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WELCOME SPEECH FROM THE CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

بسم الله الرحمن الرحيم السلام

عليكم ورحمة الله وبركاته

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed “*Embracing Construction Revolution 4.0: Transforming Malaysia’s Built Environment*.” On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'

Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM CO-CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

Associates Professor Dr. Nur Hisham Ibrahim, *PMP*
Co-Chairman, Universities' Partnering Committee
RISM Session 2024/2025
May 2025

WELCOME SPEECH FROM THE PROJECT DIRECTOR

RISM 17th International Surveying Conference for Undergraduates 2025

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

Sr Dr. Nurul Fadzila Zahari

Project Director

RISM 17th ISCU 2025

EXPLORING THE SUSTAINABLE MANAGEMENT OF WAQF CEMETERIES CRITERIA TOWARDS OPTIMIZING SPACE UTILIZATION AND ENVIRONMENTAL CONSERVATION

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ABSTRACT

Waqf cemeteries constitute a significant component of the Islamic wealth system, offering perpetual burial space for Muslim communities. The rising demand for cemeteries, driven by population growth and urban development, presents challenges in spatial optimisation and sustainable management. This study aims to identify the factors contributing to the sustainability of waqf cemeteries through a review of literature on land use strategies, environmental conservation practices, and governance frameworks. This research employs a qualitative methodology, systematically analysing secondary sources including academic journals, official reports, and pertinent policy documents. The results indicate that efficient spatial planning, the implementation of eco-friendly burial techniques, and digital mapping systems can enhance the sustainability of waqf cemeteries. Nonetheless, regulatory challenges, community awareness, and financial limitations persist as significant impediments to this optimisation endeavour. This study emphasises the necessity for a comprehensive Waqf cemetery management model to reconcile religious duties with contemporary sustainability principles. This study's findings inform policy recommendations aimed at enhancing the efficiency and environmental sustainability of waqf cemetery management in Malaysia and worldwide.

Keywords: Waqf cemetery, Waqf space, Waqf sustainable, Waqf management

I. INTRODUCTION

Waqf has historically been instrumental in the socio-economic advancement of Muslim communities, supplying vital public amenities such as education, healthcare, and burial sites. Muslim cemeteries exemplify a notable implementation of waqf, providing decent burial sites for posterity. The term waqf derives from the Arabic al-waqf, signifying to withhold or preserve. In Islamic doctrine, waqf denotes the permanent donation of property for religious or charity purposes, making it inalienable and no longer subject to private ownership. In Malaysia, waqf land is primarily allocated for religious, educational, and welfare reasons, with Muslim graves being a significant application. Waqf cemeteries have been essential in several Muslim-majority nations, offering places of burial that comply with Islamic tenets while relieving the financial strain on families. Like Malaysia, rapid urban growth has posed problems to sustainability and management. The administration of waqf cemeteries is not just a religious duty but also an essential component of urban planning, sustainable land management, and environmental preservation. Inadequate plans may result in land shortages, ineffective land utilisation, and administrative complications due to rising demand for burial sites. Confronting these difficulties necessitates creative solutions, like digital waqf land registration, improved land distribution, and integrated cemetery management systems. Moreover, environmentally sustainable burial methods and digital mapping technologies can improve sustainability while upholding the integrity of waqf ideals. Rapid urbanisation and population expansion have resulted in significant issues in Waqf cemetery administration, such as land shortages, ineffective land use planning, and administrative obstacles. These challenges have generated apprehensions over the long-term viability of waqf cemeteries in fulfilling future interment requirements. The legal validity of waqf cemeteries is a subject of contention among Islamic jurists. The Hanafi, Maliki, and Hanbali schools acknowledge a waqf based on its usage, even in the absence of a formal declaration. In contrast, the Shafi'i school asserts that a waqf is acceptable just with an express statement. This underscores the necessity of meticulous paperwork to facilitate the lawful transfer and administration of waqf assets

(Irwan Mohd Subri et al., 2022). This research explores the issues and strategic solutions involved in the sustainable management of waqf cemeteries, focusing on land scarcity, governance, legal complications, and environmental sustainability. The research seeks to build a comprehensive Waqf Cemetery Management Conceptual Framework that merges Islamic principles with modern sustainability standards, ensuring these burial sites are accessible, well-maintained, and efficient for future generations. By integrating community involvement and innovative practices, the model aims to enhance the stewardship of these cemeteries while respecting cultural significance. Ultimately, this approach will contribute to a balanced coexistence of tradition and contemporary environmental stewardship.

