



Factors Affecting Trust and Acceptance for Blockchain Adoption in Digital Payment Systems: A Systematic Review

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Abstract: Blockchain technology has become significant for financial sectors, especially digital payment systems, offering enhanced security, transparency, and efficiency. However, there is limited research on the factors influencing user trust in and acceptance of blockchain adoption in digital payment systems. This systematic review provides insight into the key factors impacting consumers' perceptions and behaviours towards embracing blockchain technology. A total of 1859 studies were collected, with 48 meeting the criteria for comprehensive analysis. The results showed that security, privacy, transparency, and regulation are the most significant factors influencing trust for blockchain adoption. The most influential factors identified in the Unified Theory of Acceptance and Use of Technology (UTAUT) model include performance expectancy, effort expectancy, social influence, and facilitating conditions. Incorporating a trust and acceptance model could be a viable approach to tackling obstacles and ensuring the successful integration of blockchain technology into digital payment systems. Understanding these factors is crucial for creating a favourable atmosphere for adopting blockchain technology in digital payments. User-perspective research on blockchain adoption in digital payment systems is still insufficient, and this aspect still requires further investigation. Blockchain adoption in digital payment systems has not been sufficiently conducted from the user's perspective, and there is a scope for it to be carried out. This review aims to shed light on the factors of trust in and acceptance of blockchain adoption in digital payment systems so that the full potential of blockchain technology can be realised. Understanding these factors and their intricate connections is imperative in fostering a conducive environment for the widespread acceptance of blockchain technology in digital payments.

Keywords: blockchain; trust; acceptance; technology acceptance model; systematic review



Citation: Norbu, T.; Park, J.Y.; Wong, K.W.; Cui, H. Factors Affecting Trust and Acceptance for Blockchain Adoption in Digital Payment Systems: A Systematic Review. *Future Internet* **2024**, *16*, 106. <https://doi.org/10.3390/fi16030106>

Academic Editors: Cheng-Chi Lee and Dinh-Thuan Do

Received: 6 February 2024

Revised: 7 March 2024

Accepted: 17 March 2024

Published: 21 March 2024



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1. Introduction

Digital payment systems have become crucial in modern financial transactions, revolutionising financial relationships through online buying and peer-to-peer money transfers. These systems offer ease and efficiency but present complex challenges and critical issues. The prevalence and intricacy of digital payment systems have led to increased risks and limitations, including fraudulent activities and cyber threats, affecting security and privacy [1]. As the digital payment ecosystem evolves, these challenges are more important to be dealt with, requiring continuous analysis and innovation. It is essential to comprehend and effectively tackle these difficulties as they form the fundamental basis of digital financial transactions. It is crucial to address these challenges and ensure the security and efficiency of digital financial transactions by exploring the potential of various emerging technologies. Among the numerous emerging technologies, blockchain technology stands out specifically for the financial sector and payment system [2,3].

Incorporating blockchain technology, a decentralised ledger that records the transaction securely, ensuring trust [4], offers a promising vision of the future, representing a

paradigm shift in how we envision and utilise digital finance. As blockchain and digital payments converge, vast opportunities lie ahead, shaping a more secure, efficient, and equitable financial ecosystem for all. Despite the aspiration to revolutionise the current payment system through blockchain technology [5,6], its implementation has remained primarily limited to cryptocurrencies such as Bitcoin and Ethereum [6]. The implementation of this idea has yet to be fully included in the existing payment systems of globally regulated and accredited institutions. Numerous financial institutions in developed nations and a limited number in developing nations have realised the need to explore the potential applications of blockchain technology inside their payment systems [7,8]. Several banks, including United Commercial Bank Limited, Prime Bank Limited, and Standard Chartered Bank, have launched blockchain-based payment systems to offer enhanced security, improved speed, increased accessibility, and reduced transaction costs [9]. They also mention that the rapid advancement of blockchain technology necessitates understanding consumer intentions towards blockchain payment services, as there is limited empirical research on this topic. Understanding whether customers or future consumers of banks will be receptive to and prepared for technological changes is of utmost importance [10–12]. From the user's perspective, it is essential to comprehend two fundamental aspects: trust and acceptance [10,13–16] for the adoption. These elements are pivotal in establishing confidence in emerging technologies, particularly blockchain technology, and facilitating integration into digital payment systems.

