurisprudence *(fiqh)* further addresses environmental sustainability through principles such as *darurah* (necessity) and *maslahah* (public interest), which allow for adaptive environmental policies in response to contemporary challenges such as climate change and pollution (Aziz & Prabuwono, 2023).

Historically, Islamic civilization has demonstrated environmental responsibility through initiatives such as afforestation, water conservation, and eco-friendly urban planning, reflecting Islam's long-standing commitment to ecological balance. Islamic finance provides various mechanisms to support environmental sustainability. One of the key financial tools is *sadaqah* (voluntary charity), where individuals and institutions contribute funds for conservation projects such as afforestation, wildlife protection, and renewable energy development (Hasbi, 2021). Additionally, obligatory zakat almsgiving can be allocated to environmental initiatives as part of broader social and environmental justice efforts. Islamic financial institutions also play a pivotal role in promoting sustainability through green financing products, including green *sukuk* (Islamic bonds), which raise capital for eco-friendly infrastructure projects such as renewable energy plants and sustainable urban developments. Furthermore, *waqf* endowment can be utilized to establish long-term funds dedicated to environmental preservation. This ensures a continuous stream of financial resources for

initiatives aimed at conserving natural ecosystems while aligning with Islamic principles (Iswanaji et al., 2021).

One of the key advantages of *waqf* over *sadaqah* and zakat lies in its enduring nature and sustainability. *Waqf* involves the establishment of an endowment in which donated assets—such as property or financial resources—are preserved in perpetuity, while the income generated from these assets is continuously allocated toward charitable causes. This perpetual cycle ensures a sustainable and reliable source of funding for various social initiatives, including education, healthcare, and social welfare, without depleting the initial capital. Unlike *sadaqah* and zakat, which are typically one-time or periodic donations, *Waqf*'s perpetual structure provides continuous financial support for charitable programs. Additionally, *waqf* offers greater flexibility, as it allows for the endowment of diverse assets beyond monetary contributions, enabling donors to leverage different resources for long-term philanthropic impact (Nafi', 2022).

This strategic approach to charitable giving aligns with the principles of responsible stewardship and community empowerment, making *waqf* a valuable instrument for sustainable social and environmental development. In this context, a green *waqf* initiative has emerged as a means to integrate environmental conservation with Islamic philanthropy. The green *waqf* concept was pioneered by Muhaimin Iqbal, who emphasized the need to address environmental degradation caused by climate change and carbon dioxide emissions through tree-planting initiatives. While *waqf* has historically been used for funding education, healthcare, and social welfare, its application in waste management is still underexplored. Given the economic and environmental benefits of waste management, this study proposes a green *waqf* model for sustainable waste management, contributing to both economic resilience and environmental sustainability (Iñiguez et al., 2019).

The green *waqf* project, initiated by Muhaimin Iqbal, serves as a collaborative platform for *waqf* institutions, environmental organizations, and renewable energy activists. It has strategic relevance not only at the local and national levels but also on a global scale. The primary goal of green *waqf* is to support the United Nations' Sustainable Development Goals (SDGs) by addressing contemporary environmental issues such as climate change and energy security. Sustainable waste management plays a crucial role in this effort by implementing efficient methods for collecting, transporting, recycling, and disposing of waste. The

overarching objective is to protect the environment, human health, and future generations by transitioning from a linear economic model make, use, dispose to a circular economy, where waste is transformed into new products or renewable energy (Seadon, 2010).

Various waste management techniques exist, including recycling, composting, landfilling, incineration, biogas production, pyrolysis, and plasma gasification. Among these, carbonization technology has emerged as the most preferred and environmentally sustainable solution. Carbonization technology involves a heat treatment process that combines pyrolysis and gasification, where waste undergoes thermal decomposition in the absence of oxygen. Unlike incineration, this process does not involve direct combustion, thereby minimizing pollution. In simple terms, the process is similar to an oven or rice cooker, utilizing thermal radiation instead of an open flame. This thermochemical conversion method enables the transformation of biomass and organic waste into valuable solid biofuels, liquid biofuels, and gaseous energy sources while requiring relatively low energy input. Additionally, this technology can process a wide range of waste materials, including sewage sludge, lignocellulosic biomass, and algae, making it a versatile and efficient solution for sustainable waste management (Chen et al., 2020).

Carbonization technology is particularly effective in converting polymer precursors—such as plastics—into high-value carbon materials. These materials include hydrocarbons, activated carbon, carbon nanotubes, graphene, carbon fibers, and carbon spheres, all of which have significant industrial applications. Carbon materials derived from waste exhibit high energy potential, making them suitable for use as solid fuels, supercapacitors, fuel cells, and adsorbents (Shen, 2020). Research on carbonization has demonstrated its feasibility, potential applications, and challenges as a sustainable plastic waste recycling method. Given the high calorific value of plastic waste, carbonization offers a viable alternative for converting it into fuel. This technology is particularly relevant for Indonesia, where sustainable waste management solutions are urgently needed to address environmental challenges. Additionally, carbonization is highly recommended for the safe and sustainable disposal of medical waste, as it significantly reduces risks to human health, ecosystem integrity, climate stability, and natural resources, compared to landfilling and incineration (Ardhistira, 2020).