II. LITERATURE REVIEW

Definition Of Muslim Cemeteries

Sulaiman (2020) states that we should honour Muslim cemeteries. In order to guarantee that everyone has the opportunity to be laid to rest, cemeteries are often built on waqf land. For Muslims in particular, cemeteries are a necessary piece of physical infrastructure. In a cemetery, the dead are laid to rest in a neat and orderly manner, shielded from the prying eyes of scavengers and superstitions. There are three epochs that people go through according to Islamic thought: the natal, the postmortem, and the reckoning (Saima Mushtaq, 2020). The barzakh is a transitional time after death when angels ask people questions about their faith and the prophet. Those who believe get it right, while those who don't don't. Islamic eschatology is covered in the Qur'an and the hadiths of Prophet Muhammad; approximately one-third of the Qur'an is devoted to the hereafter. The exact hour of the Day of Judgement is a matter for Allah alone, as Muhammad stressed. According to Othman and Husna Albakeri (2019), Islamic cemeteries serve as a visual representation of the hereafter by showing two types of gardens: the paradise garden and the hell garden.

Ethnic, economic, educational, and political factors influence the differences in burial practices, tomb construction, and tomb visits among Muslim countries. Muslims are guided via Islamic law and traditions by several madhhabs, which are schools of thought held by Sunnis and Shias. Hanafi, Maliki, Shafi'i, and Hanbali schools of thought are among the most prominent Sunni madhhabs, whereas Jafaris, Batiniyyah, Ismaelis, Sufis, and Zaydis are among the most prominent Shia madhhabs (Azhar, 2016). Countries with a Shia sect tend to have more ornate tombs and traditions of tomb visits than Sunni countries where this practice is not common due to the more conservative Sunni Islamic tradition, especially in the Gulf region, such as Saudi Arabia (Saima Mushtaq, 2020). In Islam, funerals follow precise protocols, although may vary by area and tradition. In all situations, however, sharia requires that the body be buried after a basic rite of bathing and shrouding (Ibrahim et al., 2022a) followed by prayer. The style of graves and burials may change between locations due to varying funeral practices. The Islamic commandment is limited to respectable burial places. In Islam, it is recommended to avoid constructing over graves and instead choose cemeteries with lush flora. Islamic cemeteries allow for a variety of trees, including cypress, shrubs, and flowers, in addition to naturally existing species.

COMPARATIVE CEMETERY MANAGEMENT: PRACTICES IN MALAYSIA, GERMANY AND INDONESIA

Muslim cemetery practices across different countries are deeply influenced by religious prescriptions, cultural interpretations, and legal frameworks. A comparative analysis of Malaysia, Germany, and Indonesia reveals both shared Islamic principles and context-specific adaptations in managing cemeteries.

i. MALAYSIA

Muslim cemetery practices in Malaysia are largely governed by Shariah principles and local customs. Burial is performed immediately after death to honor Islamic teachings. Key elements include purification of the body, enshrouding (kafan), positioning the body facing the Qiblah (292° 30'), and the recitation of *talqin* at the grave by the imam (Reza & Afla, 2018). The design of cemeteries follows Islamic principles which is graves must remain simple, with no elaborate decorations, and should not exceed a hand-span above ground (Sulaiman, 2020a). Cemeteries are encouraged to be near mosques and residential areas for easier management, ideally not more than 45 km or 45 minutes away. Burial plots are placed on flat terrain for optimal alignment to Qiblah. While pesticides are prohibited directly on graves to maintain ecological purity, chemicals are still used for green landscaping purposes around cemetery areas.

ii. GERMANY

In Germany, Muslim funeral practices must comply with national legal regulations, which sometimes conflict with Islamic traditions. According to Muslim Burial Practices and State Law in Göttingen (Ahmad Bunyan Wahib, 2022) burials cannot take place until at least four working days after death, a period meant for administrative procedures like post-mortem and permit processing. Islamic customs such as immediate burial and body orientation toward Mecca are respected where possible but may be limited by municipal rules. German law also requires coffins to be made from eco-friendly, biodegradable materials that prevent soil or groundwater contamination. Additionally, graves must meet environmental depth standards and though sometimes aligned with Qiblah, the orientation is treated more as a spatial than religious requirement. These laws represent Germany's emphasis on environmental sustainability and public health, sometimes at the expense of religious flexibility.