Adopting any innovative technology is contingent upon trust, as highlighted by [17,18]. Trust plays a crucial role in adopting and utilising technological services [3,19–21]. Trust is a pivotal factor in the consumers' inclination to embrace technologies and services [22] as it aids in mitigating perceived risks and uncertainties associated with them, hence augmenting customers' levels of acceptance and intention to adopt [23,24]. Another critical component that must be considered before adopting innovative technologies is the acceptance of users [2,9,25,26]. Several models and frameworks have been established to elucidate the user adoption of innovative technologies, highlighting aspects that can influence user acceptance due to the significance of this phenomenon. Investigating the factors that impact user adoption of information technology is a subject of interest for scholars across all disciplines and technology procurers working with big organisations [27]. According to [28], user acceptance is crucial in effectively deploying information systems, as users may not always be receptive to adopting innovative technologies. Although trust and acceptance are widely acknowledged as crucial, the prevailing literature considers them separately in technology adoption studies. Trust is looked at from a psychological perspective and considered a subjective belief [29] that is based on confidence [3], past experiences [30,31], and evidence [29]. At the same time, acceptance is more of a behavioural intention to use the technology [32,33]. Therefore, it is crucial to have an integrated model as it will help to understand users' behaviour. It addresses the factors that build trust and drive users' acceptance of blockchain adoption. The absence of an integrated framework that effectively examines the combined effects of these factors gives rise to a noticeable gap in blockchain adoption in digital payment systems. From the literature, there is an apparent lack of studies or systematic reviews conducted to understand the factors influencing the consumer's trust in and acceptance of the adoption of blockchain technology [2] in digital payment systems. This study was conducted with the following questions to contribute to the literature.

- RQ1** What are the factors that influence users' trust in the adoption of blockchain in digital payment systems?
- RQ2** What are the factors that influence users' acceptance of the adoption of blockchain in digital payment systems?
- RQ3** How can the trust model be integrated into the acceptance model for blockchain adoption in digital payment systems?

In the following sections, we explore the theoretical foundations, methodological strategies, and empirical insights that form the basis of incorporating trust and acceptance models in the context of blockchain adoption for digital payment systems. Using thematic analysis, this study will be conducted from the following research themes: (i) factors that influence the user's trust for blockchain adoption and (ii) factors that influence the user's acceptance of blockchain adoption. By exploring this interdisciplinary environment, we aim to make a meaningful contribution to understanding the factors that could lead to trust in and acceptance of the adoption of blockchain in digital payment systems. This will contribute to a thorough understanding of significant factors that influence the future adoption of blockchain from the user's perspective and will lead to a (iii) proposal of the integrated model of trust and acceptance model for blockchain adoption in digital payment systems.

2. Background

2.1. Overview of Blockchain

The blockchain concept was first developed by Satoshi Nakamoto in 2008 [4,22,34,35]. It is a decentralised distributed ledger system that is immutable and append-only [35]. The fundamental components of blockchain technology, including associated time stamping, verifiable logs, proof-of-work, fault tolerance, asymmetric encryption, and smart contracts, were conceptualised and developed several decades before the emergence of the first on-line blockchain [36]. Blockchain technology enables the establishment of a decentralised service by replicating distributed systems, accomplishing similar objectives as those of a trustworthy centralised system [22]. Nodes are responsible for facilitating the data exchange, processing transactions, and validating them through the execution of a consensus algorithm, all without human involvement [37]. Blockchain applications posit that they facilitate a transfer of trust from human entities to technical systems, hence sustaining the prevailing influence of centralised third-party players inside payment networks [22]. Blockchain technology is a system that hierarchically arranges transaction information, forming a chain of blocks, where each block is protected by cryptographic methods [38].