Environmental protection is strongly emphasized in Islamic teachings. Neglecting environmental conservation or engaging in activities that harm the environment is considered

a violation of God's decrees and the teachings of Prophet Muhammad. One of the financial instruments that can support this mission is *waqf*. As an Islamic non-profit organization, *waqf* is expected to play a pivotal role in preserving the environment and ensuring sustainable development. The concept of environmental *waqf* is not entirely new; it is rooted in the early Islamic legal principles of Khashi *waqf* and *istibdal*. One of the most notable institutional efforts in this area is the Kuwait Awqaf Public Foundation (KAPF), which has been instrumental in raising public awareness about the importance of environmental *waqf*. In 1992, KAPF established the Kuwait Company for Environmental Services, focusing primarily on cleaning and sanitation. Additionally, in 1995, KAPF launched the Environment Fund to finance environmental protection and conservation initiatives. KAPF has also developed wastewater treatment projects for mosques, utilizing treated water for irrigation and green landscaping, demonstrating the integration of *waqf* principles with environmental sustainability (Budiman, 2011).

In Indonesia, the concept of environmental *waqf* is relatively new and remains underutilized compared to other popular *waqf* applications, such as education, healthcare, and poverty alleviation. However, several innovative *waqf* programs have emerged, including tree-planting initiatives, well construction, and water treatment projects. Despite these efforts, *waqf*-based waste management initiatives remain largely unexplored (Hasan, 2022). The potential of *waqf* for sustainable waste management presents a unique opportunity to mobilize voluntary community efforts without imposing financial burdens on the government. The primary role of the state should be to facilitate *waqf* development by providing public awareness campaigns, regulatory frameworks, and financial incentives. To enhance the viability of green *waqf*, *waqf* institutions can initially adopt the cash *waqf* model and the autonomy model, later expanding into other models as institutional experience grows (Ascarya et al., 2022).

Several academic studies have explored the concept of green *waqf*, particularly in relation to climate change mitigation. One such study, Enhancing *Waqf* Forest Sustainability through Agroforestry," examined how *waqf* forests can contribute to Sustainable Forest Management (SFM). The research concluded that agroforestry practices within *waqf* forests could increase biodiversity, improve forest health, enhance forest production, and provide significant social and economic benefits (Jannah et al., 2021). However, while Jannah's

research focused on agroforestry, the present study explores a green *waqf* model for sustainable waste management, aiming to advance Sustainable Development Goals (SDGs) in Indonesia. Another notable study, "*Waqf* and Waste: Unknown Possibilities," emphasized that *waqf* institutions—whether privately or publicly managed—can reduce the financial burden on governments in managing societal waste. The study highlighted that environmental *waqf* aligns with *maqashid shariah*, particularly in achieving *falah* (holistic well-being) through environmental protection (Wildana, 2021).

One promising application of green *waqf* in Indonesia is energy *waqf*, particularly in the deployment of solar panels (PLTS). By utilizing *waqf* funds to finance solar energy projects, Indonesia can reduce greenhouse gas emissions while providing clean and renewable energy to households, small and medium enterprises (SMEs), and industries. This approach can decrease reliance on fossil fuels, which are major contributors to climate change. The objective of this study is to examine the energy *waqf* model, particularly its potential in addressing climate change. The successful implementation of energy *waqf* requires collaborative efforts between *waqf* institutions, the government, and the private sector. *Waqf* institutions bring expertise in Sharia-compliant asset management, the government can provide funding, regulatory support, and public outreach, while the private sector contributes technological expertise, financial investment, and specialized knowledge (Wakaf, 2024).

To maximize the impact of energy *waqf*, public awareness and education campaigns are essential. Communities need to understand the long-term benefits of *waqf*-based energy solutions and actively participate in climate change mitigation efforts. Effective dissemination of information can be achieved through educational institutions, social media, mass media, and public outreach programs. Additionally, regulatory frameworks should be developed to protect the rights of donors *(wakifs)* and beneficiaries, ensuring legal certainty and fostering public trust in energy *waqf* initiatives. Establishing clear legal guidelines can create a conducive environment for *waqf*-based energy projects, attracting more investments and collaborations. The development of solar panels through energy *waqf* presents a sustainable solution to Indonesia’s climate challenges, offering not only environmental benefits but also significant social and economic advantages (Ardiyansyah & Kasdi, 2021).