iii. INDONESIA (ACEH)

In contrast, Indonesia, particularly the Acehnese region, exhibits a strong integration of Islamic rituals with local culture. Traditional ceremonies such as *rah ulei* (ritual head washing), *khanduri jeurat* (communal grave meals), and *tulak breuh* (rice offering to fulfill spiritual debts) reflect a syncretic blend of Islamic, Hindu, and animistic elements (Manan et al., 2024). These practices are not mandated by Islam but are culturally embedded as part of honoring the dead and strengthening social bonds. Unlike Germany, there are fewer legal restrictions in Indonesia, allowing Islamic funeral practices to be performed freely with strong community participation. The role of the imam is vital, and rituals often follow lunar cycles or local cosmological beliefs.

Table 1.0 Comparative Cemetery Management

Country	Burial Timing	Body Orientation	Grave Design	Legal Restrictions	Cultural Integration
Malaysia	Immediate	Towards Qiblah (292° 30')	Simple, low profile	Moderate (Shariah-based, local council)	Medium
Germany	Minimum 4-day delay	Sometimes Qiblah	Eco-compliant coffins, strict depth	High (Federal law)	Low
Indonesia (Aceh)	Immediate	Qiblah + local traditions	Flexible	Low	Very high (includes Hindu & local customs)

In conclusion, while the core Islamic principles of burial are preserved across all three countries such as purification, Qiblah alignment, and simplicity — the implementation is heavily influenced by local laws in Germany, religious governance in Malaysia, and cultural traditions in Indonesia. Understanding these variations provides insight into the challenges and opportunities for sustainable and inclusive cemetery management across diverse Muslim communities.

FACTORS AFFECTING THE SHORTAGE OF CEMETERY SPACE

The scarcity of burial space has emerged as a critical concern in several countries globally, especially in metropolitan locales undergoing rapid population expansion and urban development. Cemeteries, once considered expansive, now struggle to accommodate the increasing number of interments, resulting in spatial deficiencies. This issue is further exacerbated by conflicting land uses, customary burial practices, inadequate planning and management regulations, and the growing influence of financial interests in cemetery management. Burial grounds are often viewed as unproductive land, complicating the allocation of sufficient space for cemeteries. Additionally, social justice concerns, such as unequal access to burial plots and the privatisation of cemetery services, further highlight the complexities surrounding cemetery shortages (Rugg, 2022). This study examines the principal causes leading to the scarcity of cemetery space, including the increasing demand for burial sites, competition for land usage, religious burial customs, planning constraints, environmental impact, and governance issues.

i. Escalating Demand for Cemetery Space

The expansion of the population and migration from rural regions to megacities like Kuala Lumpur and Johor Bahru have led to a higher demand for burial space. An ageing population contributes to rising death rates, which in turn increases the need for cemeteries. Reports suggest that cemeteries such as KL-Karak Muslim Cemetery (KLKMC) in Kuala Lumpur (Reza & Afla, 2018) are experiencing significant space problems, similar to Karet Bivak General Cemetery in Jakarta. By 2023, the cemetery in Kampung Tokai, Kedah, had reached 75.9% capacity and was

expected to run out of space for burials within the next five years (Aizazi Lutfi Ahmad, 2023). Beyond Malaysia, cities such as Hong Kong, Singapore, and Jakarta are experiencing similar land shortages. In response, some governments have introduced multi-tiered burial systems, grave reutilization, and alternative methods such as cremation (Sulaiman, 2020). Rugg's (2022) highlights that increasing demand often results in the privatisation and commercialisation of cemetery spaces, where wealthier individuals can secure burial plots while lower-income families struggle to find affordable burial options. This trend further exacerbates inequality in access to burial grounds, creating a significant social justice issue.

ii. Competition for Land Utilization

Rising urbanization has intensified competition for land between urban development and cemeteries (Sulaiman, 2020). Cemeteries are often regarded as unproductive property, leading to conflicts over land use when large plots are designated for burials instead of housing or commercial projects (Reza & Afla, 2018a). Cemetery administration in Kedah frequently lacks a systematic and well-structured approach (Aizazi Lutfi Ahmad, 2023), further complicating land allocation. According to Rugg's (2022) urban densification and rising land values have resulted in burial sites being repurposed for commercial or residential developments, further restricting cemetery space. In some cases, local governments and private developers convert older cemeteries into parks or other public spaces to maximize land usage, despite potential cultural and ethical concerns. Additionally, cemeteries in many regions are losing legal protections, making them vulnerable to financial interests that prioritize economic gain over social equity.

