Upholding the Trust of Khilafah: AI-Enhanced Green Accounting in University Social Responsibility

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ABSTRACT

This study proposes a conceptual framework that integrates Artificial Intelligence (AI) into Green Accounting (GR) practices to enhance University Social Responsibility (USR) within the context of Islamic values. The framework positions the Khilafah principles, derived from the Qur'an and Hadith, as a moderating factor that influences the relationship between AI-driven GR and USR outcomes. The study identifies five key elements of the khilafah principle, namely amanah (trust), adl (justice), ihsan (excellence), maslahah (public welfare) and tafwid or hisbah (delegated trust and accountability), which serve as essential values guiding the ethical integration of AI into sustainability practices. By aligning technological advancements with these faith-based responsibilities, the proposed model promotes a value-driven approach to sustainability. This framework contributes to the expanding body of literature on Islamic sustainability practices and offers practical insights for policymaking and strategic planning in higher education institutions.

Keywords: Khilafah principles, Artificial Intelligence, Green Accounting, University Social Responsibility

INTRODUCTION

In Islam, humankind is appointed as khalifah (vicegerent) on Earth, entrusted to preserve balance, uphold justice, and manage resources responsibly (Qur'an, 2:30). This duty extends beyond worship to environmental stewardship, ethical governanc and service to society. Universities, as centers of knowledge, share this trust through their social responsibility in promoting sustainability and justice. Green accounting (GR) supports this role by measuring environmental impact and guiding informed decision-making. When enhanced with artificial intelligence (AI), it strengthens transparency accuracy and efficiency in resource management, in line with Islamic values of amanah and accountability. The Prophet Muhammad SAW reminded: "Each of you is a shepherd and each of you is responsible for his flock" (al-Bukhari & Muslim). Thus, integrating AI into GR reflects an Islamic model of stewardship, advancing university social responsibility (USR).

Universities today are expected to go beyond education and research by contributing to sustainable development, social equity and community well-being. However, many institutions, particularly in developing countries, face challenges in integrating USR due to the absence of clear frameworks, limited resources and weak institutional commitment, which undermines their role in addressing global issues such as climate change and inequality (Žalėnienė et al., 2021).

GR has emerged as a tool to measure and manage environmental impact, yet its integration with AI remains limited and fragmented, constrained by the lack of standardized frameworks, ethical concerns and misalignment with USR governance (Silitonga et al., 2024). Although AI offers improved data accuracy and efficiency (Areiqat

& Jaber, 2025), adoption risks becoming superficial without a principled foundation, leading to greenwashing and loss of trust. The Islamic principle of khilafah, rooted in Qur'anic guidance (2:30; 6:165), provides an ethical framework that emphasizes accountability, justice and stewardship, enabling AI-driven GR to align technological innovation with universities' ecological, social and spiritual responsibilities (Osman et al., 2023).

LITERATURE REVIEW

USR extends the traditional roles of teaching and research by promoting sustainability, ethical governance and community engagement. It requires universities to integrate social and environmental responsibilities into their academic and operational functions, ensuring that institutional contributions align with societal well-being (Lo et al., 2017). Collaboration with communities through initiatives such as service learning and participatory research strengthens the relevance and impact of USR in addressing real-world challenges (Olson & Brennan, 2017).

In order to support sustainability, universities increasingly adopt GR which identifies and quantifies environmental costs to guide efficient resource management and strengthen accountability (Chukka et al., 2024). The integration of AI further enhances green accounting by improving data collection, analysis and reporting accuracy (Peng et al., 2023). Tools such as eco2AI and AI-driven carbon tracking systems demonstrate that technology can reduce risks of greenwashing and promote transparency (Oladeji et al., 2023). Moreover, embedding AI in academic programmes helps cultivate sustainability literacy and green competencies among students, preparing them for responsible leadership (Iskandar et al., 2021).

However, AI-enhanced sustainability practices often lack integration with deeper ethical or spiritual values. For Islamic institutions, this gap highlights the need for a value-driven model that unites AI, green accounting and faith-based ethics. Core principles such amanah (trust) and maslahah (public welfare) provide a moral framework to guide responsible innovation (Haryati et al., 2023; Osman et al., 2023). By embedding these values, universities can transform green accounting from a technical tool into a means of ethical decision-making and authentic accountability.

The Islamic worldview enriches sustainability by framing humans as stewards entrusted with protecting the Earth, guided by values of justice (adl), excellence (ihsan) and divine unity (tawhid) (Kadir et al., 2022). Islamic higher education institutions are thus uniquely positioned to demonstrate that technology and spirituality can complement one another in advancing ecological integrity and social justice. Studies affirm that integrating Islamic values into USR fosters stronger community engagement and equips graduates with both ethical and professional competencies to address global sustainability challenges (Ibrahim et al., 2024).