METHOD, DATA AND ANALYSIS

The research method used in this study was literature research, involving the collection of data from theoretical sources, books, journals, and publications related to the concept of the circular economy. In the theoretical study, the author utilized data sources from media publications and reliable research findings relevant to the topic. This research employed a qualitative method, applying theoretical approaches and analyzing data through a comprehensive literature review. Literature studies, as a research method, involved a systematic examination and analysis of existing scholarly works, including books, journal articles, theses, and other published materials relevant to the research topic. This approach encompassed a thorough review and synthesis of the literature to identify key themes, debates, theoretical frameworks, empirical findings, and gaps in knowledge within the field of study. Researchers conducting literature studies typically employed rigorous search strategies, citation analysis, and critical appraisal techniques to select and evaluate relevant sources contributing to the development of research questions and hypotheses (Sugiyono, 2014).

One of the primary advantages of literature studies as a research method was its ability to provide a comprehensive overview of existing knowledge and scholarship on a given topic. By synthesizing and integrating findings from diverse sources, literature studies enabled researchers to identify patterns, trends, and theoretical perspectives that informed their research inquiries. Additionally, literature studies served as a foundation for theoretical frameworks, conceptual models, and research designs, guiding the formulation of research objectives, methodologies, and data collection strategies. This methodological approach was particularly valuable in disciplines such as humanities, social sciences, education, and interdisciplinary studies, where building upon existing knowledge and engaging with scholarly discourse were fundamental to advancing understanding and contributing new insights to the field (Creswell, 2016).

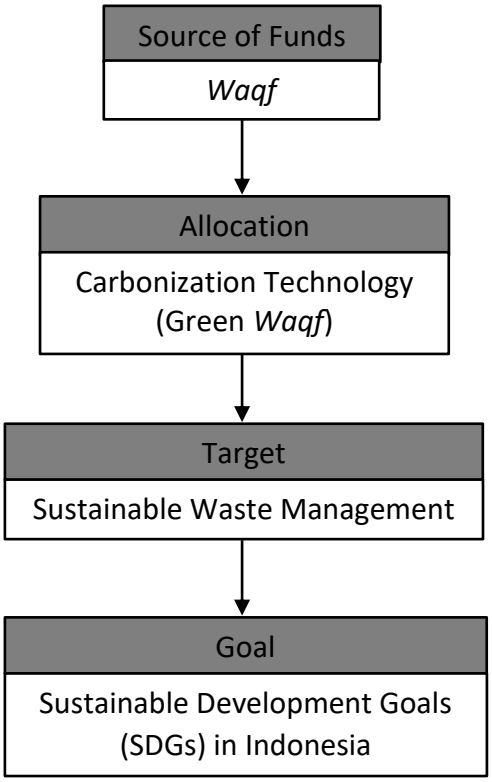

Figure 1

Research Framework

Data source: Author one, 2025

Figure 1 explains the research method framework that considering the benefits of sustainable waste management, this study proposed the allocation of *waqf* funds for sustainable waste management, referred to as Green *Waqf*. Thus, enhancing the green *waqf* model for sustainable waste management, particularly through carbonization technology, was identified as a priority program for environmental protection while simultaneously accelerating economic growth. This initiative was strongly recommended to support the green economy and contribute to sustainable development.

RESULT AND DISCUSSION

Sustainable Economic Development and the Presence of the Circular Economy

Based on the analysis, the implementation of a circular economy is an effective solution for sustainable and environmentally friendly economic development. This financial model enhances economic efficiency and outcomes while reducing environmental degradation. A study on material utilization in the manufacturing industry found that material recycling can

improve resource efficiency by up to 30% and reduce global natural resource consumption by 20%. If processing facilities expand across multiple industries, global resource consumption and carbon emissions could decline by 10% by 2030. The circular economy approach necessitates a business model that fosters ecological product development and optimizes raw material and energy utilization. Companies adopting this model can generate economic benefits while maintaining environmental sustainability (MacArthur, 2015).

In an era marked by economic uncertainty and vulnerability due to the COVID-19 pandemic, environmental crises have become more pressing and demand urgent solutions. One effective strategy is the development of a circular economy, which is widely regarded as a sustainable solution to enhance financial efficiency and economic resilience. The importance of this model has grown as society becomes increasingly aware of high energy consumption and rapid depletion of natural resources. In recent years, awareness of the necessity to reduce greenhouse gas emissions and improve waste management has prompted policymakers to develop circular economy strategies. This economic model promotes the sustainable use of materials while minimizing resource consumption. A study on material utilization in the manufacturing industry found that recycling can enhance resource efficiency by 30% and decrease global natural resource consumption by 20%. These findings underscore the effectiveness of the circular economy in addressing waste management and environmental sustainability challenges (Meyer et al., 2021).

