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Developing a Digital System for Zakat Calculation: A case study of gold and silver

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Abstract
This study aims to develop a digital system for the calculation of zakat on gold and silver. With the advent of digital transformation, current methods of zakat calculation face significant challenges in terms of accuracy, efficiency, and user engagement. Software Development Life Cycle (SDLC) is used for system development methodology. The findings indicate that the digital system significantly enhances the precision and ease of zakat calculations for gold and silver assets, promoting greater compliance and trust among the zakat payers.

Keywords: digital transformation, zakat calculation, gold, silver.

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1.0 Introduction

Zakat is one of the five pillars of Islam, which has been made obligatory by Allah SWT to Muslims whose income or wealth reaches a certain level for those in need. It serves as a mechanism for wealth redistribution and social justice within the Muslim community. Zakat is a calculated variety of assets, including cash, animals, and precious metals such as gold and silver. Historically, face-to-face interactions between zakat administrators *('Amil)* and payers *(Muzakki)* often led to inefficiencies due to logistical challenges and limited accessibility. Traditional zakat calculation procedures are based on manual processes that can lead to mistakes and inefficiency. According to Salaudeen and Zakariyah (2022), the family faces a series of difficulties collecting Zakat, from technical problems such as long distances to travel to *muzakki*, Amil does not have sufficient time, transportation difficulties, and expensive and inefficient costs.

These approaches may also not be practical enough to keep up with market changes and changing financial situations. Therefore, transitioning from traditional to digital systems for zakat collection reflects significant technological advancements and evolving societal behaviors. As a result, there is an increasing demand for zakat applications to have more precise, efficient, and user-friendly zakat calculation methods, particularly for expensive items like gold and silver. This development indirectly contributes to the change in the

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pattern of services provided by social institutions such as Zakat, especially those involving the digital segment (Meerrangani et al., 2022).

Therefore, the main objectives of this study are: (i) to propose a theoretical foundation for developing a digital zakat system; (ii) to design and implement a prototype of a gold and silver zakat calculator based on current market data, and (iii) to assess its usability and reliability for Muslim users in fulfilling their zakat obligations.

The digital transformation of the Zakat administration represents a significant step forward in how this vital Islamic rite is conducted, notably in terms of gold and silver. The Zakat system is a critical component of Islamic economics and finance, and it must embrace digitalization to be compatible with today's digital economy. Rosele et al. (2022) believe the growth of technology and innovation is unavoidable, as proven by the world's embrace of its benefits at all levels and purposes, which are driven by artificial intelligence, big data, data analytics, cloud computing, and other technologies. The digital transformation not only enhances convenience but also aims to increase the overall amount of zakat collected, as it caters to the growing reliance on digital transactions in contemporary society. According to Muda et al. (2010) and Rahim et al. (2011), management efficiency, effectiveness, and transparency contribute to confidence in zakat institutions. This also aligns with Salaudeen and Edghiem (2023), who mentioned digitizing the collection and distribution of Zakat can increase transparency, reduce administrative expenses, and enhance the process's efficacy. Accountability, openness, justice, and accountability of zakat institutions are significant factors in determining zakat payment to formal entities. The employment of the digitalization segment in the management system is regarded as creating a zakat institution more organized, practical, and consistent with the image of an organizational body with a corporate notion (Meerrangani et al., 2022).

Zakat institutions need to take appropriate steps in digitising the existing management system and exploring innovations and technologies to improve services and zakat management in line with current global developments. Therefore, using digital systems for calculating zakat on gold and silver is essential because the prices of gold and silver can change rapidly. Digital systems can provide real-time updates on the market value of gold and silver, ensuring that zakat calculations are accurate and reflect the current market conditions. This system helps individuals fulfill their zakat gold and silver obligations more precisely and prevents any discrepancies due to outdated price information.

