



Micropayment Model Using Shariah-Compliant FinTech on Campus

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Abstract- The integration of financial technology into campus ecosystems has revolutionized payment systems, offering convenience and efficiency. This study proposes a micro-payment model using Shariah-compliant fintech tailored for university campuses, aligning with Islamic financial principles while addressing the needs of students, staff, and vendors. The primary objective is to design a secure, ethical, and user-friendly payment system that adheres to Shariah law. The model aims to enhance financial inclusion, promote cashless transactions, and foster a seamless payment experience within the campus environment. The methodology involves a qualitative approach. First, a literature review is conducted to explore existing Shariah-compliant fintech models and their applicability to micro-payments. Second, ensuring compliances of the model with Shariah principles by referring to Syariah Subject matter experts. Third, a prototype of the micro-payment system is developed, incorporating blockchain technology for transparency and security. Fourth, the system is applied on pilot test to the targeted users in a controlled campus environment and feedback is collected to refine the model. The discussion highlights the potential benefits of the proposed model. By leveraging blockchain, the system ensures transparency and reduces fraud, addressing concerns about trust and accountability. The use of digital wallets and QR codes simplifies transactions, making it accessible to all users, including those without traditional bank accounts. The proposed micro-payment model using Shariah-compliant fintech presents a viable solution for campus buying and selling systems, combining ethical financial practices with modern technology. It not only aligns with Islamic principles but also enhances the overall efficiency and inclusivity of financial transactions within the university ecosystem.

Keywords: Micro-payment, Shariah-compliant, Fintech, Blockchain, Financial inclusion.

I. Introduction

The integration of financial technology (fintech) into campus ecosystems has brought about a notable transformation in payment systems, enhancing convenience, efficiency, and accessibility. As traditional payment methods become less favoured among younger demographics, there is a pressing demand for innovative solutions that cater to the evolving needs of the campus community. S. Ahmad et al. (2024) analyses the growing intersections between fintech applications as a key trend that emphasizes the transformative such as blockchain, artificial intelligence, and machine learning in enhancing operational efficiency and decision-making processes.

To address these challenges while adhering to Islamic financial principles, this study proposes a micro-payment model utilizing Shariah-compliant fintech tailored explicitly for university campuses. This model not only aligns with ethical financial practices but also supports the community's transitions toward the finance technology paradigm (Ali & Sulaiman, 2021). Micro-payment model is designed to enhance financial inclusion among users by providing a secure, ethical, and user-friendly payment system that complies with Shariah law, avoiding *riba* (interest), *gharar* (uncertainty), and *maysir* (gambling). Trustability between seller and buyer in the buying process is very important to establish the platform. By incorporating blockchain technology, the model enhances transparency and security, addressing concerns over trust and accountability in financial transactions (Aziz & Mukhiddinov, 2023). Moreover, the use of digital wallets and QR codes



simplifies the transaction process, allowing users—especially those without access to traditional banking services—to engage seamlessly with the campus's financial ecosystem (Raza & Poon, 2022).

In this study, we propose a micro payment model that can be used as a payment method for all transactions in micro payment around the campus. This model will be managed by the university foundation known as Yayasan KUIS that distributes the fund from a particular donor to all students who are in need in the form of a virtual token with a certain amount. Then students can buy anything they want in all shops in the campus by scanning the QR code to deduct the token value in their account. The details of the architecture will be described in the methodology.

The rationale for this model's proposal is that totally cashless technology has certain implementation constraints because it is dependent on profit oriented and controlled by government policies, such as authorization to offer e-wallet services. This method is also very straightforward between all parties in the campus circle due to the fact that this approach is targeted to be used on campus. There are no bankers needed in the process so that all *riba* and *gharar* transactions are totally avoidance in the transaction and the saving. The project's goal is to aid underprivileged students by giving them money to cover basic expenses like food and other educational necessities so that their academic pursuits are not hampered by financial difficulties. It is not for commercialization purposes.

This model was created with the intention of i) offering a Shariah-compliant platform for conducting on-campus buying and selling transactions, and ii) helping students in need by providing funds to meet their needs without requiring more intricate banking transactions and outside financial matters. Its use is purposely to the campus community.

II. Fintech in Islamic Finance Study

The proposed micro-payment model using Shariah-compliant fintech on campus offers several benefits. Firstly, the blockchain-based system ensures transparency and reduces the risk of fraud, addressing concerns about trust and accountability. Secondly, the use of digital wallets and QR codes concept simplifies the transaction process, making it accessible to all users, including those without traditional bank accounts, thereby promoting financial inclusion. Additionally, the model aligns with Islamic financial principles by avoiding *riba*, *gharar*, and *maysir*, providing an ethical alternative to conventional payment systems. The pilot test results indicate a high level of user satisfaction and an increase in cashless transactions within the campus environment. Since it is a new and growing technology in finance there is a lot of research to explore, especially in Islamic finance perspective.

