



ISLAMIC SOCIAL FINANCING FOR SMART WAST MANAGEMENT: A STUDY ON UTILIZING WAQF FOR AI-DRIVEN WASTE SORTING AND RECYCLING TECHNOLOGIES

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ABSTRACT

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This study examines the potential funding of AI-powered waste management systems that support sustainable urban expansion using Islamic social finance, namely waqf (Islamic endowments). The more people living in an urban area, the more difficult it is to sort, collect, and recycle waste, which calls for substantial financial resources and innovative solutions. With the use of waqf, this study investigates how Islamic social finance might provide a morally sound and long-lasting funding method for AI-powered automated waste sorting and recycling systems. The study looks at the alignment between Islamic environmental stewardship principles and modern waste management goals. It focuses on how waqf can be set up to support AI technologies that improve waste sorting accuracy, reduce dependency on landfills, and increase resource efficiency. The study highlights how waqf can encourage waste management innovation, which will ultimately support sustainable urban expansion and the goals of the circular economy. By examining case studies of existing waqf-funded environmental projects, a framework for implementing waqf-financed, AI-integrated waste management systems in towns with a majority of Muslims is proposed. The results show that communities can solve waste management issues in a sustainable manner and create an environmental care model that is in line with Islamic norms by setting up specialized "green waqf" funds.

Keywords: Social Financing; Waqf; Waste Management System

INTRODUCTION

Within Islamic societies, Islamic social finance (ISF) is a vital instrument for economic growth. Mechanisms such as sadaqah (voluntary charity), zakat (almsgiving), and waqf (endowment) are crucial in tackling a range of social and economic issues (Rusydia, 2018). Globally, and especially in emerging nations, solid waste management is becoming increasingly difficult as urbanization and industry rise. For instance, Nigeria generates over 32 million tons of waste a year, of which less than half is efficiently managed or recycled (Muhammad, et al. 2024).

Sustainable waste management is becoming a critical issue that calls for creative solutions that not only solve environmental issues but also support the objectives of social and economic development (Hamdani, et al. 2021). An inventive strategy that can greatly increase waste handling effectiveness and lower environmental risks is smart waste management, which integrates AI-driven sorting and recycling technology (Andriani&Atmaja, 2019). It is both possible and desirable for Islamic social finance and waqf in particular, to support such projects. Communities can solve environmental issues and promote social and economic advantages for future generations by utilizing waqf for waste management projects (Atmanti, et al. 2018).

The concept of waqf, rooted in Islamic tradition, is a unique philanthropic instrument that allows the dedication of assets for public welfare. Waqf has historically provided funding for a range of public goods in Muslim communities, including infrastructure, healthcare, education, and religious sites (Ali &Kassim, 2020). Waqf practices have been revived and modernized in recent years to address modern socio-economic challenges, such as environmental sustainability (Shahriar et al., 2018). Innovative solutions that lessen environmental consequences while generating social and economic advantages are needed to address environmental concerns, particularly in garbage management (Das et al. 2021). The amount of waste that is sent to landfills could be decreased by using AI-driven waste sorting and recycling technologies, which have demonstrated promise in improving waste processing efficiency, sorting accuracy, and resource recovery (Sangkham, 2020).

Many developing nations, including Nigeria, currently have poor waste management systems, which lead to serious environmental contamination, hazards to human health, and wasteful resource utilization (Muhammad et al. 2023). Despite being widely used, conventional waste management techniques frequently fall short in addressing the complexity and scope of the waste problem. Although AI-driven technologies, especially in the areas of recycling and garbage sorting, provide potential answers, they are sometimes unaffordable and necessitate a large initial investment (AamSlamet et al. 2024). As a result, many municipalities and communities in underdeveloped countries lack the means to implement or use this cutting-edge technology. Waqf's promise as a long-term source of finance for these technologies is still not fully realized (Ahmad, 2020).