iii. Religious Burial Practices and Space Constraints

Islamic burial practices prioritize direct burial into the earth, promoting natural decomposition and avoiding the use of coffins (Sulaiman, 2020). This requirement often necessitates significant land allocation, which, when coupled with inefficient burial layouts, contributes to land shortages. In Kampung Tokai, burial plots are assigned without meticulous classification or systematic organization (Aizazi Lutfi Ahmad, 2023), leading to wasted space and inefficient land usage.

Rugg (2022) highlights that religious traditions influence how cemetery systems are structured, particularly in countries with diverse cultural and religious backgrounds. In some countries, Muslim and Orthodox Jewish communities face challenges in securing designated burial spaces due to planning regulations that do not adequately accommodate their religious requirements. The absence of dedicated religious burial zones in public cemeteries may force families to seek private or community-run burial sites, which are often costly and contribute to the increasing shortage of cemetery land.

iv. Environmental Impact and Sustainability

Rugg (2022) highlights that cemeteries pose significant environmental challenges, including pollution from burial sites and cremation emissions. Improperly planned cemeteries in some regions have led to contamination of underground water sources due to the decomposition process (Tsepang Leuta, 2017). Additionally, crematoria contribute to air pollution through toxic emissions, with some locations experiencing protests due to hazardous smoke from poorly regulated facilities (Tsepang Leuta, 2017).

Another major concern is the sustainability of land use for cemeteries, as burial sites permanently occupy land, reducing space for other essential urban needs. Ethical debates arise regarding whether cemeteries should continue to consume scarce land or if alternative practices, such as vertical burials or green cemeteries, should be promoted to reduce environmental impact.

v. Governance and Accountability Issues

A significant challenge in cemetery management is the lack of comprehensive data and forward planning to anticipate future burial space requirements. Although Plan Malaysia employs systematic methodologies for cemetery planning, these techniques are not widely adopted by urban planners (Aizazi Lutfi Ahmad, 2023). Moreover, data on cemetery capacities are often poorly documented, leading to inaccurate forecasts and inefficient land use (Sulaiman, 2020b). Rugg (2022) argues that many governments fail to integrate cemetery planning into

broader urban development strategies, resulting in reactive rather than proactive decision-making.

Additionally, poor governance has led to mismanagement and unethical practices in some cemetery systems. There have been cases where burial plots were resold without permission or where gravesites were disturbed due to lack of regulatory oversight (Rugg, 2022). In some areas, privatization of cemetery services has resulted in excessive costs, making burial inaccessible to lower-income families. Addressing these governance challenges requires stricter regulations, transparent land allocation, and improved accountability in cemetery management.

vi. Lessons from Waqf Land Management

Insights from Indonesia's waqf land management reveal key factors that contribute to inefficient land use, which may also impact cemetery space availability. According to Syarief (2021), many waqf lands remain uncertified, leading to legal uncertainties that hinder proper land utilization, including for burial purposes. Additionally, a significant portion of waqf land is underutilized, often restricted to traditional religious functions such as mosques and educational institutions, without a strategic approach to maximizing land use efficiency. This mismanagement results in a lack of available space for expanding burial grounds. Another major factor is the limited professional expertise among nazhir (waqf administrators), which leads to ineffective planning and allocation of waqf properties, further exacerbating land shortages. To address these challenges, Syarief (2021) highlights the need for formal waqf land certification, the adoption of information and communication technology (ICT) for better land monitoring, and professional training programs for waqf administrators. Implementing these strategies in cemetery management could help optimize land use, prevent future shortages, and ensure sustainable burial site planning in Malaysia and other countries facing similar challenges.