Arshad and Ali (2023) integrating fintech within Islamic finance has shown considerable potential to enhance financial inclusivity and efficiency in the sector. This comprehensive review has highlighted that current practices in fintech demonstrate a growing alignment with Shariah principles, facilitating innovations such as digital wallets, blockchain applications, and AI-driven financial services. However, challenges remain in establishing robust regulatory frameworks and ensuring compliance with Islamic law. Future directions should focus on the development of Shariah-compliant fintech products, enhanced collaboration between fintech firms and Islamic financial institutions, and the importance of educating all stakeholders on these innovations. By addressing these areas, the Islamic finance sector can leverage technology to meet evolving consumer needs while adhering to ethical and religious standards.

Bakar and Abdul Rahman (2022) underscores the transformative role of fintech in enhancing microfinance access for the underbanked, particularly from an Islamic perspective. By leveraging innovative technologies, fintech can overcome traditional barriers associated with access to finance, such as high transaction costs and lack of collateral. The findings suggest that Shariah-compliant fintech solutions not only foster financial inclusion but also ensure ethical considerations inherent in Islamic finance are upheld. The integration of digital platforms and mobile technologies can streamline processes, making microfinance more accessible and user-friendly for marginalized populations.

Hassan & Ali, (2022) aligning with Islamic financial principles offers a distinctive advantage, as it sets a standard for ethical financial behaviour while presenting an alternative to conventional payment systems. The proposed model fosters financial literacy among users, ensuring they are equipped to navigate and maximize the benefits of fintech in their daily transactions. Through a mixed-method approach that includes qualitative and quantitative research, this study aims to



develop a comprehensive understanding of the needs and preferences of the target users, leading to practical solutions that enhance the overall transaction experience within the campus.

Dahdal et al. (2022) The blockchain technology has strong potential to enhance Islamic finance by promoting transparency, trust, and efficiency in financial transactions. It aligns well with Shariah principles, particularly in reducing uncertainty (gharar) and ensuring traceability in contracts. However, widespread adoption will require addressing regulatory, technical, and educational challenges within the Islamic finance ecosystem. To fully harness blockchain's benefits, collaboration among regulators, scholars, and industry stakeholders is essential to develop Shariah-compliant frameworks and innovative financial products.

Noor and Ismail (2022) provide a comprehensive framework for Shariah-compliant digital payment systems that aligns with modern banking practices. Their study emphasizes the importance of integrating fintech innovations while adhering to Islamic principles, thereby ensuring ethical financial transactions. The proposed framework not only enhances transparency and security in digital payments but also promotes financial inclusion among diverse user groups. As digital payment systems continue to evolve, this framework serves as a critical guide for developing compliant solutions that meet the needs of both consumers and Islamic financial institutions.

Hussain and Khan (2023) highlight the significant acceleration of cashless transactions in Islamic countries due to the COVID-19 pandemic. Their research demonstrates how the health crisis has prompted both consumers and businesses to adopt digital payment methods, contributing to a shift in financial behavior. The study underscores the adaptability of Islamic financial systems in embracing fintech solutions while adhering to Shariah principles. Additionally, the findings suggest that the continued growth of cashless transactions could enhance economic resilience and financial inclusion in these countries. Ultimately, the authors call for further exploration of regulatory frameworks to support and sustain this transition in the post-pandemic landscape.

Raza and Shahbaz (2023) provide valuable insights into the relationship between digital wallets and customer satisfaction within the context of Islamic fintech. Their study reveals that features such as convenience, security, and user-friendliness play a crucial role in enhancing customer experience and satisfaction. The authors emphasize the importance of aligning digital payment solutions with Shariah principles to attract a broader user base and retain existing customers. Furthermore, the research highlights the need for continuous innovation and improvement in fintech offerings to meet evolving consumer expectations. Ultimately, the findings underscore the potential of digital wallets in transforming customer interactions and driving growth in the Islamic finance sector.

By leveraging this blockchain technology, the system ensures transparency and reduces fraud, addressing concerns about trust and accountability. The digital wallets and QR codes concept in the development give advantage as it simplifies transactions, making it accessible to all users, including those without traditional bank accounts.

III. Methodology

The study employs a mixed-method approach, combining qualitative and quantitative research. First, a comprehensive literature review is conducted to explore existing Shariah-compliant fintech models and their relevance to micro-payments. Second, the model's compliance with Shariah principles is ensured by consulting Shariah subject matter experts. Third, a prototype of the micro-payment system is developed, incorporating blockchain technology for transparency and security. Fourth, the system is applied in a pilot test within a controlled campus environment, and feedback is collected to refine the model. Finally, surveys are administered to students, staff, and vendors to understand their payment preferences, challenges, and expectations.