2.2. Role of Trust

It is critical to understand the ever-changing financial technology landscape in the implementation of blockchain technology in digital payment systems [2,29,30]. Trust is crucial for mitigating perceived risks associated with technology adoption [12]. It is imperative to comprehend the complexities of trust dynamics as users perceive them to foresee and clarify adoption patterns reliably. The trust model enhances the comprehension of user adoption behaviours in conjunction with the unified theory of acceptance and use of technology through integrating trust-related constructs [2,21]. Smart contracts, a term coined by Szabo, is a crucial development in blockchain technology that automates and upholds agreements for trust [39,40]. Several models and concepts, like zero-trust security, federated learning, zero-knowledge proofs, and self-sovereign identity, may be integrated into blockchain-based payment systems to enhance adoption and trust substantially. Zero-knowledge proofs bolster privacy and confidentiality [30], whereas self-sovereign identity retains authority for users to manage their digital personas [30]. Zero-trust security models employ rigorous authentication and authorisation protocols to reduce the likelihood of unauthorised access and intrusions, ensuring security [41,42]. Federated learning methodologies enable the training of collaborative machine learning models across decentralised nodes, thereby ensuring data privacy protection [43,44]. Integrating these tenets, payment systems based on blockchain technology can offer improved security, privacy, and user autonomy, promoting increased adoption and confidence among users and stakeholders.

2.3. Technology Acceptance

The unified theory of acceptance and use of technology comprises eight different models [2,25,45] that facilitate comprehension of user-perceived technology adoption [2].

By incorporating principles from multiple theoretical frameworks—such as the technology acceptance model, theory of reasoned action, and innovation diffusion theory—it enables an all-encompassing comprehension of user behaviour [21,33]. In addition to performance expectancy, effort expectancy, social influence, and facilitating conditions, UTAUT considers subjective norms, personal beliefs, and attitudes, which are socio-psychological factors [33]. The model also considers the moderating influences of age, gender, experience, and voluntary use, considering the ever-changing attributes of user environments and demographics [25,45]. The usefulness of UTAUT in adopting blockchain technology in payment systems is limited. An emphasis is placed on individual factors, with network effects and sociotechnical dynamics being disregarded. Furthermore, security concerns, regulatory compliance, and interoperability issues might not be adequately considered.

A significant amount of studies on using blockchain technology in payment systems highlight the potentials of an integrated approach incorporating factors of trust and acceptance [2,21,25]. The relationship between trust and acceptance is closely interconnected, as trust influences the initial adoption of blockchain technology and plays a crucial role in its continued utilisation [21]. The integrated model would provide a thorough understanding of the interdependent relationship between trust and acceptance, revealing all factors influencing the adoption of blockchain technology in digital payment systems [21,25]. The model will be pivotal in developing strategies that will improve user trust and acceptance, eventually leading to the widespread adoption of blockchain technology.

3. Related Works

Since 2016, research related to understanding the factors influencing trust in and acceptance of blockchain adoption in digital payment systems has increased considerably, as described in next section, marking an essential growth in the field over the past few years. The growth in research efforts aligns with the prevalent integration of cryptocurrencies, smart contract platforms, and the investigation of blockchain technology for many uses not limited to financial transactions. There is still a scarcity of research focusing on users' perspectives on adopting blockchain technology in digital payment systems. This highlights a significant knowledge deficit related to how users perceive, place their trust in, and adopt blockchain technology in payment systems. Trust, security, privacy, regulatory frameworks, and social influence significantly influence users' perceptions and adoption of blockchain technology [2,25]. The academics have put forth supplementary and modified versions of the UTAUT framework [2,33], which incorporate social influence, perceived complexity, perceived risk, and technology trust in blockchain networks. This will offer significant perspectives to foster the effective adoption of blockchain technology in payment systems [12,33].