STRATEGIC APPROACHES FOR SUSTAINABLE WAQF CEMETERY MANAGEMENT

i. MULTILEVEL CEMETERIES

To address the shortage of burial land, various solutions have been proposed, including the implementation of multilevel cemeteries. This approach increases burial capacity without requiring additional land. Islamic law allows for exceptions to the prohibition on re-excavating graves under certain circumstances. According to Al-Shirwani in *Hawashi Tuhfah al-Muhtaj*, re-excavating graves is permissible when a cemetery is full and can no longer accommodate new burials (Jamaludin et al., 2021). This ruling is based on the principle of *Istihsan*, which allows modifications to Islamic rulings for the benefit of society.

In Malaysia, several fatwas have permitted the reuse of old cemeteries, the construction of multilevel cemeteries, and the development of cemeteries that are no longer in use. For instance, a fatwa in 1992 allowed the reuse of cemeteries older than 90 years, while a fatwa in 2018 permitted the construction of multilevel cemeteries in emergency situations, particularly in land-scarce urban areas. In the context of waqf cemetery land management, fatwas play a crucial role in ensuring that changes align with Islamic principles, addressing current needs while maintaining respect for the deceased.

The *Maslahah Mursalah* principle supports measures such as the reuse of old graves and adaptation to urban planning requirements. Efficient space management strategies can minimize the need for new burial land by optimizing cemetery layouts, exploring multilevel burial systems, and establishing specific guidelines for waqf cemeteries to ensure systematic and effective management. The application of *Maslahah Mursalah* principles allows for a more flexible approach to addressing challenges related to waqf cemetery land.

Multilevel Islamic cemeteries provide an optimal solution for urban land shortages by maximizing space utilization while adhering to Islamic principles (Mohd Firrdhaus, 2004). This concept prioritizes qibla alignment, non-overlapping burial layers, and well-structured ventilation and drainage systems to maintain cleanliness and structural integrity. Additionally, essential facilities such as prayer areas (surau) and dedicated pathways ensure convenience for visitors and grieving families.

However, several challenges arise in implementing this system, including social acceptance, high construction costs, and environmental concerns such as preventing soil contamination. Countries like Singapore and Hong Kong have successfully adopted multilevel cemeteries, demonstrated the potential of this system when planned in accordance with Islamic guidelines (Mohd Firrdhaus, 2004.) Overall, multilevel Islamic cemeteries offer a sustainable solution for urban burial management by integrating technical, social, and economic considerations (Mohd Firrdhaus, 2004).

ii. ROTATIONAL CEMETERY SYSTEM

In Singapore, severe land scarcity has led the government to implement a rotational cemetery system to optimize space usage. At Choa Chu Kang Cemetery, graves are allocated for a fixed period of 15 years before exhumation. For religions that allow cremation, ashes are stored in columbariums. However, for those that require permanent burial, such as Islam, the remains are reburied in smaller graves to conserve space (Ocón, 2023).

This approach reflects government efforts to balance burial needs with urban development, although it remains a topic of debate due to concerns over cultural heritage and religious sensitivities. Despite the challenges, rotational cemetery systems provide a viable solution for managing burial space efficiently in densely populated cities.

INNOVATIVE SOLUTIONS IN ISLAMIC CEMETERY MANAGEMENT

Islamic cemetery management faces several challenges, including irregular death records, lost or unmarked graves, and limited burial land. To address these issues, modern technologies such as Geographic Information System (GIS), Quick Response (QR) Codes, and web-based systems have been introduced to enhance efficiency and ensure a more systematic approach (Abdullah et al., 2022).

i. The Role of GIS in Cemetery Management

GIS plays a crucial role in mapping burial sites, organizing grave placements, preventing overlaps, and optimizing land use. A study conducted at Bukit Kiara Islamic Cemetery in Kuala Lumpur demonstrated how GIS improves data management and simplifies the grave search process (Abdullah et al., 2022). Additionally, GIS enables tracking, mapping, and forecasting cemetery needs based on population growth (Mohd Noor et al., 2023).

In Perlis, GIS analysis revealed an oversupply of waqf cemetery land due to a misalignment between religious institutions and urban planners. Integrating GIS with the MAIPs MyGOS database improved tracking, planning, and coordination of burial land management (Mohd Noor et al., 2023). GIS further enhances space utilization by visualizing burial locations, identifying underused areas, and forecasting future demand (Asni et al., 2020); (Mohd Noor et al., n.d.) It also facilitates data sharing among relevant agencies, reducing conflicts and promoting strategic land use.