3.1 Micro Payment Model

The architecture of the micro payment model is proposed as in Figure 1 consist of three roles of user such as admin, students and vendor. Admin has a high access level to the system. They are assigned from among the staff in the Foundation office or any other department that works on managing the crowd fund and award to the students as a buying token. Admin also can register other users among students and vendors and can award the virtual token to the students.

Students' roles in the system are a group of users among current active students in the campus. They will be selected by the Foundation office and will be allocated with a certain amount of token to pay

the cost of buying with the vendors. Vendors use the system as a registered premise that have an authority to accept the payment by students. Vendors can claim the purchasing with Foundation or admin on a monthly or weekly basis.

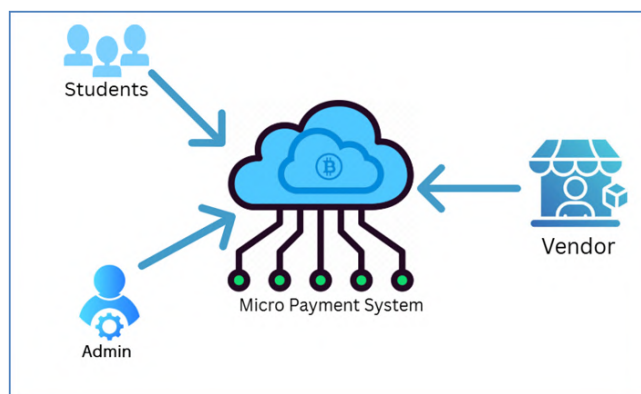


Figure 1. Micro Payment Model Architecture

The high-level system architecture in Figure 2 describe the general relationship and the communication of the system in cloud technology services.

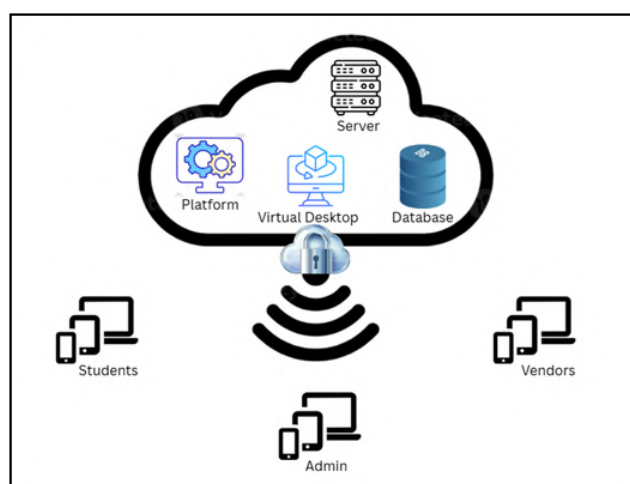


Figure 2. High-level System Architecture

The cloud services provided with complete package such as MySQL database, web service, platform service and virtual desktop. MySQL is an open-source relational database management system (RDBMS) that uses Structured Query Language (SQL) to manage and manipulate all the data related with all users, transaction history and archive. It's used as a backend of web applications and supports features like transactions, replication for scalability and reliability. This application is web based using web services that delivers web content to users over the internet protocol. It handles requests from all users in the system and processes them and sends the response. A platform service provides a framework or environment for developers to build, deploy, and manage applications in real-time without managing the underlying infrastructure in the cloud. A virtual desktop service delivers a desktop computing environment over the internet, allowing all users with different access levels to their desktop, applications, and data from any device. It centralizes desktop management and enhances security, scalability, and remote work capabilities.

This cloud service offers scalability, flexibility, and cost-efficiency. An integral part of these services is built-in cybersecurity features designed to safeguard data and operations. Data encryption, both in transit and at rest, ensures that sensitive information remains secure as it moves through networks and resides in storage. Identity and Access Management (IAM) allows organizations to control who has access to specific resources, while Multi-Factor Authentication (MFA) adds an extra layer of protection by requiring more than one form of verification during login processes.



In addition to access controls and encryption, cloud services typically include robust network security measures like firewalls that monitor and filter incoming and outgoing traffic. Threat detection systems continuously scan for suspicious activities, and security monitoring tools provide real-time alerts to IT teams, enabling swift responses to potential breaches. These features are often powered by machine learning and AI to identify emerging threats and anomalies more effectively than traditional tools.

