User Perceptions and the Evolution of Cashless Payment Systems: Adoption, Innovation, and Sustainability

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Abstract. The rapid evolution of mobile and cashless payment systems has significantly transformed global financial landscapes, fueled by technological innovations and shifting consumer behaviors. This systematic literature review (SLR) aims to synthesize findings from recent studies on the adoption and impact of cashless payment technologies, with a particular focus on user perceptions, business sustainability, and the factors influencing technology acceptance. Based on 10 key studies, the review examines critical themes such as consumer trust, perceived ease of use, security, and innovations in digital payment systems, including QR codes and wearable devices. The findings highlight the importance of understanding user behavior to enhance the effectiveness of cashless technologies, as these systems align with sustainability goals by reducing reliance on physical currency and improving operational efficiency within businesses. Furthermore, the review identifies challenges and opportunities for enhancing user engagement and adoption rates. The insights provided are valuable for policymakers, financial institutions, and technology providers striving to foster inclusive, sustainable, and efficient digital payment ecosystems that support economic growth and financial inclusion.

Keywords: Cashless Payment Systems, Technology Acceptance, User Perception, Sustainable

1 Introduction

Over the last decade, the financial landscape has undergone significant transformation, driven by technological advancements and shifts in consumer behavior. The global move from traditional cash-based transactions to digital payment methods signifies a pivotal evolution in how societies engage in commerce. This transition is not just a technological shift but a response to growing demands for more secure, efficient, and convenient payment methods in an increasingly globalized economy.

Mobile and cashless payment systems have emerged at the forefront of this financial revolution, offering numerous benefits such as enhanced transaction efficiency, reduced operational costs, and improved access to financial services. These systems are integral to the concept of a cashless society, where physical money

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is replaced by digital equivalents, thereby facilitating faster, safer, and more convenient transactions across various sectors and demographics.

The success of cashless payment systems heavily depends on user perception, which includes trust, perceived ease of use, and perceived utility. Consumer trust, in particular, plays a crucial role as it influences how secure and reliable users perceive the digital payment systems to be. Positive perceptions can significantly boost adoption rates, while negative perceptions may hinder the acceptance of cashless systems despite their objective benefits. Research has indicated that the perceived ease of using these systems, coupled with strong security measures, encourages broader consumer adoption.

The adoption and integration of digital payment solutions vary significantly across different regions and cultures, influenced by a complex web of factors including technological infrastructure, economic policies, social norms, and regulatory frameworks. In developed economies, the widespread availability of smartphones and high-speed internet has paved the way for rapid adoption of mobile payments. Conversely, in developing regions, while traditional banking services may be less penetrated, mobile payments have carved a unique niche, bridging gaps left by conventional financial institutions and reaching previously unbanked segments of the population.

Cashless payment systems align closely with the principles of the Green Economy, aiming to balance economic growth with environmental sustainability needs. By reducing the necessity for physical cash production, distribution, and management, cashless systems diminish the carbon footprint associated with these processes. Furthermore, they contribute to reducing deforestation, pollution, and waste generation linked to the production and disposal of traditional payment instruments like paper money and plastic cards. In the business sector, these systems enable more streamlined operations and significantly lower resource utilization, aligning with sustainable business practices and supporting global efforts towards a more sustainable and resilient economic model.

This systematic literature review aims to delve into the myriad aspects of mobile and cashless payment systems by synthesizing research findings from diverse contexts and methodologies. It will explore key factors influencing the adoption and sustainability of these systems, analyze consumer behaviors and attitudes towards digital payments, and examine the technological, socio-economic, and cultural variables that shape the landscape of digital transactions. Through a comprehensive review of recent literature, this study seeks to provide a holistic understanding of the current trends, challenges, and future prospects of mobile and cashless payment systems, offering valuable insights for policymakers, financial institutions, and technology providers engaged in shaping the future of global commerce and sustainability.

This research aims to explore how user perceptions and cultural factors influence the adoption of cashless payment systems, the role of technology innovation in shaping these perceptions, and the environmental and economic impacts of cashless systems in contributing to business sustainability. The analysis is structured as follows: Section 2 outlines the systematic process used for the literature review. Section 3 provides a descriptive discussion of the selected literature. Section 4 details the theoretical aspects of the subject matter. The discussion concludes with

conclusions in Section 5, while limitations and recommendations for future research are discussed in Section 6.