Moreover, GIS improves transparency and accessibility of cemetery records by allowing real-time updates through centralized databases such as MyGOS (Mohd Noor et al., 2023). The integration of GIS in waqf cemetery management not only enhances operational efficiency but also prevents land oversupply and strengthens coordination among stakeholders. The case study in Perlis highlights the effectiveness of GIS in aligning land use with long-term planning needs. Future research could explore AI-driven geospatial technologies to further enhance waqf land management (Mohd Noor et al., 2023).

ii. Strategic Knowledge Management (SKM) in Cemetery Administration

Strategic Knowledge Management (SKM) focuses on how organizations acquire, store, transfer, and apply knowledge to support decision-making (Ferreira et al., 2020). In modern organizations, knowledge is not just an asset but a key resource for maintaining a competitive advantage (Ferreira et al., 2020). SKM is closely linked to the Resource-Based View (RBV) theory, which emphasizes that unique internal resources, particularly those difficult to replicate, contribute to an organization's success (Ferreira et al., 2020).

According to *Strategic knowledge management: theory, practice, and future challenges*, SKM comprises three key components:

1. Knowledge Creation and Acquisition – Involves gathering new insights through research, case studies, and field experiences.
2. Knowledge Storage and Transfer – Focuses on systematically documenting and disseminating information within an organization.
3. Strategic Utilization of Knowledge – Applies knowledge to problem-solving and improving operational efficiency.

In the context of waqf cemetery management, SKM ensures sustainable land use by systematically collecting and analyzing burial data, implementing efficient data storage, and applying strategic insights for long-term planning and resource allocation. Organizations managing waqf cemeteries must assess burial trends, land availability, and

community needs to formulate effective management strategies. The concept of absorptive capacity (Ferreira et al., 2020) helps explain how these organizations can identify, assimilate, and utilize new knowledge effectively.

Digital records and GIS-based data storage enhance record-keeping accuracy and decision-making efficiency. SKM also fosters collaboration among key stakeholders, including religious authorities, urban planners, and policymakers, to develop integrated and sustainable cemetery management solutions. By adopting SKM principles, organizations can mitigate land scarcity issues, optimize resources, and implement data-driven policies to ensure long-term sustainability.

iii. QR Code Integration for Cemetery Records

The use of QR Codes simplifies access to burial records, allowing users to retrieve information about the deceased through a quick smartphone scan. This technology helps address the issue of unmarked or lost graves (Abdullah et al., 2022). Systems such as the Muslim Graveyard Management System (MGMS) have integrated QR Codes, enabling families to locate graves efficiently and accurately (Abdullah et al., 2022).

iv. Web-Based Cemetery Management Systems

Web-based cemetery management systems provide online access to burial records, digital location searches, and real-time updates on death registrations (Abdullah et al., 2022). Research on MGMS indicates that such systems reduce administrative burdens and improve efficiency in cemetery operations (Abdullah et al., 2022).

Technologies such as GIS, SKM, QR Codes, and web-based systems offer innovative solutions for Islamic cemetery management by simplifying grave searches, organizing death records, and enabling strategic land planning. In a broader context, these technological advancements can be adopted to ensure systematic and sustainable utilization of burial land, addressing current and future challenges in cemetery management.

INTERNATIONAL PERSPECTIVES ON CEMETERY MANAGEMENT: LESSONS FOR WAQF CEMETERIES

In several global cities, burial grounds have evolved into multifunctional green assets, contributing not just to religious needs but also to environmental and social sustainability (Grabalov & Nordh, 2022). Within Islamic traditions, waqf cemeteries hold dual responsibilities: upholding religious rites and serving community welfare. However, increasing urban density and shrinking land supply demand a rethinking of cemetery management approaches.

Innovative strategies from cities like Oslo and Copenhagen provide valuable references. In Oslo, cemeteries are seamlessly incorporated into city planning, supporting biodiversity through initiatives like beehive installations and community gardening (Grabalov & Nordh, 2022). These practices not only align with ecological values but also reinforce climate resilience. Copenhagen offers another model, where cemeteries are reimagined as shared civic spaces, hosting events such as art displays, musical performances, and historical tours to foster local engagement (Grabalov & Nordh, 2022).

To ensure long-term spatial sustainability, both cities adopt a 20-year grave lease and reuse policy. This practical approach supports land optimization without compromising respectful burial standards. Furthermore, municipal planning ensures inclusivity by reserving sections for various religious and cultural groups—including Muslims, Jews, and Buddhists—demonstrating a proactive model of pluralistic burial governance (Grabalov & Nordh, 2022).