Cloud providers also support regulatory compliance by offering tools that help businesses meet standards such as GDPR, HIPAA, and ISO/IEC 27001. Regular security updates and patches are managed and able to reduce the burden on internal teams and ensure protection against known vulnerabilities. Overall, the integration of comprehensive cybersecurity features within cloud services for the system provides a more secure, resilient, and compliant digital environment.

3.2 Experimental on Shariah Compliance

The research method employs a qualitative approach using an experimental model designed to gather in-depth insights through expert interviews. This method focuses on exploring the perceptions, opinions, and expert judgments regarding the Shariah compliance of a proposed fund distribution model that uses the concept of deferred payment (Bai' BithamanAjl). In this model, transactions between students and vendors are treated as debt obligations, which will later be settled by the Foundation on behalf of the students. The objective is to evaluate the feasibility and Shariah legitimacy of financial mechanisms to clarify whether the mechanism is exactly Bai' BithamanAjl or not.

The first step involves identifying and proposing the subject matter experts who are knowledgeable in Islamic finance and Shariah principles. Three experts will be selected for this purpose: two from academic backgrounds, who are well-versed in Islamic economics and education policy, and one from an industrial background, such as Islamic banking or fintech, who understands the practical implementation of Shariah-compliant financial models. As additional requirements all of them are well expert in Islamic economics with more than ten years' experience. Each expert will be presented with a detailed conceptual model of the fund distribution system using the deferred payment approach.

Semi-structured interviews will be conducted with these experts. A set of carefully crafted questions will be used to guide the discussion, focusing on the key aspects of Shariah compliance, practical applicability, risk management, and ethical considerations in the proposed model. The qualitative data collected will then be analyzed through thematic analysis, identifying patterns, common views, and differences in expert opinions. This method allows the researchers to validate and refine the model based on expert insights, ensuring it aligns with both theoretical and practical dimensions of Islamic finance.

3.3 Experimental on System Functionality

The quantitative experimental technique described here is a user-centered evaluation approach that aims to measure the functionality and usability of a system through a structured process involving user training, system interaction, and post-usage surveys. This technique focuses on collecting numerical data that can be analyzed statistically to determine the effectiveness, efficiency, and user satisfaction of the system.

i. User Training Phase

In the first phase, users are trained on how to use the system. This involves providing them with detailed guidance or demonstrations—either through workshops, video tutorials, or hands-on training. The goal is to ensure that all participants have a baseline understanding of the system's features and operations. This minimizes learning curve issues during the actual usage and ensures that usability feedback is based on system design, not user unfamiliarity.

ii. System Exploration Phase

After the training, users are given the opportunity to freely explore and interact with the system. This phase simulates real-life usage where users perform specific tasks or navigate the system based on their own needs in the real scenario. This interaction period allows researchers to observe natural usage patterns, identify any usability issues, and assess system functionality from the user's perspective. Optional system logs or usage tracking tools



can be employed to gather data on user actions, time spent on tasks, error rates, and navigation paths.

iii. **Post-Usage Survey (Quantitative Data Collection)**

Once the users have completed their interaction with the system, they will be given the link of google form survey designed to collect quantitative feedback. The survey typically includes Likert-scale questions and possibly open-ended responses for more context. The survey results provide measurable data on user satisfaction and usability effectiveness, which can then be analyzed using statistical methods such as mean scores, standard deviation, or even hypothesis testing if comparing different groups.

This experimental technique is effective for evaluating systems from a user-experience perspective while ensuring the results are statistically measurable. By combining structured training, real usage, and systematic feedback collection, this method ensures that the insights gained are both practical and reliable—ideal for improving system design or validating a prototype's effectiveness before deployment.

IV. Conclusion

In conclusion, the proposed micro-payment model using Shariah-compliant fintech represents a significant advancement in addressing the financial needs of university campuses. By integrating modern technologies like blockchain, digital wallets, and QR codes, the model not only simplifies transactions but also ensures adherence to Islamic financial principles such as avoiding *riba*, *gharar*, and *maysir*. However, it is just a half-cook model that needs to proceed with a pilot study among users as another steps of research. This innovative approach fosters a trust-based environment for financial transactions, crucial for the seamless exchange of goods and services within the campus community.

For future studies, further exploration could focus on the scalability of this micro-payment model beyond university campuses to other institutions, such as community centres or small enterprises, ensuring it remains Shariah-compliant in various contexts. Additionally, investigating the socio-economic impacts of the model on students' education and lifestyle could provide valuable insights into its effectiveness. Future research could also delve into developing advanced features within the platform, such as AI-driven financial literacy tools, to further enhance user engagement and empower students to make informed financial decisions. Leveraging collaborations with fintech firms and Islamic financial institutions may lead to more robust regulatory frameworks that can support broader adoption and innovation in Shariah-compliant fintech solutions.

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