METHODOLOGY

This study adopts a qualitative, conceptual approach grounded in Islamic epistemology. It applies thematic analysis of the Qur'an, Hadith and key tafsir sources to construct a value-driven framework that integrates Islamic ethical principles with AI-enhanced green accounting in the context of USR. Central to this framework is the Qur'anic principle of khilafah (stewardship), supported by values such as al- 'adl (justice), al-ihsan (excellence), maslahah (public welfare) and tafwid (delegated trust). These principles are synthesized with contemporary practices in green accounting and AI-based sustainability reporting. The model positions Islamic higher education institutions as ethical stewards (amin) who apply AI technologies in line with Shariah-compliant sustainability standards, thereby promoting accountability, ecological integrity and spiritual responsibility (Sayyid Qutb, 2000; Ibn Kathir, 2008; Hamka, 2012).

RESULTS AND DISCUSSION

The Qur'anic principle of khilafah establishes humans as vicegerents entrusted by Allah to manage, protect and sustain the Earth responsibly (Al-Baqarah 2:30; Al-An'am 6:165). This responsibility is not limited to spiritual obligations but includes social justice, environmental care and ethical governance. The Prophet Muhammad (peace be upon him) emphasized accountability when he said, "Each of you is a shepherd and each of you is responsible for his flock" (al-Bukhari, no. 893; Muslim, no. 1829). Within the context of higher education, this

principle extends to universities as institutions entrusted to guide knowledge, innovation and leadership for the benefit of society and the environment.

In recent years, the integration of AI into GR has emerged as a promising avenue to strengthen USR. AI technologies enhance environmental data collection, track energy consumption, monitor carbon emissions and improve sustainability reporting with greater accuracy and timeliness. The Qur'an itself encourages reflection and the pursuit of knowledge (Al-Baqarah 2:31; Al-Qamar 54:49), which legitimizes the use of advanced technologies in serving human stewardship. When universities employ AI to support green accounting, they operationalize Islamic values of amanah (trust) and ihsan (excellence), ensuring that innovation is not merely technical efficiency but also spiritual accountability. The hadith that "If a Muslim plants a tree… it is regarded as sadaqah for him" (al-Bukhari, no. 2320) further highlights how environmental care, when aided by technology, becomes a form of ongoing charity.

The role of khilafah as a moderating principle is central in ensuring that AI adoption does not fall into superficial or exploitative practices such as greenwashing. Instead, it provides the ethical compass that aligns technological applications with justice (adl), responsibility (amanah) and collective welfare (maslahah). Surah Sad (38:26) reminds leaders to judge fairly and avoid desires that deviate from divine guidance, a message that resonates with institutional governance in universities. Similarly, Surah Al-Ma'idah (5:2) advocates cooperation in righteousness, framing USR initiatives as acts of obedience to Allah rather than just policy compliance. By embedding these ethical safeguards, khilafah ensures that AI-driven green accounting upholds true accountability and contributes meaningfully to environmental sustainability and social inclusion.

Building on these insights, this study proposes a conceptual framework where khilafah moderates the relationship between AI-enhanced GR and USR outcomes. The framework positions Islamic higher education institutions as ethical stewards (amin) that integrate advanced technologies while remaining rooted in Shariah-based values. This integration enhances transparency in sustainability reporting, fosters ethical leadership among students and strengthens community engagement. The Qur'an's emphasis on avoiding corruption and imbalance (Ar-Rum 30:41; Al-A'raf 7:56) underscores the urgency for universities to adopt sustainable practices guided by divine accountability. By aligning AI tools with Islamic moral responsibilities, universities can fulfil both global sustainability goals and faith-based obligations.

Thus, the convergence of AI with GR and the principle of khilafah produces a holistic model of USR that advances ecological integrity, social justice and spiritual responsibility. This value-driven approach transforms sustainability efforts from mere institutional policy into a reflection of divine stewardship, reinforcing the role of universities as agents of ethical and transformative change.

However, the integration of AI into green accounting also requires careful consideration of the limitations and boundaries set by Shariah and institutional governance (Khaliq, 2024). AI technologies, while beneficial for efficiency and accuracy, cannot independently interpret ethical intentions, moral nuances or the maqasid dimensions of environmental stewardship unless these principles are explicitly embedded within system design (Kannike & Fahm 2025). This creates a risk of algorithmic bias, data manipulation, or over-reliance on automated outputs that may conflict with the values of amanah and adl. From a governance perspective, universities may face challenges relating to transparency, data ownership, digital inequality across campuses and the potential misuse of AI-driven reports to create superficial images of sustainability (Saeed, 2024). These limitations highlight the need for strong human oversight, Shariah-informed guidelines and robust institutional policies to ensure that AI remains a tool that supports, rather than replaces, ethical human judgment in fulfilling the responsibilities of khilafah.