2 Research Design

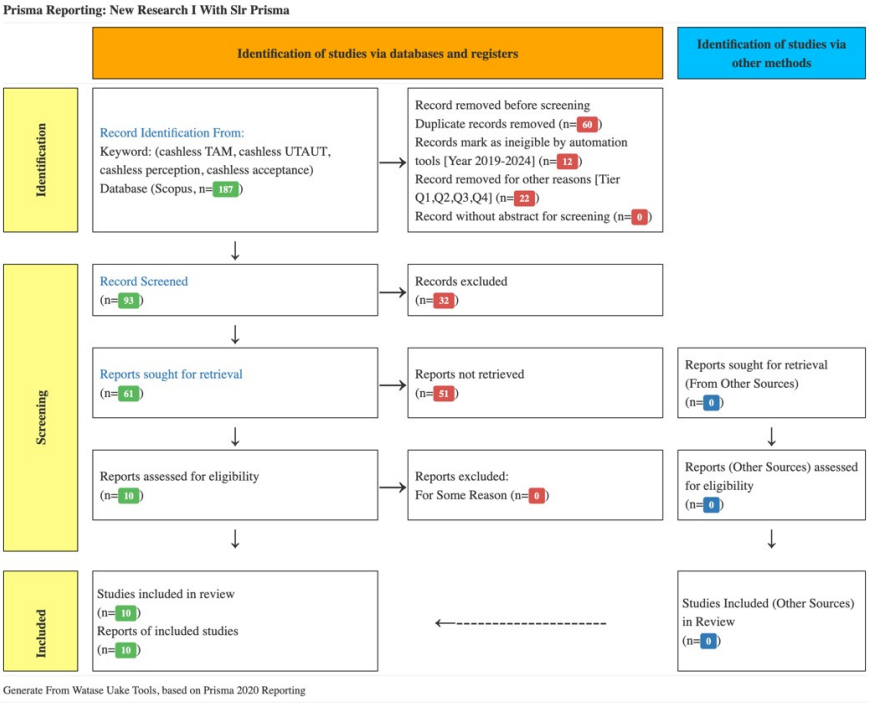

Fig. 1. Generate From Watase Uake Tools, based on Prisma 2020 Reporting.

This study employs a systematic literature review (SLR) method using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The literature review process is facilitated by the Watase Uake web-based application, accessible at watase.web.id. The first step involves searching for articles with relevant keywords from the Scopus database for the period from 2019 to 2024. Included articles must belong to tiers Q1, Q2, Q3, or Q4. The search is conducted using abstracts, titles, and keywords as criteria. The keywords used include "cashless TAM", "cashless UTAUT", “cashless perception”, or "cashless acceptance". The initial search or identification found 187 articles. The subsequent process involves removing duplicate articles (60 articles), articles outside the search period (12 articles), and articles without the specified tier (22 articles) from the initial identification process.

After the identification process, 93 articles remained and were further screened to ensure relevance to the research topic. In this process, articles not relevant to the research topic (32 articles) and reports that were inaccessible or could not be retrieved

(51 articles) were removed. During the extraction process, 10 articles were selected for data extraction. Relevant data collected include study design, and key findings. Subsequently, the methodological quality of each study is evaluated using appropriate assessment tools. Data collected from the studies are analysed and interpreted to identify patterns, trends, and key findings from the reviewed literature.

With this approach, the literature review can provide a comprehensive overview of the development and trends in the sharia capital market, identify research gaps, and offer directions for further studies.

3 Descriptive Analysis

The descriptive analysis of the literature review will provide an overview of the selected studies, including the focus countries and the key findings.

3.1 Publication Timing

Table 1. Publication Timing.

Publication Year	Number of Article
2019	1
2020	1
2021	1
2022	3
2023	3

The articles obtained from the SLR process were incorporated into the dataset to provide a comprehensive and current representation of the topic under review. The search process was conducted using the Scopus database with keywords relevant to the research topic. According to the data, the year with the most publications related to the sharia capital market was 2022 and 2023. The publication trend appears relatively stable, with a consistent number of articles published each year in recent years..

3.2 Theoretical Framework

This research divides the analysis of the theoretical framework into three major theories:

Theory of Technology Acceptance (TAM) , developed by Fred Davis [1], is a foundational framework widely utilized to understand and predict user acceptance of new technologies. Rooted in the Theory of Reasoned Action (TRA), TAM posits that two primary constructs—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—are critical determinants of an individual's attitude toward adopting a technology.

Unified Theory of Acceptance and Use of Technology (UTAUT) is a comprehensive model developed by Venkatesh et al. [2] to explain user intentions to adopt technology and the subsequent usage behavior. UTAUT synthesizes elements from eight prominent technology acceptance theories, including the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and others, to provide a more unified framework for understanding technology adoption.

Theory of Planned Behavior (TPB) , developed by Icek Ajzen in 1985, is a psychological theory designed to predict and explain human behavior in specific contexts. TPB extends the Theory of Reasoned Action (TRA) by incorporating the concept of perceived behavioral control to account for behaviors that are not entirely under an individual's volitional control.

The majority of the articles utilize UTAUT as the theoretical framework in their papers.

Table 2. Theories Used.

Theories Used	Number of Article
Theory of Technology Acceptance (TAM)	3
Unified Theory of Acceptance and Use of Technology (UTAUT)	5
TAM and Theory of Planned Behavior (TPB)	2
Total	**10**
Theories Used	**Number of Article**

3.3 Geographic Analysis Region

Each country has unique characteristics that are reflected in various aspects of life, including culture, history, economy, and geography. The geographic region of a country can be a significant factor influencing various social, economic, and political phenomena within it. Therefore, in conducting a literature review, it is important to consider the geographic context of a country, as this can affect our understanding of the various phenomena observed.