The circular economy model depends on business strategies that facilitate the production of ecological goods while optimizing the use of materials and energy. This fosters sustainable financial returns and helps businesses cut costs while increasing product value. Furthermore, the development of circular economy models contributes to the establishment of sustainable and environmentally friendly economic systems. In the long run, adopting an ecological economic framework can significantly impact sustainable economic growth. The circular economy integrates social, environmental, and economic considerations, underscoring the importance of addressing these factors collectively. Public awareness is essential, as implementing circular economy principles requires recognition of environmental and social issues within the broader economic framework. Additionally, financial ownership, technological advancements, and resource management must be factored into circular economy development to ensure comprehensive solutions (Ralph, 2021).

When implementing a circular economy, it is crucial to assess how this economic model aligns with societal conditions. Factors such as natural resource availability, demographic dynamics, and cultural influences must be taken into account. The COVID-19 pandemic has heightened global economic vulnerabilities while intensifying environmental challenges that require urgent action. Applying circular economy principles presents a practical means of addressing environmental concerns while fostering sustainable economic growth. The circular economy model prioritizes efficient natural resource and waste management, leading to reduced waste generation and increased renewable product utilization. This approach enhances material and energy efficiency, boosts production efficiency, and mitigates environmental impact (Campbell-Johnston et al., 2020).

A key advantage of the circular economy is the efficient use of natural resources. Research on material utilization in manufacturing reveals that recycling can boost material efficiency by up to 30% and decrease global natural resource consumption by 20%. Expanding recycling initiatives across industries could further reduce global resource usage and carbon emissions by 10% by 2030. However, the circular economy is not solely focused on environmental sustainability; it also aims to generate long-term economic and social value. Effective implementation requires a business model that produces ecological goods while intelligently optimizing raw materials and energy use. This ensures companies can derive sustainable financial benefits while minimizing environmental harm. Over time, the circular economy model will contribute to the development of an economic system that is both sustainable and environmentally friendly (Muhafidin, 2020).

This concept integrates social, environmental, and economic factors, making a substantial contribution to sustainable economic progress. However, public awareness is essential for the successful implementation of circular economy principles. It is necessary to consider environmental and social concerns as integral components of the economic framework. Collaboration among all societal elements is crucial for advancing circular economy initiatives. Additionally, understanding how these economic models adapt to unique societal conditions is critical. Specific factors such as resource availability, demographic characteristics, and cultural influences must be analyzed in depth. The circular economy serves as a key solution for fostering sustainability and environmental preservation. Amid ongoing environmental and economic crises, adopting circular economy principles remains

one of the most effective strategies for building a more sustainable and environmentally responsible future (Biresselioglu et al., 2016).

The continued reliance on linear economic models within business and society contributes to excessive waste production and heightened carbon emissions, exacerbating atmospheric pollution. It is imperative for all stakeholders to recognize that manufacturing processes will persist indefinitely, ensuring that production will never cease. Consequently, the ongoing extraction of raw materials will remain a fundamental driver of economic expansion, often leading to environmental degradation. The circular economy emerges as a critical framework for mitigating these issues. Its successful implementation requires comprehensive engagement from various societal sectors, including students, educators, and organizational leaders. Encouraging student participation in circular economy initiatives fosters awareness and instills sustainable values. Educational programs that incorporate circular economy concepts will not only cultivate responsible consumption patterns but also equip students with the necessary skills to drive sustainability efforts. Implementing waste reduction programs in educational institutions can promote greater environmental consciousness and contribute to global efforts to curb carbon emissions and mitigate climate change (Ramirez-Contreras et al., 2022).

Benefits of the Circular Economy in the Context of Sustainable Development

The advantages of the circular economy in the context of sustainable development include minimizing the use of natural resources and reducing the amount of waste entering the environment. In the long run, implementing a circular economy model can enhance overall financial efficiency and outcomes. By recycling and reusing raw materials, companies can optimize resource utilization and prevent unnecessary waste. This approach also helps reduce waste accumulation and environmental pollution (Rivai & Anugrah, 2020).