Malaysia could adapt similar frameworks to manage waqf cemeteries more efficiently. Measures such as digital grave tracking systems, structured reuse policies, and integration into broader green infrastructure planning could help overcome current land limitations while preserving the spiritual sanctity of Islamic burials (Grabalov & Nordh, 2022).

Johannesburg further illustrates how green burial landscapes can contribute to urban (Tsepang Leuta, 2017). These insights can inspire the development of waqf cemetery models that feature eco-conscious layouts, flexible burial formats, and multipurpose land use, benefiting both the environment and surrounding communities. Strategies like vertical layering of graves, shared double-depth burials, and columbaria can be carefully considered within Islamic legal and cultural boundaries.

However, implementing such reforms requires cultural sensitivity and stakeholder cooperation. Public hesitation

toward non-traditional burial models is often rooted in religious conservatism. Engaging with religious authorities, facilitating dialogue with community leaders, and launching awareness initiatives can foster greater acceptance of sustainable burial reforms. Robust governance frameworks—through partnerships between waqf boards, urban planners, and environmental bodies—are also crucial for long-term success.

While urban models like Johannesburg offer promising practices, their adaptation to the Malaysian waqf context must consider local religious norms and institutional settings. Emphasizing social-ecological resilience can guide the development of waqf cemeteries that are not only spiritually meaningful but also adaptable to urban realities.

III. METHODOLOGY

This study employs a qualitative research approach that relies entirely on secondary data sources. This conceptual research aims to explore the sustainable management of waqf cemeteries by combining material from a range of current academic and institutional literature. The academic journals primarily consist of peer-reviewed journal articles obtained from reputable databases such as Scopus, Google Scholar, and ResearchGate, encompassing publications in the domains of Islamic studies, urban planning, environmental management, and land administration. The principal periodicals examined are the *Journal of Islamic Accounting and Business Research*, *Habitat International*, *Planning Malaysia*, and other regional publications concentrating on waqf and cemetery administration in Southeast Asia and the Middle East.

i. Design of Research

The data obtained from previous investigations was carefully evaluated and analysed via a qualitative content analysis methodology. The design is suitable for the identification of significant themes, gaps, and potential solutions in the context of cemetery space management, environmental sustainability, and Islamic funerary practices.

ii. Data Collection

A variety of secondary data sources were collected, including peer-reviewed journal articles, academic journals, fatwas, and policy papers related to waqf, urban land use, and cemetery management. When selecting resources, relevance, dependability, and publication within the previous year were considered, however classical Islamic texts were also reviewed as needed. The majority of publications were identified using keywords such as "waqf cemetery," "Islamic burial land," "cemetery space management," and "sustainable graveyard planning" in academic databases including Google Scholar, Scopus, and ResearchGate. To provide a comparative analysis, around thirty sources were examined, including research from Malaysia, Indonesia, and many Middle Eastern countries.

iii. Data Analysis

A thematic analysis was conducted on the obtained material to identify recurring concepts and practices. Thematic analysis facilitated the development of significant concepts from the literature by pattern detection and inductive reasoning, without imposing preconceived categories. A conceptual framework for the sustainable management of waqf graves was established based on these findings.

iv. Scope and Limitations

The research is confined to data derived from previously published sources, as it relies exclusively on secondary data. No primary data collection or fieldwork was conducted. Consequently, despite the proposed framework's robust theoretical base, more empirical confirmation is recommended for future research.

CONCEPTUAL FRAMEWORK

This study proposes a conceptual framework integrating three primary dimensions for the sustainable management of waqf cemeteries: Islamic principles, waqf governance mechanisms, and environmental sustainability strategies. The framework was constructed based on a thematic synthesis of secondary sources from Malaysia, Indonesia, and selected Middle Eastern countries. The foundational layer is based on Islamic jurisprudence, particularly the principle of *maqasid al-shariah*, which prioritises the preservation of life, faith, intellect, progeny, and wealth. These objectives guide burial practices to ensure they uphold spiritual obligations while aligning with communal and environmental responsibilities (Ibrahim et al., 2022b). The second dimension involves waqf governance mechanisms such as regulatory frameworks, institutional oversight, land administration, and public policy instruments. Effective governance ensures that cemetery lands are maintained, protected from encroachment, and managed transparently in accordance with the waqf's perpetual nature (Irwan Mohd Subri et al., 2022b). Lastly, sustainability