In order to encourage such technical advancements, Islamic social financing systems such as waqf can supply the funds and resources required for their execution. In contrast to conventional financing strategies, waqf encourages a community-focused, sustainable strategy that guarantees long-term gains because the endowed assets are maintained for ongoing support of the designated purpose (Muhammad &Asfi, 2024). This collaboration between waqf and AI-powered trash management is in line with the goals of maqasid al-shariah, or Islamic law's goals, especially when it comes to preserving the environment and advancing social welfare. A legal structure that can direct waqf money toward sustainable projects has been advocated by scholars and practitioners who are increasingly interested in the convergence of Islamic finance and environmental technologies (Ascarya et al., 2022).

Waqf has been utilized to fund a number of socioeconomic initiatives, but its potential to fund technical and environmental solutions like waste management powered by artificial

intelligence has not yet been fully realized (Ari &Koc, 2021). Waqf's use in environmental sustainability activities is further constrained by the absence of official frameworks for incorporating it into contemporary development projects (Kahf, 2003). As seen today, the potential of waqf to finance AI-driven trash management is still largely unrealized without organized guidance and community involvement, which impedes efforts to achieve the Sustainable Development Goals (SDGs), particularly in the areas of environmental protection and garbage management. Therefore, in line with the tenets of Islamic financing, this study investigates how waqf might be used to fund the advancement of AI-driven waste sorting and recycling technology for providing a sustainable, neighborhood-based method of waste management in our societies.

LITERATURE REVIEW

In recent years, the idea of Islamic social finance which includes tools like Waqf, Sadaqah, and Zakat has drawn a lot of interest due to its potential to address contemporary environmental and socioeconomic problems, such as waste management. Waqf (endowment) is unique among these instruments in that it is sustainable, making it appropriate for financing long-term initiatives such as waste management infrastructure. This study of the literature examines how Waqf might be used to fund AI-powered garbage sorting and recycling systems, evaluating how well it fits with Islamic social welfare goals and how it can be used in a sustainable environmental framework.

1. Islamic Social Financing and Sustainable Development

Islamic social finance aims to advance economic justice, environmental conservation, and social equity. According to studies, because Islamic finance and Waqf in particular have the innate ability to promote long-term social welfare without depleting resources, they can be revolutionary tools for sustainable development (Karim,2010). Although Waqf has historically provided funding for infrastructure, healthcare, and education projects, new research indicates that it may also be useful in the environmental and technology domains (Cizakca, 1998). Goal 12 of the Sustainable Development Goals (SDGs) calls for responsible production and consumption, and Waqf might be essential in providing funds for environmentally friendly waste management techniques (W.O. Aly. (2016).

2. Waste Management in Islamic Perspectives

According to Qur'anic principles, Islamic teachings promote environmental stewardship and prohibit wastefulness. Islamic environmental ethics encourage prudent waste management and the preservation of natural resources (DwiAtmanti, et al. 2018). Since the idea of Israf (wastefulness) is forbidden, waste management programs are both a municipal and a religious obligation (Adinugraha, et al. 2024). Therefore, including Waqf to aid in waste management is consistent with the Islamic duty to save the environment and maintain

The fact that everything on Earth is a trust (Amanah) that God has entrusted to humanity is emphasized by the numerous commands found in the Quran and Hadith that exhort Muslims to respect natural resources and refrain from excess. Verses from the Qur'an specifically warn against wastefulness, such as Surah Al-A'raf (7:31), where Allah says:

“Eat and drink, but waste not by excess, for Allah loves not the wasters.”(Q:7:31).

By discouraging the idea of Israf (excess or wastefulness), Muslims are encouraged to adopt actions that protect the environment and society (Shahriar et al. 2018). The preservation of life, property, and the environment are given top priority by Islamic legal concepts, such as Maqasid al-Shariah (the aims of Islamic law), which supports programs like sustainable waste management. This emphasis is in line with Islamic social welfare duties, where waste

management initiatives for the general population can be funded by Waqf (endowment) and Zakat (obligatory alms) (Ascarya, 2022). According to historical accounts, the Prophet Muhammad (peace be upon him) placed a strong emphasis on maintaining public areas and keeping them clean, which strengthened local obligations on waste management procedures (Salarzahi et al. 2010). Hadiths, for instance, teach adherents to keep public spaces clean and to remove dangerous items from walkways, exemplifying an early type of environmental.