In the long term, adopting a circular economy will have a lasting and positive impact both economically and environmentally. This model enables a significant increase in resource-use efficiency, improves the availability of raw materials, and reduces production costs. Furthermore, the implementation of a circular economy creates new business opportunities by promoting environmentally friendly products, which, in turn, contribute positively to economic growth. By embracing circular economy principles, industries can maximize

resource efficiency and minimize waste. Over time, this system enhances financial performance and reduces negative environmental impacts. Therefore, industries and businesses should consider adopting this model to improve resource management, optimize production systems, and develop eco-friendly products (Intan, 2024)

Despite its numerous advantages, the widespread adoption of the circular economy faces several challenges. One major challenge is the lack of public awareness and understanding of sustainability within the circular economy framework. Many individuals and businesses remain uninformed about its importance, necessitating efforts to enhance public education and awareness. Another obstacle is the inadequate infrastructure and technological capabilities required to support circular economy practices, particularly in rural areas. Moreover, not all industries can seamlessly integrate circular economy principles, as certain sectors generate waste that is difficult to recycle and require advanced technology for waste reduction. Additionally, financial priorities often outweigh sustainability efforts, leading some companies to prioritize immediate profits over long-term environmental responsibility (Afiyah, 2025). To overcome these challenges, comprehensive policies and regulations are essential to incentivize businesses to adopt circular economy principles. Governments can play a crucial role by investing in the development of necessary infrastructure, offering financial incentives such as tax benefits, soft loans, and grants, and promoting research into eco-friendly technologies. Furthermore, the enforcement of strict regulations, including penalties for non-compliance, can encourage industries to integrate sustainable practices. Public awareness campaigns and educational initiatives are also crucial in fostering a collective understanding of the benefits of a circular economy and driving behavioral change (Panchal et al., 2021).

The benefits of the circular economy extend beyond environmental preservation, offering significant economic advantages as well. By reducing waste through recycling and reusing materials, businesses can decrease landfill usage and lower environmental degradation. Optimizing resource use reduces dependency on newly extracted natural resources, thereby enhancing sustainability. Additionally, the circular economy contributes to the reduction of carbon emissions by minimizing the need for raw material extraction and processing, ultimately mitigating climate change. It also stimulates innovation in product design and production processes, paving the way for new business opportunities and job

creation in the recycling and repair industries. Furthermore, reliance on local materials instead of imported raw materials strengthens economic resilience and reduces supply chain vulnerabilities. From a financial standpoint, lowering production costs through resource reuse and waste reduction results in substantial cost savings over time. Additionally, minimizing environmental pollution contributes to improved public health and quality of life (Guo et al., 2017).

The transition to a circular economy also fosters greater corporate social responsibility, encouraging businesses to adopt sustainable practices. The promotion and adoption of eco-friendly technologies accelerate progress towards a more sustainable economic system. Moreover, collaboration among key stakeholders—including governments, industries, academia, and local communities—is vital to achieving shared sustainability objectives. Given these extensive benefits, the circular economy serves as an effective strategy for addressing global environmental challenges while simultaneously promoting long-term economic growth (Aghasafari et al., 2020). Sustainable development seeks to maintain a balance between economic growth, environmental protection, and social welfare. The circular economy plays a pivotal role in achieving these goals by emphasizing efficient resource management, minimizing waste, and reintegrating materials into production cycles.

Key strategies for implementing circular economy principles include designing recyclable products, transitioning to renewable energy sources, promoting responsible consumption patterns, and strengthening partnerships between industries, governments, and society. The broader implications of adopting a circular economy include a reduced environmental footprint, increased efficiency in resource utilization, job creation, and enhanced economic resilience. However, transitioning from traditional linear economic models to circular approaches requires businesses to shift their operational paradigms and embrace long-term sustainability strategies. Addressing these challenges will be critical in unlocking the full potential of the circular economy in achieving sustainable development (Dabbous & Tarhini, 2021).

In this era of rapid globalization, awareness of the importance of maintaining a balance between economic growth, environmental protection, and social welfare is increasing. The consequences of uncontrolled economic growth and excessive exploitation of natural resources have resulted in serious impacts on the environment, such as climate change,

decreased biodiversity, and environmental pollution. On the other hand, economic inequality and social injustice continue to complicate efforts toward sustainable welfare for the entire global community. At this point, the concept of sustainable development has emerged as a solution capable of balancing economic growth with environmental protection and social empowerment. Sustainable development, as defined by the World Commission on Environment and Development in 1987, is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. However, realizing sustainable development requires a new paradigm that integrates economic, environmental, and social dimensions holistically. One such paradigm that has gained increasing attention is the circular economy (Lasmiatun & Manteghi, 2025).

The circular economy offers a transformative approach to resource management and waste reduction. Traditionally, the linear economic model defines the production process as a one-way flow from raw material extraction to product disposal, often resulting in high levels of waste and environmental degradation. In contrast, the circular economy seeks to close this loop by promoting sustainable practices such as recycling, reusing, and repurposing materials within the production cycle (Supriyanti et al., 2025). This model ensures that resources remain in circulation for as long as possible, reducing the demand for virgin materials and minimizing waste generation. By shifting the focus from ownership-based consumption to service-based models, businesses can foster innovation, enhance resource efficiency, and drive new market opportunities. The circular economy not only reduces environmental harm but also stimulates economic growth by encouraging industries to adopt sustainable technologies and innovative business strategies. Ultimately, integrating circular economy principles into mainstream economic systems is essential for achieving long-term sustainability and resilience in an ever-changing global landscape (Bonaraja Purba et al., 2024).