considerations are incorporated, focusing on space optimisation, ecological preservation, and integration with urban land use planning. Techniques such as green cemetery design, digital grave mapping, and GIS-based land monitoring have been identified to promote long-term viability (Abdullah et al., 2022a). This conceptual framework facilitates a holistic understanding of waqf cemetery management by connecting traditional religious values with modern-day planning and sustainability imperatives. Figure 1 illustrates the conceptual framework required for the management of waqf cemeteries in Malaysia. Collaboration between SIRC, the exclusive trustee of waqf land, and the local community responsible with cemetery management must be prioritised. The collaboration between the two parties facilitates the development of more efficient and visitor-friendly cemetery management.

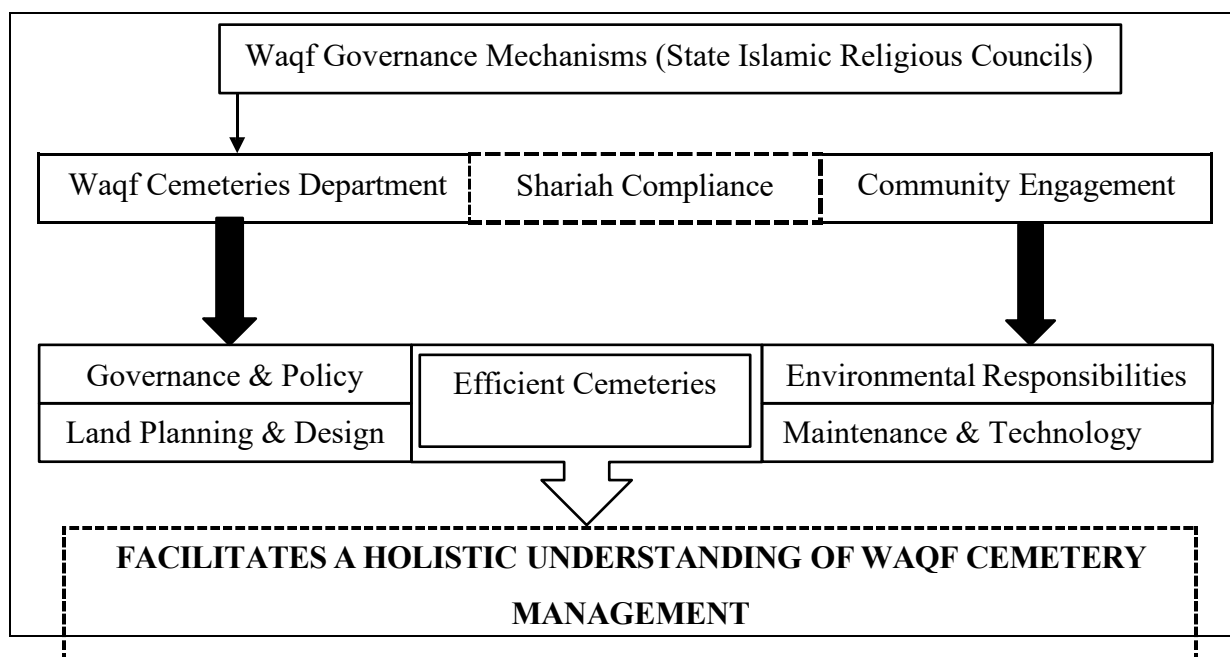


Figure 1.0: The Conceptual Framework Required for The Sustainable Management of Waqf Cemeteries in Malaysia

CONCLUSION

This study highlights the importance of sustainable management of waqf cemeteries to optimize space utilization and environmental conservation. Through a literature review and comparative analysis of international practices, it has been found that efficient spatial planning, the adoption of eco-friendly burial techniques, and the implementation of digital mapping systems can enhance the sustainability of waqf cemeteries. However, challenges such as regulatory constraints, community awareness, and financial limitations remain significant barriers. Therefore, a comprehensive waqf cemetery management model that integrates Islamic principles with modern management strategies is essential to ensure long-term effectiveness. The findings of this study are expected to serve as a reference for stakeholders in developing policies and strategies to improve waqf cemetery management in Malaysia and globally.

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