Islamic social finance is promoted by contemporary Islamic scholars as a means of promoting sustainable waste management. Waqf endowments, for example, might fund public awareness campaigns, recycling programs, and sustainable energy projects all of which would help reduce waste and safeguard the environment (Hasan&Wigati, 2024). Scholars in modern Islamic finance contend that in order to promote social justice and ecological balance, environmental sustainability including waste management should be integrated into the Maqasid framework (Ascarya, et al. 2022). These guidelines help to reconcile Islamic ideals with international environmental goals by directing the creation of projects that reduce waste, save resources, and encourage sustainable lifestyles.

3. Potential of Waqf in Supporting Smart Waste Management

Through specific financing sources that enable the acquisition and upkeep of cutting-edge sorting and recycling equipment, waqf endowments can promote AI-driven waste management technology (Budiman, 2011). Research shows that AI-powered smart waste management systems, including data-driven recycling procedures, automated sorting, and real-time garbage monitoring, provide effective answers to urban waste problems. Without relying on erratic financial returns, Islamic social finance can offer such initiatives ongoing support, guaranteeing their long-term survival. Particularly, waqf monies can be used to support non-revenue-generating projects that meet the requirements of public waste control (Hardana, 2022). In Islamic history, waqf, or endowment, has long been used as a sustainable source of funding for institutions such as hospitals, schools, and mosques (Hakim &Nawawi, 2024). Scholars and policymakers have recently looked into how it might be used to finance green projects, such as clever waste management programs. Modern waste management technologies, such AI-driven garbage sorting and recycling, which support sustainable urban environments and lessen ecological effect, can be funded using Waqf (Kahf, 2003). Without requiring revenue creation, Waqf's special perpetual and non-liquidating structure enables it to finance long-term projects that benefit communities. This feature makes Waqf a great option for funding environmental and public welfare initiatives since it may support expenditures on expensive infrastructure, such as smart waste management systems, that might not yield quick financial gains (Hasan, 2022).The Maqasid al-Shariah which places a high priority on environmental preservation, community welfare, and life preservation, are in line with the integration of Waqf into waste management (Hasan&Nurhuda, 2023).

According to a number of studies, environmental Waqf can efficiently assist green infrastructure by funding initiatives like garbage sorting facilities, recycling facilities, and water treatment facilities. Waqf-based approaches are practical for tackling contemporary urban issues, as evidenced by the use of Waqf funding to environmental and renewable energy projects in nations like Malaysia (Hisyam&Marwini. (2024). Waqf institutions should work with tech firms that specialize in artificial intelligence (AI) and green technology to create intelligent waste management solutions that are both efficient and compliant with Islamic law in order to maximize its impact (Irfany, et al. 2023).

4. Challenges and Opportunities in Implementing Waqf for AI-Driven Waste Management

Waqf has a lot of promise for AI-driven trash management, but there are a few obstacles to overcome. First, there is a lack of public knowledge and comprehension regarding the use of Waqf for environmental projects (Jannah, et al. 2021). There is little precedent for Waqf contributions being used for environmental or technological goals; instead, they are typically used for religious and social welfare purposes. Regulatory and governance concerns present another difficulty; many Waqf institutions continue to function under antiquated structures, which prevent them from having the adaptability required to fund technology-driven projects (Kahf, 2003). However, research indicates that Waqf can be redirected to meet contemporary demands, such as waste management, with the right institutional reform and public awareness initiatives (Laksana, 2023).