The nascent phase of user-centric research emphasises the need for studies examining users' perspectives, behaviours, and experiences in relation to blockchain payment systems. This is important in identifying challenges impeding user adoption and the development of interventions. The previous research offers fundamental knowledge regarding the factors that impact trust and acceptance for adopting blockchain technology in payment systems separately, as shown in Table A1. Our findings indicate a scarcity of research proposing an integrated model of trust and acceptance for blockchain technology adoption in digital payment systems. This gap presents a significant opportunity for future studies.

4. Methodology

A systematic literature review is used for this study to comprehensively examine all relevant research that could significantly address the research questions. A systematic review is a methodological study that uses database searches to evaluate and interpret all research relevant to the specific theme or topic [46]. This systematic review adopted the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement and protocol [47], which is a set of checklists and flow diagrams used in systematic reviews and meta-analyses. It provides a structured framework to ensure a reproducible and

transparent investigation of factors influencing trust in and acceptance of blockchain adoption in digital payment systems. PRISMA was selected as it is a well-established framework with widely recognised principles that promote transparency, credibility, and adherence to best practices for writing systematic reviews. The following methodology was included:

1. Identify the need for the review, prepare a proposal, and develop the review protocol according to PRISMA.
2. Identify the research, select the studies, assess the quality, take notes, extract data, and synthesise the data.
3. Report the results of the review.

4.1. Conducting the Search

An extensive search strategy was developed to locate relevant studies from several academic databases, namely Web of Science, IEEE, ACM, and Scopus, that included conference proceedings and sources of grey literature. The search incorporated terminology and expressions related to the topics of “trust”, “acceptance”, “blockchain”, and “digital payment systems” and their associated terms. The investigation was carried out within a specified temporal scope, considering scholarly works published until 2023. Figure 1 shows the search strategy drawn following the PRISMA flowchart.

4.2. Study Selection and Evaluation

Eligibility was assessed separately from the literature obtained, using a predetermined exclusion and inclusion criteria set in Table 1 below. Before incorporating the literature into the bibliographic manager, specific exclusion criteria were employed, including constraints based on language, research scope, full-text availability, and document type. The initial assessment reviewed all research publications’ titles, abstracts, and introductory sections of the grey literature. Articles that fulfilled any exclusion criteria were not included in this study and were categorised based on the specific reason for their exclusion. The use of the search strategies as shown in Figure 1 generated 1859 articles in the search results. In the import to the database stage, 176 articles were excluded owing to missing authors’ names. 336 articles were identified as duplicates and excluded from the analysis. As a result, the total number of the remaining articles amounted to 1347. The inclusion and exclusion criteria for each of these studies were implemented. During this phase, the peer-reviewed condition of the paper was validated. The critical criterion was whether or not it substantially contributes to blockchain adoption acceptance and trust. Finally, only English-language articles that were available in full text were included in the studies. In accordance with these requirements, 48 studies were chosen for the final analysis as provided in Table A1.

4.3. Analysis Process

All the articles found from the mentioned databases were imported into a web-based platform used for systematic reviews, Rayyan [48], to screen and select the articles according to the exclusion and inclusion criteria, as shown in Table 1. MAXQDA 2022 [49], a qualitative analysis software, was used for coding and analysis. The coding method was developed to classify the articles in alignment with the study topics. The program was further utilised to record fundamental details about each document, encompassing the title, factors of trust and acceptance, and the models used to adopt blockchain. The factors were subjected to coding to ascertain fundamental details about their influences on trust and acceptance, such as their classification as either conceptual or empirical.