2.0 Literature Review

2.1 Digital Transformation in Zakat Institution

The convergence of blockchain technology, digital transformation, financial technologies, and financial inclusion within Islamic finance, has emerged as a groundbreaking phenomenon worldwide (Kanwal, Tayyab, & Idrees, 2023). Over the past decade, these financial technologies have significantly transformed the global financial services sector, introduced new challenges, and disrupted traditional practices. The rise of fintech, digitalization, and blockchain has created distinct opportunities and challenges in Islamic countries that adhere to Sharia law, as compliance with Islamic financial standards is essential (Mhlanga, 2023). Islamic finance is inherently reliant on financial technology. The Islamic financial ecosystem is more progressive and dynamic. Financial technology is one of contemporary finance research's most frequently used terms. Financial technology also refers to applying innovative, modern technology to the banking and Islamic institution sectors. In essence, it is the delivery of financial services through creative and state-of-the-art technology. The concept of financial technology peaked in the latter half of the 2010s (Haddad & Souissi, 2022).

Financial technology has provided innovative and secure financial services in response to investors' growing demand for security. Another factor driving the advancement of financial technology is the need for more mobile applications and efficiently accessible financial services (Anikina, Gukova, Golodova, & Chekalkina, 2016). According to a report by Mirza (2023), in 2019 and 2020, approximately 44 Islamic financial technology companies globally focused on using peer-to-peer (P2P) and crowdfunding platforms to raise capital. The global Islamic finance market is estimated to have an asset value of $2.88 trillion. Driven by this tremendous fact, the present article indicates that Islamic finance would fully be utilized by enhancing digital transformation technologies to serve as enablers or barriers to the goals of Islamic institutions such as Zakat organizations. Digital transformation is essential as it improves effectiveness and enables institutions to adapt to the digital landscape (Ikhlas, Muneem, Abdul Rahman & Ali, 2022).

Digital zakat is a new way of collecting and distributing zakat that offers greater transparency and convenience. It works best when there is a strong plan for managing zakat, government support, and good internet infrastructure. People are more likely to use digital zakat apps if they find them trustworthy and easy to use and if there is active promotion and awareness about their benefits (Herviana & Andika Seri, 2024).In the context of Malaysia, Elsayed and Zainuddin (2020) emphasize the need for Malaysian zakat institutions to enhance their Zakat Information System Technology (ZIST), which will ultimately improve zakat performance. Additionally, adopting technology and innovation is crucial for these institutions to effectively distribute zakat to the eligible recipients (aṣnāf), manage funds, and build public trust. This transformation will significantly alter perceptions of zakat (Salleh & Chowdhury, 2020). Practically, zakat management in Malaysia is governed by state law, with the State Islamic Religious Council (SIRC) serving as the authoritative body overseeing zakat operations nationwide (Wahab & Abdul Rahman, 2011). However, to enhance service delivery and facilities related to zakat, some states have opted to privatize zakat management, delegating responsibilities to specific companies or institutions for the collection and distribution of zakat (Zulkifli, Taha, Mohd Nor, & Ali, 2021). Their responsibility is to collect zakat from eligible Muslims who meet the obligations to pay through various available methods. These methods include physical booths in mosques, online payments from bank accounts, and salary deductions (Zulkifli, Taha, Mohd Nor, & Ali, 2021).

Additionally, zakat institutions are tasked with identifying eligible recipients (aṣnāf) and distributing zakat according to their needs. They also assist aṣnāf by providing education, training, and skill development for sustainability purposes. Malaysia is one of the Muslim countries that has established effective zakat management, positioning it as a pioneer in this area (Migdad, 2019). Despite having a commendable zakat management system, several studies have identified areas for improvement that zakat management should address (Wahid, Abdul Kader, & Ahmad, 2012). The management of zakat in Malaysia needs to enhance its efficiency and transparency, as many zakat payers perceive deficiencies among zakat institutions. Research by Ram Al Jaffri Saad et al. indicates that respondents find the competence, accountability, accessibility, and communication of zakat management below satisfactory levels (Migdad, 2019; Zulkifli et al., 2022). Malaysian zakat institutions have websites that offer basic information and showcase recent contributions. These websites also provide zakat payers access to information and options for making zakat payments, including details about applying for zakat funds and the eligibility requirements for those funds (Saad, Abdul Wahab, & Md Hussin, 2018). Due to these issues, the Zakat Institution should expand technology enhancements by providing transparency knowledge (haul, nisab, etc.) about Zakat and easy access payments that assist the Zakat payer in fulfilling their responsibilities. Therefore, the present article proposes a study about the digital system that should be explored to strengthen the zakat calculation, as explained in the next section.