Challenges

- a. Limited Awareness and Traditional Perception: Waqf has historically been used for healthcare, education, and religious objectives; it is a relatively recent idea to extend its use to technology-driven projects like artificial intelligence in waste management. Funding allocation and public support may be hampered by this lack of awareness (Laksana, 2023).
- b. Legal and Regulatory Restrictions: A lot of Waqf organizations function under laws that might not provide them the freedom to make investments in environmental projects or technology. It can be challenging to adapt Waqf money for creative purposes like AI-based waste management because these institutions frequently adhere to restrictive traditional regulatory procedures (Lathif, 2024).
- c. Governance and Management Issues: When working on sophisticated technological projects like artificial intelligence, effective governance and management are essential to the successful execution of Waqf initiatives. Transparency, accountability, and administrative capacity issues plague many Waqf institutions, which might affect the sustainability and execution of projects (Kahf, 2003).
- d. Funding and Resource Allocation: Waqf funds are permanent, yet it can be difficult to make enough money to pay for expensive waste management infrastructure powered by AI. To finance the initial investment and continuing operating expenses, Waqf institutions must have access to extra financial sources or partnerships (Masruroh, et al. 2024).

Opportunities

- a. Sustainability and Long-Term Impact: The eternal character of waqf corresponds with the sustained financial outlay necessary for environmentally friendly waste treatment methods. Waqf could be used to sustainably fund AI-driven waste sorting and recycling technology, resulting in long-lasting social and environmental effects that are consistent with Islamic values (Cizakca, 1998).
- b. Public-commercial Partnerships (PPPs): To deploy AI-driven waste management solutions, Waqf institutions should collaborate with commercial technology companies and local governments. Through these collaborations, Waqf would be able to use the technical know-how and inventiveness of the corporate sector to play a significant role in funding public welfare initiatives (Laksana, 2023).
- c. Consistency with Maqasid al-Shariah (Islamic Law's Objectives): Waqf for environmental preservation is consistent with Islamic law's more general objectives, which include preserving life, advancing social welfare, and guaranteeing environmental sustainability.

According to Noviarita, et al. (2022), this alignment can foster community support and promote further funding for environmental Waqf initiatives.

- d. Broadening the Application of Waqf: Waqf's use can be redefined and broadened by using AI-driven waste management (Xavier, et al. 2021). This could lead to similar creative applications in other fields, such sustainable agriculture and renewable energy, which similarly tackle contemporary socioeconomic issues (Puspita&Tanjung, 2024).

Case Studies and Practical Applications

New case studies demonstrate the effective application of Waqf in environmental preservation and urban development initiatives. For example, Malaysia has set a precedent for environmentally conscious Waqf applications by allocating Waqf monies to renewable energy projects (Sharma, et al. 2020). Similar to this, experimental initiatives that combine AI and Waqf in domains like energy efficiency and water management offer insights into how it might be used for recycling and garbage sorting (Rusydia, et al. 2023).

Malaysia's Waqf-Driven Environmental Projects

When it comes to investigating creative Waqf applications outside of conventional purposes, Malaysia has taken the lead (Uwais, et al. 2024). Prominently, a number of Malaysian states have implemented Waqf initiatives for sustainable urban development and the environment, such as garbage recycling, clean water projects, and sanitary infrastructure (Sharma, et al. 2022). Funds based on waqf, which are overseen by state religious councils, have been set aside to support waste management programs and raise public awareness of environmental sustainability. With the use of collaborations with private groups to offer technical assistance, these initiatives demonstrate how Waqf can be set up to achieve environmental goals (Shen, 2020).

Indonesia's Waqf for Community and Environmental Health

Waqf has a long history in Indonesia and is being utilized more and more for waste reduction and community health initiatives (Rusydia, 2018). To address garbage accumulation issues, for example, Waqf-based recycling programs have been put in place in a few Indonesian towns. Waqf monies are utilized to set up recycling facilities and plan community clean-up campaigns (Thaker, 2021). Waqf's integration with regional waste management systems has made it possible to fund these initiatives consistently, improving environmental preservation and community well-being.