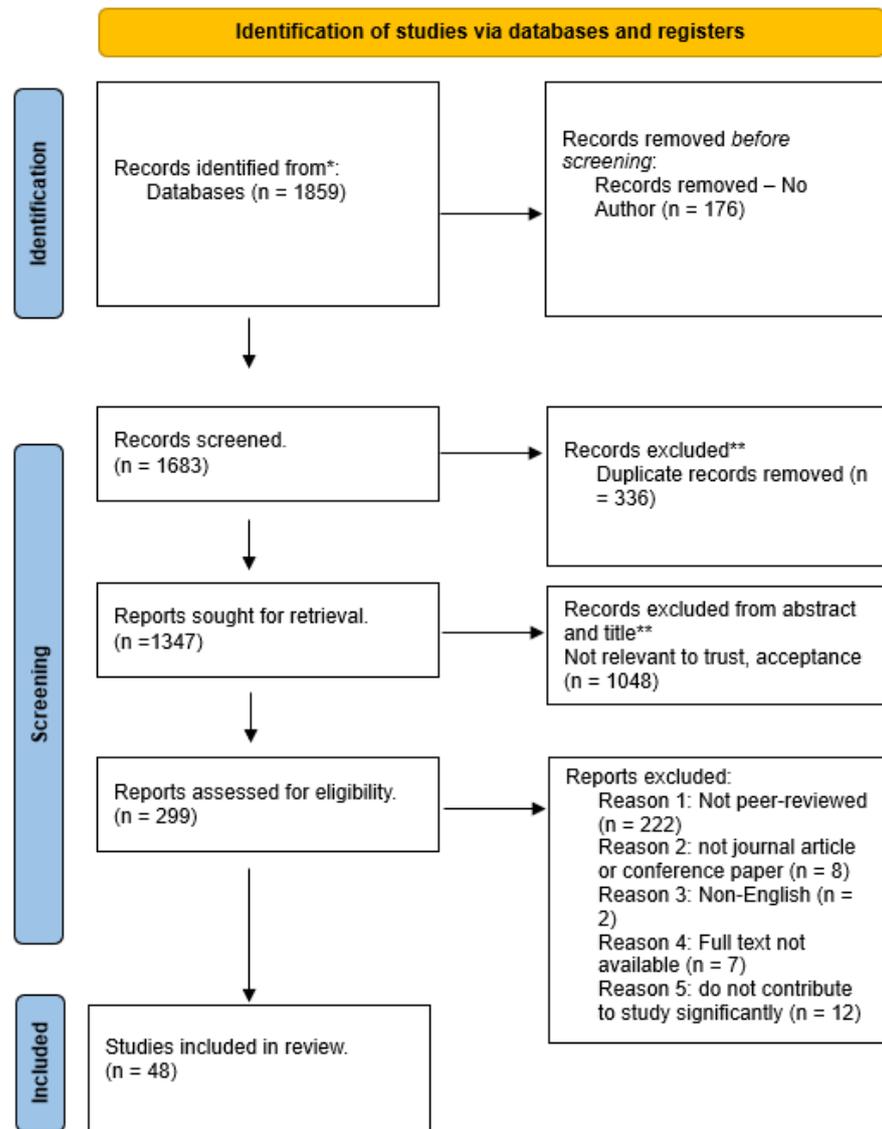


Figure 1. Flowchart of the search strategy.

Table 1. Inclusion and exclusion criteria.

Selection Criteria	Scientific Database
Inclusion	All articles which are peer-reviewed No time limitation
Exclusion	Prior to importation to bibliographic tool Articles without author
	During title screening Duplicate articles related to the blockchain technology adoption
	During abstract screening Articles related to the blockchain technology adoption, trust, and acceptance
	During full-text screening Articles addressing trust and acceptance for the adoption of blockchain technology for payment Peer-reviewed Other than journal articles Non-English articles

5. Descriptive Analysis

This study was conducted based on 48 publications published until August 2023. The primary aim of the descriptive study is to investigate: (i) factors that influence the user’s trust in the adoption of blockchain technology in digital payment systems; (ii) factors influencing users’ acceptance of blockchain technology in digital payment systems; (iii) the potential for incorporating the trust and acceptance paradigm for the adoption of blockchain technology inside digital payment systems. A descriptive analysis was performed to gain insights into the temporal distribution of publications and examine the theme analysis and distribution of publications across time.