In addition, the use of AI in Islamic sustainability frameworks introduces the possibility of both technological bias and interpretive bias (Kausar, Leghari & Soomro, 2024). AI systems are trained on datasets that may not reflect Islamic ethical priorities, leading to outputs that privilege Western environmental standards while overlooking value-based criteria such as maslahah or ihsan (Bukhari, 2025). At the same time, the interpretation of Islamic principles itself may vary across scholars, madhahib and institutional contexts, resulting in different understandings on khilafah should guide technological decision-making (Zuhdi, Helmin, Labib & Jasafat, 2025).

These differences may affect the design of AI models, the selection of sustainability indicators and the weighting of ethical dimensions within green accounting. Without careful scholarly oversight and contextual interpretation, AI-driven recommendations may unintentionally misrepresent or dilute Islamic values, reinforcing the need for interdisciplinary collaboration between Shariah experts, sustainability practitioners and AI developers.

In addition to technological and interpretive limitations, the integration of AI into green accounting faces multiple challenges across technological, institutional, and ethical dimensions. From a technological perspective, issues such as system interoperability, data quality, limited AI literacy among staff, and the complexity of embedding Shariah-based ethical criteria into algorithms can hinder effective implementation (Khaliq, 2024; Kannike & Fahm, 2025). Institutionally, variations in governance structures, resource availability, digital infrastructure and policy frameworks across universities may restrict standardization and consistency in AI-enhanced sustainability practices (Saeed, 2024). Ethically, ensuring that AI-driven decisions adhere to principles of amanah, adl, and maslahah requires careful human oversight to prevent misuse, greenwashing, or decisions that prioritize efficiency over moral accountability (Kausar, Leghari & Soomro, 2024).

Despite these challenges, the proposed framework demonstrates relevance beyond Islamic higher education, as many of its underlying principles of stewardship, accountability, justice and environmental responsibility carry universal ethical significance (Yasmeen, Yasmin & Al Abri, 2024). In non-Islamic institutions, the khilafah construct may be operationalized as an ethical stewardship model that guides the integration of AI into green accounting through principles of transparency, responsible decision-making and ecological care (Khaliq, 2024). This demonstrates the framework's adaptability to diverse institutional contexts, emphasizing shared human responsibilities toward environmental protection, societal well-being and sustainable governance while maintaining rigorous ethical oversight.

FUTURE RESEARCH

This study proposes a conceptual framework that integrates AI into green accounting practices, guided by the principle of khilafah, to strengthen USR. Future research should focus on three key directions. First, empirical validation is necessary to test the moderating role of Islamic stewardship in the relationship between AI-enabled GR and USR, where quantitative approaches such as structural equation modeling can assess how ethical values shape sustainability outcomes (Hair et al., 2014). Second, comparative studies between Islamic and non-Islamic universities may highlight how faith-based stewardship, accountability and integrity influence environmental governance through AI systems. Third, future research should develop policy guidelines that align AI adoption with Maqasid al-Shariah, ensuring that universities fulfil their mandate as khalifah by promoting sustainability, accountability and protection of the environment (Durre et al., 2025).

Additionally, subsequent studies may refine this conceptual contribution through the application of a more clearly defined empirical methodology that enables rigorous testing of each proposed relationship within the framework. Approaches that incorporate longitudinal data, mixed-method triangulation or advanced analytical models would offer stronger explanatory power (Pranesti, A., & Romadhon, 2025). It also enhances the validity of findings concerning the integration of AI, green accounting practices and Islamic stewardship in strengthening USR.

CONCLUSION

This framework positions AI-enhanced green accounting as a transformative tool for advancing USR within Islamic higher education. By embedding khilafah values as a moderating principle, it ensures that technological innovation is aligned with Qur'anic and Prophetic guidance. The integration of stewardship principles provides ethical direction, making sustainability efforts not only effective but also faith driven. Central to this framework are the five key elements of khilafah, namely amanah (trust), adl (justice), ihsan (excellence), maslahah (public welfare) and tafwid or hisbah (accountability), which together guide the ethical adoption of AI in sustainability practices. This model offers a foundation for empirical research and practical strategies in building socially responsible and environmentally conscious university governance.

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