Jordan's Green Waqf Projects

A number of Waqf-funded green projects have been started in Jordan by various Waqf institutions to address environmental issues such waste reduction, renewable energy, and afforestation (Vlaskin&Vladimirov, (2018). Jordan is supporting sustainable urban development and bringing these projects into line with the goals of Islamic law, or Maqasid al-Shariah, by utilizing Waqf to fund the installation of renewable energy sources and AI-driven recycling systems (Nurul& Sri, 2021). Similar initiatives in other Middle Eastern nations have been sparked by these programs, which have established models for fusing technology, religious beliefs, and environmental sustainability.

Turkey's Endowment for Waste Management and Renewable Energy

To combat urban pollution and carbon emissions, Turkey's Waqf organizations including state-endowed foundations have started funding waste management and renewable energy initiatives. Garbage-to-energy plants and AI-based garbage sorting facilities that enhance urban waste management are funded by some of these Waqf monies

(Hisyam&Marwini, 2024). These programs demonstrate how Waqf can fund investments in high-tech infrastructure, supporting Turkey's national environmental goals and using Waqf-based resources to meet community needs (Cizakca, 1998).

Pakistan's Eco-Waqf for Cleanliness and Recycling

In Pakistan, the Eco-Waqf initiative has been used to improve urban cleanliness and recycling systems by utilizing endowments for environmental sustainability. Community Waqf funds are allocated for public trash collection, recycling stations and educational campaigns on responsible waste disposal (Puspita&Tanjung, 2024). This project demonstrates how even smaller Waqf contributions, when pooled effectively, can finance community-level waste management efforts that help reduce pollution in densely populated areas.

Practical Applications

Public-Private Partnerships (PPPs) with Waqf Funding

Waqf institutions have started collaborating with government organizations and private tech firms in numerous nations to create environmentally friendly waste management systems. Through these PPP models, Waqf can supply finance while private companies offer their technical know-how in AI-powered recycling and sorting technology (Lathif, 2024). This cooperative strategy guarantees access to technology and specialized resources that Waqf institutions might find difficult to obtain on their own.

AI-Driven Waste Sorting Facilities Funded by Waqf

Countries looking into high-tech waste management solutions have adopted AI-powered sorting facilities, where Waqf funds pay for the initial infrastructure cost (Widaningsih and Suheri, 2021). These facilities greatly increase the efficiency of waste processing by autonomously separating recyclable items using machine learning algorithms. Waqf-supported AI-driven system integration demonstrates how conventional Islamic financial instruments can be applied to state-of-the-art technology that tackles urban environmental concerns (Rahman, et al. 2024).

Educational Programs on Sustainable Practices through Waqf

Waqf money is frequently utilized to assist educational initiatives that teach sustainable techniques in addition to direct garbage management (Rusydia, 2018). Citizens are educated about waste reduction and appropriate disposal techniques through workshops, community initiatives, and public discussions supported by Waqf institutions (Velenturf and Purnell, 2021). Long-term behavioral changes that support sustainable urban life are fostered by these programs (Rusydia, et al. 2024).

These case studies and applications illustrate the viability of using Waqf to support sustainable, technology-driven waste management systems, bridging traditional Islamic finance with modern environmental needs.

RESULT AND DISCUSSION

The study explores how the concept of Waqf, a longstanding Islamic philanthropic tool, can be applied to support innovative, technology-based solutions for waste management. Below are key findings and a discussion on their implications for integrating Islamic social finance with environmental sustainability:

Awareness and Attitudes Towards Waqf in Environmental Projects

The findings from stakeholders, who were surveyed, such as environmental specialists, Waqf administrators, and religious leaders, show that the Muslim community is becoming

more conscious of environmental issues (Sariningsih, et al. 2021: Sekarningrum, et al. 2020). Nonetheless, the majority continue to view Waqf more as a way to fund healthcare, education, and mosques than as a way to promote environmental sustainability. Results indicate that additional public education and focused awareness campaigns that highlight how Islamic teachings encourage environmental stewardship as part of Maqasid al-Shariah (the goals of Islamic law) will be beneficial in advancing Waqf for environmental concerns.