Environmentally Friendly *Waqf* Model: A Solution to Realize Sustainable Economic Development and the Presence of a Circular Economy

Cash *waqf*, a concept rooted in Islamic finance, is a form of charitable endowment in which an individual or institution allocates a sum of money to support specific charitable or social causes. Unlike traditional *waqf*, which involves physical assets such as land or buildings, cash *waqf* is based on monetary contributions. The establishment of a cash *waqf* entails the

transfer of ownership of these funds to a *waqf* institution, which subsequently manages and invests them in Sharia-compliant ventures. The returns generated from these investments are then utilized to finance charitable projects and initiatives, such as education, healthcare, and poverty alleviation, on a perpetual basis.

One of the defining features of cash *waqf* is its sustainability and perpetual nature. Since the principal endowment remains intact while only the generated income is allocated to charitable activities, cash *waqf* ensures a continuous stream of funding for the designated causes. This financial model is closely aligned with Islamic principles of social justice and equitable wealth distribution, as it encourages affluent members of society to contribute to the welfare of the less privileged. Furthermore, cash *waqf* can be structured in a manner that allows donors to specify their preferences regarding fund utilization, ensuring that their charitable intentions are upheld even beyond their lifetime. The primary objective of establishing cash *waqf* is to provide waqifs with the opportunity to fulfill their philanthropic aspirations while seeking rewards in the afterlife. Even a modest contribution can yield substantial benefits for this institution. Additionally, cash *waqf* institutions serve as crucial fundraising entities, generating the necessary funds to restore deteriorating *waqf* properties while simultaneously offering community services and creating new employment opportunities (Syamsuri et al., 2021).

The establishment of a green *waqf* institution or fundraising initiative can be initiated by individuals, organizations, corporations, governments, or institutions. In fulfilling its role, a green *waqf* institution must outline both the benefits it offers and the intended beneficiaries. By doing so, it can attract a greater number of contributors willing to donate cash *waqf*—either directly or indirectly—to selected beneficiaries. Green *waqf* institutions have the capacity to manage and accumulate cash *waqf*, which can subsequently be allocated to specific projects, such as sustainable waste management initiatives that employ carbonization technology. This study proposes a green *waqf* model aimed at fostering sustainable waste management. The green *waqf* model presents significant advantages by offering a structured and perpetual funding mechanism for environmentally friendly initiatives. Through green *waqf*, endowments can be specifically dedicated to waste management projects, including the development of recycling facilities, waste-to-energy technologies, and community education programs on waste reduction (Iman et al., 2021).