Table 3. Country of Research.

Country	Number of Article
Bangladesh	1
India	2
Indonesia	3
Jordania	1
Malaysia	2

4 Result And Discussion

Adoption of Cashless Payment Technology.
The results of our systematic literature review clearly indicate that user perceptions, notably relating to the ease of use and the robustness of security measures, play a critical role in catalyzing the adoption of cashless payment systems. In developed markets, the enhanced efficiency of transactions combined with fortified security protocols appears to be a significant driver, persuading users to transition from traditional to digital payment methods. This preference underlines a broader trend towards financial systems that not only simplify financial operations but also enhance security measures to protect user data [3]. In contrast, in developing regions, mobile payments serve a critical role in filling the infrastructural void left by traditional banking systems, thus facilitating financial inclusivity and enabling economic participation among previously unbanked population [4].

Innovations in Payment Systems.
Innovations in payment technologies, especially wearable tech, have reshaped consumer interactions with digital payment platforms by significantly enhancing user trust and system adoption rates. These advancements not only simplify the transaction process but also integrate enhanced security features, thereby cultivating a more secure and user-friendly environment for digital transactions [5]. Moreover, the proliferation of QR code-based payment systems across various service platforms has revolutionized the user experience by streamlining transactions and enhancing the overall efficiency of digital payments, fostering greater customer retention within the expansive digital payment network [6].

Business Sustainability.
The integration of cashless payment systems offers substantial sustainability advantages to businesses by significantly reducing operational costs associated with cash handling and diminishing losses due to theft and mismanagement. These systems promote a more streamlined, efficient approach to financial management within fast-paced retail environments, effectively reducing the complexities associated with cash transactions and enhancing overall business operations [7]. Additionally, the environmental benefits derived from minimizing the physical cash lifecycle—reducing the carbon emissions tied to production, transportation, and disposal—are in line with global sustainability objectives, delivering dual benefits of economic efficiency and environmental stewardship [8]

Factors Influencing Technology Acceptance.
Trust in digital payment systems emerges as a fundamental determinant influencing user acceptance and adoption. Enhanced transparency around digital payment security measures can significantly mitigate user apprehensions and promote wider adoption, as demonstrated in the study [9]. Cultural influences and societal norms also profoundly impact the rate of technology acceptance, where societies open to innovation are quicker to embrace new technologies compared to those with a

conservative stance towards technological changes [10]. Additionally, the presence of robust financial infrastructures, underpinned by supportive regulatory frameworks, is essential for fostering widespread adoption and effective integration of cashless payment systems [11].

5 Conclusion

The systematic literature review presented here underscores a pivotal transformation in the financial landscape through the adoption of mobile and cashless payment systems. This transformation is profoundly influenced by consumer perceptions, technological innovations, and a complex interplay of cultural and regulatory factors. Our findings reveal that enhanced transaction efficiency, bolstered security, and the integration of innovative technologies like QR codes and wearable devices are key drivers enhancing user adoption across various global regions. Moreover, these digital payment systems support broader economic inclusivity by bridging service gaps in regions with limited traditional banking infrastructure.

The adoption of cashless payment systems is not only reshaping how transactions are conducted but also aligns closely with environmental sustainability goals. By reducing the need for physical currency, these systems decrease the carbon footprint associated with traditional currency production and management. In the business realm, they contribute to sustainability by lowering operational costs and enhancing transactional efficiency, which are vital in today's fast-paced economic environment.

6 Limitations and Future Research

While the review provides comprehensive insights into the adoption and impact of cashless payment systems, several limitations must be acknowledged. The studies reviewed predominantly focus on urban and developed regions, potentially overlooking the unique challenges and opportunities present in rural and less economically developed areas, which may result in an incomplete understanding of the global landscape of cashless payment adoption. Additionally, the rapid pace of technological advancement means that many studies could quickly become outdated, especially if they do not account for the latest innovations in payment technologies, leaving some cutting-edge aspects of digital payment systems underexplored. Furthermore, consumer behavior is dynamic and influenced by various fleeting factors, such as global crises like the COVID-19 pandemic, which suggests that more longitudinal studies are needed to capture long-term digital payment trends comprehensively. Lastly, the continuously evolving regulatory landscape for digital payments may not be fully addressed in this review, potentially overlooking recent changes that could significantly affect the adoption and operation of cashless payment systems.

Future research should focus on expanding the geographical scope of studies to include underrepresented regions to better understand global dynamics. Longitudinal studies are also needed to capture the evolving nature of consumer behaviors in response to technological and economic changes. Additionally, future analyses should

continually integrate the latest technological advancements and regulatory developments to remain relevant and provide timely insights into the adoption of cashless payment systems. By addressing these gaps, subsequent studies can offer more comprehensive and actionable insights for policymakers, businesses, and consumers navigating the shift towards a cashless global economy.

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