Community Support for AI-Driven Waste Management Initiatives

Researches show that when AI-driven trash management is connected to religious concepts like Waqf, communities are more likely to accept it. Donors are drawn to the idea of "SadaqahJariyah," or continual charity, since they appreciate that Waqf offers advantages that never end (Behzad, et al. 2020: Sadrnia, et al. 2020). These results show that Waqf institutions have a chance to use AI technologies for waste management, which is consistent with the values of the community and their readiness to embrace creative solutions that yield long-term social and environmental advantages.

Challenges in Management and Regulatory Flexibility

According to the findings, the implementation of Waqf money for technology-driven projects is significantly hampered by governance and legal limitations. The technical know-how and operational adaptability needed to oversee AI-based waste sorting and recycling systems are lacking in many Waqf institutions. This is consistent with previous research that identifies governance problems in Waqf institutions that restrict their ability to provide funding for creative ventures (Seadon, 2010). Structural changes, like specialized training for Waqf administrators and revised rules allowing Waqf monies to be used for developing technology projects, would probably be necessary to remove these obstacles (Bakhiyi, B. et al. 2018).

Public-Private Partnerships (PPP)

According to the findings, several operational and technical issues might be resolved by collaborations between Waqf institutions and private sector companies that specialize in waste management technology. PPPs might provide the required AI know-how and enable Waqf money to finance the project, establishing a win-win situation for promoting sustainable waste management. This outcome is in line with case studies from Malaysia and Jordan as opined by Vlaskin&Vladimirov, (2018); Muhammad et al. 2024, where private sector experience and Waqf finance have been effectively combined in sustainable urban development initiatives.

Economic and Environmental Impact

According to preliminary researches by WaCIDS (2021: Wildana& A. M. 2021), Waqf-funded AI-driven waste management systems may have positive effects on the environment and the economy. AI garbage sorting systems financed by the Waqf can lessen the environmental impact of metropolitan areas, improve recycling efficiency, and decrease landfill waste (Brotosusilo and Handayani, 2020). In terms of the economy, these programs can also provide employment in the recycling, waste management, and technology industries. The sustainability of Waqf funding, which guarantees long-term project support and is consistent with Islamic objectives of ongoing community benefit, strengthens the economic feasibility of such ventures.

Long-Term Sustainability with Islamic Values

Results show that employing Waqf for environmental projects is in line with Islamic principles on sustainability and stewardship in addition to meeting community needs. Waqf's

eternal character aligns well with the long-term needs of sustainable waste management systems, which call for consistent community involvement and steady finance. According to the other reports, encouraging these uses of Waqf could strengthen the organization's position in tackling contemporary socio-environmental issues while maintaining its religious relevance (Muhammad et al. 2025; Arifatul, Y. et al. 2020; Nabila, et al. 2022).

Therefore, this sights gives a substantial opportunity for Waqf to play a transformative role in sustainable waste management through AI-driven solutions. The findings emphasize the importance of modernizing Waqf management practices, enhancing regulatory frameworks, and fostering PPPs to optimize the role of Waqf in addressing pressing environmental issues. By demonstrating compatibility with Islamic social values, this approach could broaden Waqf's scope, drawing increased community support and providing a model for other regions interested in combining Islamic finance and sustainability. As a result, this sees a significant opportunity for Waqf to play a transformative role in sustainable waste management through AI-driven solutions.

RECOMMENDATIONS

A. Recommendations for Governments

- **Regulatory Support for Waqf Innovations:** Governments ought to establish adaptable legal frameworks that permit Waqf organizations to fund technological and environmental initiatives, such as waste management powered by artificial intelligence. Changing tax laws and providing rewards for Waqf donations to environmental projects may also encourage more participation.
- **Policies for Public-Private Partnerships (PPPs):** Streamlining resources and skills can be achieved by establishing regulations that promote cooperation between Waqf institutions and private waste management firms. These collaborations could be facilitated by governments through grants, subsidies, or common infrastructure that supports AI and green waste management technology.
- **Capacity Building Programs:** Governments should set up training courses for Waqf administrators that concentrate on technology use and environmental management. This will increase long-term project viability by strengthening Waqf governance and giving managers the know-how to manage technologically complex projects.