2.2 The Concept and Philosophy of Zakat Calculation

Zakat is a fundamental aspect of Islamic practice, serving as a form of almsgiving and a religious obligation for Muslims who meet specific wealth criteria. Zakat, commonly known as “wealth tax,” is paid at 2.5 percent of the wealth of the individual. Zakat is also a fundamental pillar of Islam and a crucial component of the Islamic financial system (Supriani et al., 2022). According to Wahab and Rahman (2011), Zakat is a religious "tax" charged to the rich and well-to-do members of the Muslim community for distribution to the poor, needy, and other eligible beneficiaries. Like a tax, zakat requires individuals with surplus wealth to contribute a specific portion of their assets. It is specifically meant to be paid by those who have surplus wealth, thereby resembling a “tax” on the rich. The zakat calculation can vary based on the type of assets owned, and it is traditionally calculated on wealth exceeding a minimum threshold known as nisab. Nisab is the bare minimum level of wealth required to pay zakat. Each wealth category has its nisab rate, but for zakat on income, the nisab is equal to 85 grams of gold (Paizin, 2022). In Malaysia, a niqab has been used as general collateral, consisting of 85 grams (20 dinars) of gold valued in currency (Senawi & Mat Isa, 2016). Masrom, Mohd Saroni, Mohd Azhar, Mohd Azri, & Abd Rahim (2025) highlight that while both zakat and taxation serve as mechanisms for wealth redistribution and tackling economic inequality, zakat is rooted in religious principles and emphasizes spiritual purification and social justice, in contrast to taxation, which functions as a secular fiscal instrument aimed at financing public services and infrastructure, reflecting the wider governance and societal values of a nation.

2.3 Zakat Application and Calculation

Zakat applications have shifted significantly with the advancement of technology through the development of digital platforms for zakat calculation and distribution. The rise of connectivity and smartphone applications made it possible to shift everyday activities to the digital world, including zakat calculation (Tawalbeh & Abdullatif, 2022). The development of the Zakat calculator application has empowered Muslims to calculate and pay Zakat via online platforms. This digital tool simplifies the complex calculations required for Zakat by automating the process and ensuring accuracy. These programs leverage technology to increase accessibility and user interaction, helping Muslims to accomplish their religious requirements easily and efficiently. As Zakat is a financial matter, Zakat calculation is recognized as financial technology (Fintech) (Aditiyawarman & Mu'allim, 2020). Experts have advised financial institutions to adjust to rapid expansion to ensure sustainability (Lee & Shin, 2018). Fintech encompasses innovations and advancements in financial services facilitated by digital technologies. According to Aljbr. et al. (2018), Zakat calculator platforms (ZCPs) have taken the role of Zakat calculator traditional activities. ZCP refers to any zakat calculator that works on the internet, a smartphone, or another platform. Researchers and countries have developed IT systems to facilitate zakat calculations. The growth of digital technology allows the application to become more efficient, precise, and accessible techniques for establishing zakat duties, especially in circumstances that need specific calculations, such as those involving gold and silver. Components within a digital zakat system generally include user registration, nisab threshold update modules, real-time market price integration, calculators, payment gateways, and tracking dashboards for zakat history. Ensuring these features are well-integrated enhances the system’s credibility and user engagement.

2.4 Theoretical Foundation

This study adopts the Technology Acceptance Model (TAM) as a theoretical basis to understand users' intention to adopt the digital zakat calculator. TAM posits that perceived usefulness and ease of use are primary factors influencing the adoption of new technologies (Davis, 1989). In the context of zakat, digital systems must demonstrate clarity, reliability, and alignment with Shariah principles to gain trust among users.