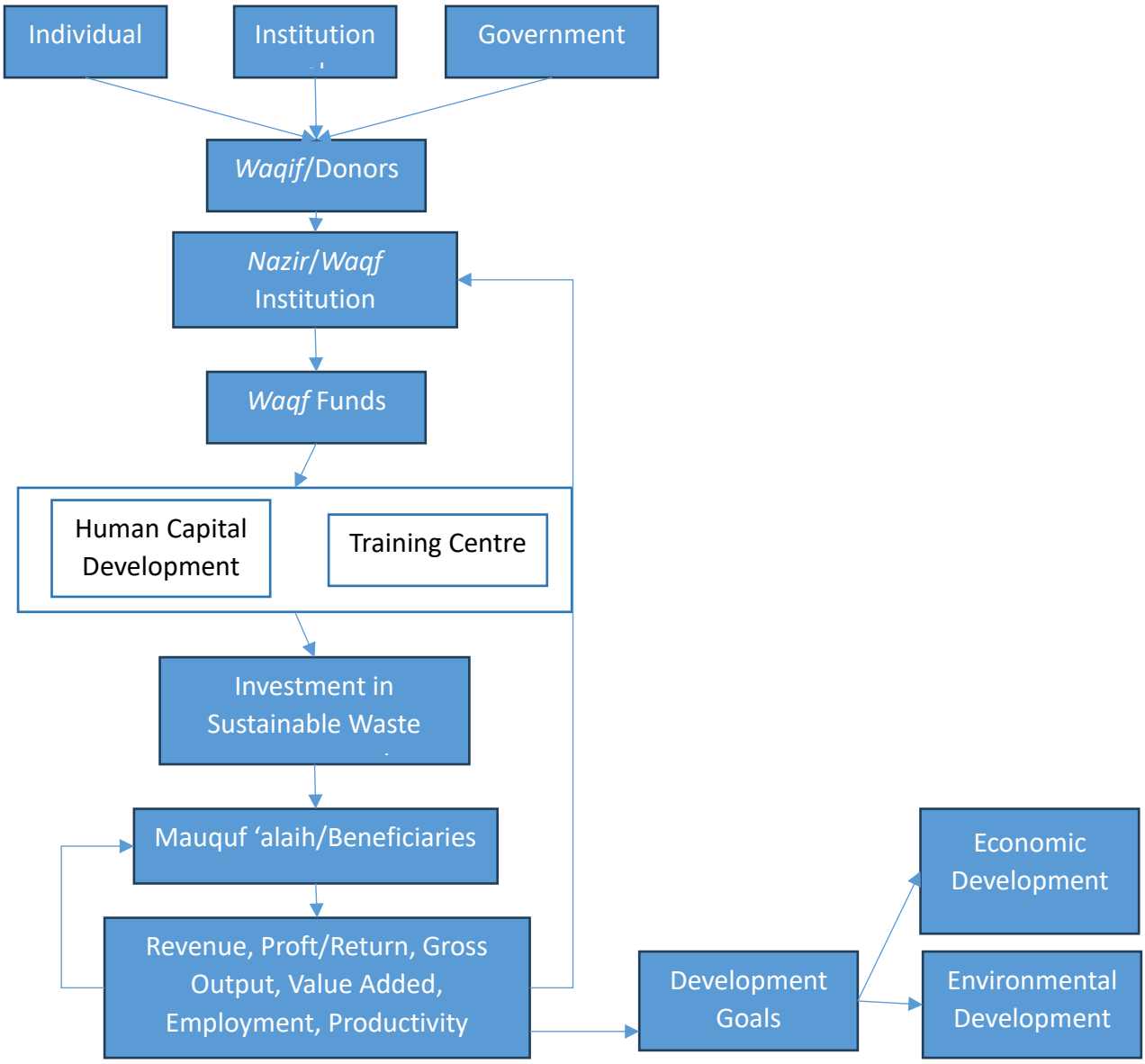

Figure 2

Green *Waqf* Model for Sustainable

Data source: Author one 2025

Figure 2 explains the systematic flow of *waqf* sustainable that this project has the potential to generate a profound societal impact through human resource development programs. Notably, one of the most significant effects will be on government budgets, as the proposed model is designed to generate its own funding through cash *waqf* for the development of human capital. The waqif plays a crucial role as the initial founder or donor, dedicating assets such as property, funds, or other valuables for charitable purposes. The waqif's responsibilities include defining the specific objectives and beneficiaries of the *waqf*,

establishing the terms and conditions governing its management and utilization, and ensuring adherence to Islamic legal principles and ethical standards. Through their philanthropic contributions, waqifs not only support social welfare and community development but also fulfill religious obligations and attain spiritual rewards. Waqifs or donors may come from diverse backgrounds, including individuals, institutions, organizations, and governmental entities (Mahmassani, 2021).

These initiatives not only address immediate waste disposal challenges but also contribute to long-term sustainability by mitigating environmental pollution, conserving natural resources, and fostering a culture of responsible waste management within communities. Moreover, the perpetual nature of green *waqf* ensures a continuous flow of financial resources to sustain ongoing waste management efforts, thereby enhancing the overall resilience and sustainability of waste management systems. Based on Thaker's research, this study integrates green *waqf* investment with human capital development through an integrated green *waqf* waste management investment model. This model is specifically designed to facilitate the human capital development of beneficiaries and relevant institutions. Enhancing human capital through such programs is a strategic approach to ensuring that *waqf* cash funds are effectively utilized to establish cutting-edge training centers equipped with subsidized and state-of-the-art facilities. These training centers will offer subsidized participation fees for enterprises while providing opportunities for organizations to conduct training programs and other capacity-building activities aimed at modernizing, upgrading, and improving workforce competencies and capabilities (Thaker, 2021).

Waqf institutions, known as Nazirs, serve as trustees or administrators responsible for managing and overseeing *waqf* assets and operations. Their primary duties include safeguarding *waqf* properties, ensuring that the income generated is allocated in accordance with the donor's intentions and Sharia principles, and maintaining accurate records of financial transactions and disbursements. Nazirs play a pivotal role in maintaining the integrity and sustainability of *waqf* institutions by upholding transparency, accountability, and the effective utilization of resources for charitable purposes. Second, *waqf* institutions will allocate *waqf* funds to establish and operate training centers equipped with advanced carbonization technology, with subsidies aimed at promoting human resource development. Third, *waqf* facilities will provide skill development training programs and business-oriented

short courses through these training centers, enabling beneficiaries (mauquf ‘alaih) to enhance their workforce capabilities. To maximize participation, beneficiaries should be charged a minimal subsidized fee (Syamsuri & Wibisono, 2019).