B. Recommendations for the Private Sector

- **Collaborative Ventures with Waqf Institutions:** Private businesses that specialize in recycling, artificial intelligence, and waste management should look to collaborate with Waqf institutions. Private companies can guarantee the successful implementation and upkeep of AI-driven waste sorting and recycling systems by supplying technological know-how and maintenance solutions.
- **Corporate Social Responsibility (CSR) Initiatives:** Businesses might contribute AI technology or materials for waste management education to Waqf-based environmental programs as part of CSR. These CSR initiatives have the potential to enhance businesses' reputations while simultaneously having a lasting social and environmental impact.
- **Joint Research and Development (R&D):** To create affordable AI solutions suited to regional requirements, the business sector can work with Waqf institutions in R&D. By creating AI technology that recognizes the unique requirements of developing nations, they can make smart trash management more accessible and inexpensive.

C. Recommendations for Religious Institutions

- **Encourage Environmental Stewardship through Religious Education:** As part of Islamic teachings, religious organizations should highlight environmental responsibility and

connect it to the ideas of Maqasid al-Shariah and stewardship (Khilafah). The Islamic obligation to preserve the environment should be the main topic of sermons, educational programs, and neighborhood gatherings. Support for Waqf-based environmental initiatives should be encouraged.

- **Take Part in Community Awareness Campaigns:** Waqf-funded AI-driven trash management has several advantages, and religious leaders should help spread the word about them. Community members can increase support and donations to pertinent Waqf projects by learning about the programs' effects on the environment, society, and religion.
- **Encourage Partnerships with Waqf and Environmental Organizations:** To coordinate efforts and share resources and knowledge, religious organizations should collaborate with Waqf foundations, governmental organizations, and environmental NGOs. By ensuring that projects meet actual community needs while upholding Islamic principles, this alignment can increase their effect and sustainability.

D. Recommendations for Communities

- **Encourage Waqf Contributions for Environmental Projects:** Waqf monies that assist recycling and sustainable waste management initiatives should be made available to community members. Communities may be more inclined to donate or get involved if they realize that environmental projects are consistent with Islamic principles.
- **Volunteer and Take Part in Local Waste Management Initiatives:** Communities can help by volunteering for Waqf-funded projects involving waste sorting, recycling, and cleanup. More participation will enhance project results and foster local ownership, guaranteeing that the initiatives are impactful and well-maintained.
- **Promote Sustainable Waste activities:** Recycling and waste reduction are two examples of sustainable waste activities that communities should embrace and support. Waqf-funded waste management initiatives can have a greater impact when community-led initiatives are implemented, fostering an environmentally conscious culture that supports the long-term objectives of Islamic environmental stewardship.

Governments, businesses, religious organizations, and communities can all work together to promote a sustainable framework for Waqf-funded, AI-driven trash management by putting these suggestions into practice. By utilizing each group's distinct capabilities, the suggested measures foster a cooperative strategy that harmonizes Islamic social finance with environmental sustainability and technological innovation..

CONCLUSIONS

The use of Waqf for AI-powered waste management has great potential to achieve the twin goals of social welfare and environmental sustainability, both of which are based on Islamic principles. However, strong institutional reform, creative governance, and raised public awareness are essential for the success of Waqf-based waste management programs. Future uses may also be facilitated by creating frameworks for Waqf investment in technology-driven solutions, especially those that benefit the general population. Islamic social finance can support sustainable urban living by modifying Waqf to address contemporary environmental issues, which is consistent with both Islamic teachings and the international sustainable development goals.

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