3.0 Methodology

This application provides an information platform related to gold and silver zakat and a calculator space to calculate gold and silver zakat. Using the application, users can find out whether they are subject to gold and silver zakat. In addition, if they are charged gold and silver zakat, they can know the amount of zakat that needs to be paid. They can get information about gold and silver zakat by using this mobile application anytime and anywhere. This application provides several modules, including zakat information, including a gold and silver zakat, gold and silver zakat payment guide, examples of scenarios related to gold and silver zakat, mandatory conditions of

gold and silver zakat, and a calculator for calculating gold and silver zakat. It lets users determine their zakat obligations for both metals according to market values.

Software Development Life Cycle (SDLC) is the system development methodology. The SDLC phases are system planning, systems analysis, systems design, systems implementation, and systems security and support (Hossain,2023). All phases involved in this project will briefly explain the activities and techniques used to develop this application. A preliminary investigation is conducted in the systems planning phase to evaluate the opportunity and problem. The initial inquiry is critical, as the outcome will affect the entire development process. SLDC was initiated to increase the awareness of gold zakat among Muslim individuals. According to Tawalbeh and Hama (2021), by applying SDLC, conducting user surveys, utilizing GPS and database technologies, implementing software and usability engineering principles, and evaluating usability, usefulness, and ease of use, a Zakat calculator application can be effectively analyzed, designed, and developed.

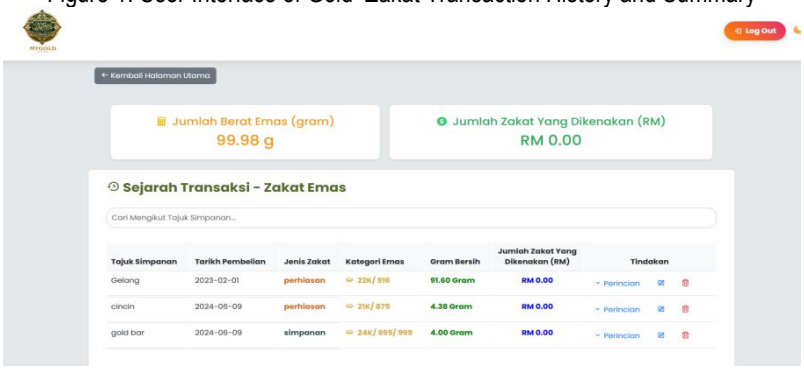
The system analysis phase aims to build a logical model of the proposed system. Thus, fact-finding techniques such as interviews and surveys are conducted to understand the system requirements. The proposed system flow, objective, and scope are identified. In the system design phase, a physical model that satisfies all documented requirements is created, the user interface is designed, and the system's outputs, inputs, and processes are constructed. After all the inputs have been recorded and the interface has been decided upon, the system will be implemented. The software design will be implemented into the source code in this phase. All the components of the software are implemented in this phase. Once the implementation phase is done, system testing will evaluate how it works. In this phase, the system will be evaluated. It ensures the system will run smoothly and meet its requirements. Any errors, problems, and unsuitable elements in this system are discussed thoroughly, and the system is refined.

4.0 Findings and Discussion

4.1 User Interface

The strength of this application is that it focuses on digital information about gold zakat, which can be accessed by Muslim individuals anywhere at any time. Besides that, this application can assist users in understanding the gold zakat scenario, thus increasing their knowledge and awareness about gold zakat. This application also excels in several key areas that enhance its usability and effectiveness for managing personal gold savings and zakat obligations. The application features a user-friendly interface with essential functions such as add, search, update, and delete, facilitating effortless input, modification, and organization of gold-related data. This intuitive design simplifies tracking gold possessions, including the weight of owned gold and the dates of possession or wear, ensuring accurate calculation of ownership periods essential for zakat determination.

Figure 1: User Interface of Gold Zakat Transaction History and Summary



This interface displays the total weight of gold owned, the amount of zakat due, and a detailed transaction history including item names, purchase dates, zakat categories, and zakat amounts calculated.

4.2 Gold and Silver Zakat Calculation Modules

Moreover, this application automates the calculation of hauls that gold has been owned, which is crucial for precise zakat payments according to Islamic principles. Beyond functionality, the app offers educational resources on gold zakat, empowering users with knowledge of zakat conditions and calculations. A reminder feature further supports users by notifying them of impending zakat payments based on entered data, promoting timely fulfillment of religious obligations.