Fourth, upon acquiring the necessary skills and training from *waqf* institutions, beneficiaries are expected to secure employment and become more productive, ultimately leading to increased incomes, thereby contributing to the achievement of SDG 1—No Poverty and SDG 2—Zero Hunger. Moreover, sustainable waste management initiatives can effectively handle various types of waste, fostering a greener and healthier environment, which aligns with SDG 3—Good Health and Well-being and SDG 11—Sustainable Cities and Communities. Additionally, sustainable waste management can produce hydrochar or carbon materials with high potential applications in solid fuels, supercapacitors, and fuel cells, supporting SDG 7—Affordable and Clean Energy and SDG 13—Climate Action. In summary, implementing a Green *Waqf* model for sustainable waste management offers a viable solution to both economic and environmental challenges in Indonesia. Fifth, for sustained effectiveness, continuous monitoring, evaluation, and performance reporting must be conducted. Continuous improvement within *waqf* institutions entails a systematic approach to enhancing operational efficiency, service delivery, and long-term impact. Accountability, monitoring, and evaluation mechanisms are fundamental to ensuring transparency, integrity, and effectiveness in utilizing *waqf* assets and resources for charitable purposes while upholding ethical standards and honoring donor intentions (Fanani et al., 2020).

The proposed green *waqf* model seeks to provide ongoing support to impoverished beneficiaries through training and educational programs financed by *waqf* endowments. In this regard, the green *waqf* model serves as a sustainable initiative that complements existing governmental and non-governmental programs in Indonesia. As a result, this model has the potential to enhance economic growth and contribute to the Sustainable Development Goals. Once a community benefits from this model, it may inspire others, thus fostering greater employment opportunities and reducing poverty at the grassroots level. Effective implementation of this model is expected to enhance societal productivity. If successfully adopted, the proposed green *waqf* model could serve as a benchmark for other organizations in developing *waqf*-based funds. However, it is essential to acknowledge potential challenges associated with this model. The primary issues faced by cash *waqf* institutions pertain to

system efficiency, product innovation, regulatory frameworks, and technological advancements. Therefore, for *waqf* institutions to successfully establish and manage cash *waqf*, they must prioritize transparency and accountability, develop highly competent Nazirs, and implement innovative marketing strategies (Rusydiana, 2018).

Green *waqf* introduces an innovative and impactful strategy for addressing both economic and environmental concerns. By establishing *waqf* endowments dedicated specifically to environmentally sustainable projects, green *waqf* significantly contributes to the development of a green economy. The funds generated through these endowments can be allocated to renewable energy projects, ecological conservation efforts, and green infrastructure development, all of which are vital for promoting sustainable economic growth while preserving the environment for future generations (Fatira & Nasution, 2019). Furthermore, the influence of green *waqf* extends beyond immediate economic benefits to encompass broader environmental sustainability objectives. By fostering investments in clean technologies, climate change mitigation strategies, and eco-friendly practices, green *waqf* plays a crucial role in reducing carbon footprints, conserving natural resources, and mitigating environmental degradation (Rizal et al., 2020).

CONCLUSION AND SUGGESTION

The application of the circular economy concept in sustainable development is an appropriate recommendation. This concept not only reduces the use of natural resources more efficiently but also provides significant economic benefits. By applying circular economy principles, societies can gain multiple advantages, such as improving natural resource efficiency, maintaining economic stability, reducing waste, and creating new sustainable business opportunities. The implementation of the circular economy serves as a strategy to build a sustainable and environmentally friendly economy in the future. This study has discussed the challenges in realizing sustainable development through a circular economy, including low public awareness, lack of infrastructure and technology, and insufficient supportive regulations and policies. However, these challenges can be addressed by increasing public awareness, developing eco-friendly infrastructure and technology, and establishing strict regulatory frameworks. With collective awareness and support, sustainable development based on a circular economy can be successfully achieved and provide positive environmental

and social impacts. Therefore, it is essential to continue raising awareness, promoting the circular economy, and fostering collaboration to take proactive measures in achieving environmentally friendly and sustainable development.

The proposed green *waqf* model for environmentally friendly waste management has the potential to benefit both economic and environmental sustainability. This model consists of five key stages. First, the waqif transfers cash *waqf* to the *nazir* (*waqf* institution). Second, the nazir allocates *waqf* funds to establish and manage training centers equipped with waste management technology, thereby promoting human capital development. Third, the nazir provides skill development programs to empower beneficiaries *(mauquf 'alaih)*. Fourth, it is expected that beneficiaries, upon completing the training, will secure employment and enhance their productivity. Fifth, continuous monitoring and evaluation should be conducted to ensure ongoing improvements. To support the successful implementation of this green *waqf* model, government intervention is crucial. The government must take an active role in raising public awareness, facilitating land management, ensuring legal support, and providing financial incentives to encourage participation in this noble initiative.

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