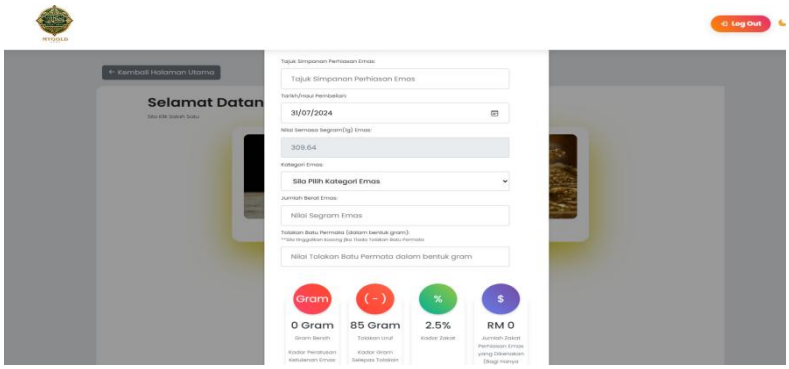
4.3 Security and Accessibility

Additionally, this application prioritizes data security through robust measures to protect users' financial and personal information, fostering trust and confidence in its use. Designed for cross-platform accessibility across mobile devices and web browsers, the app ensures seamless management of gold data regardless of the user's device preference, accommodating diverse needs and providing a consistent experience. Together, these strengths make this application a comprehensive tool for Muslims to manage their gold assets efficiently and fulfill their religious duties conscientiously.

4.4 User Feedback and Limitations

While this application offers robust functionalities, several considerations should be addressed to optimize its utility and reliability. Accuracy in zakat calculations hinges on users inputting precise data like gold weight and ownership periods, highlighting potential errors that could impact calculations. Additionally, the app's accuracy relies heavily on up-to-date market prices of gold, which may fluctuate and influence zakat amounts.

Figure 2: User Interface for Gold Zakat Input and Calculation Form



This form allows users to input gold purchase details, including item description, date, weight, and category. These details are then used to compute zakat obligations based on nisab and applicable rates.

Despite providing educational content, users may still require further guidance on complex zakat rules and interpretations. Moreover, accommodating cultural and regional variations in zakat practices is crucial, necessitating flexibility or customization options within the app. Continuous technical support and updates are essential to maintain functionality and security, aligning with evolving technology and user expectations. Building user trust around sensitive financial and religious data is pivotal, necessitating transparent practices and proactive measures to address concerns upfront. Overall, while this application shows promise in facilitating convenient management of gold possessions and zakat obligations, addressing these considerations will bolster its effectiveness and reliability for users.

5.0 Conclusion and Recommendations

The present article concluded that the digital system for Zakat calculation plays a vital role in enhancing the institution's Zakat collection. This application automates the calculation of the amount of gold owned, which is essential for accurate zakat payments according to Islamic principles. In addition to its functional capabilities, the application provides educational resources on gold zakat, equipping users with knowledge about zakat conditions and calculations. In addition, this application also facilitates convenient management of gold possessions and zakat obligations; addressing these considerations will bolster its effectiveness and reliability for users. This outcome can be achieved when The Zakat Institution enhances this application by providing transparency knowledge (haul, nisab, etc.) about Zakat and easy access payments that assist the Zakat payer in fulfilling their responsibilities.

This article also recommended Zakat institutions to improve their digital applications' user interface and experience. This includes simplifying the payment process, ensuring the application is user-friendly, and providing clear instructions for users. Besides, there is a need for better data management systems to maintain accurate records of eligible recipients (aṣnāf) and zakat funds collected and distributed. A digitalized Zakat management system should include comprehensive databases that track these metrics effectively. Lastly, Zakat institutions should provide educational resources within their applications to inform users about zakat calculations, eligibility criteria, and the importance of zakat. This can empower users and improve their understanding of the zakat process, fostering trust and engagement with the system. Future research may explore the integration of blockchain for transparent recordkeeping and machine learning to personalize nisab tracking based on user behavior. These advancements can lead to a more comprehensive and adaptive zakat digital ecosystem.

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Paper Contribution to Related Field of Study

Zakat Calculation Practices / Islamic Philanthropy

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