Although the search was run without time restrictions until 2023, only papers relevant to the topic were found from 2016 onward. Figure 2 below presents an overview of the selected articles. According to current trends, publication is seeing a growing momentum and annual increase. The research was mostly carried out in other areas before 2016, and a significant portion of the publications lacked peer review. The upward trajectory indicates the scholarly significance of examining the use of blockchain technology in payment systems. There is a notable interest in examining the extent to which blockchain technology can be applied within digital payment systems. In the early stages, most research focused on examining cryptocurrencies and the broader adoption of blockchain technology without delving into the specific factors influencing consumer trust in and acceptance of blockchain in payment systems. However, there appears to be a growing recognition of the need to examine the user’s perspective on trust and acceptance, as seen in Figure 2.

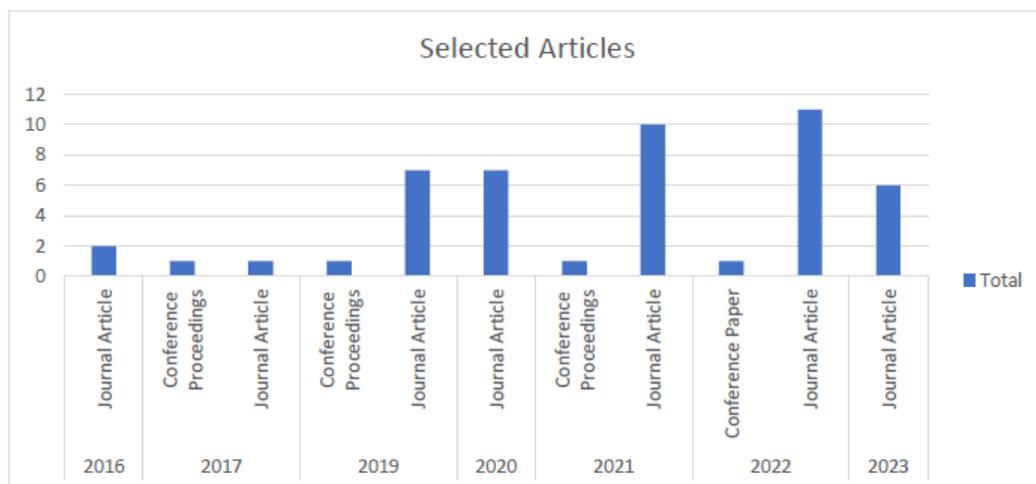


Figure 2. Analysis of selected articles published yearly.

The distribution of domain-specific data obtained from a sample of 48 research articles over time identifies eight factors as having a substantial impact on the trust in and acceptance of blockchain adoption in digital payment systems. The use of blockchain technology in digital payment systems is expected to be strongly influenced by crucial aspects such as security, privacy, and regulations. The influence of this phenomenon extends beyond trust and holds relevance in shaping acceptance. Transparency is an additional aspect that influences trust. The acceptance of a particular phenomenon is influenced by several essential aspects. However, to be understood from the user’s perspective, UTAUT [45] has been found to be prominent [25,33], and its factors, namely social influence, facilitating conditions, effort expectancy, and performance expectancy, have been found to be significant. Furthermore, several more factors impact the trust in and acceptance of blockchain technology in the context of digital payment systems [21,25,33,50]. Various factors, such as quality, design, awareness, experience, financial literacy, perceived ease of use, usefulness, and risk, influence the trust in and acceptance of blockchain technology in digital payment systems. In the following sections, the significance of these eight factors is elaborated.

6. Results

The findings from this study provide several factors from various models of trust and acceptance that can impact blockchain adoption in payment systems, as shown in Figures 3 and 4. The factors have been studied generally using specified models and context. The findings indicate that the current literature consistently highlights the importance of security, privacy, regulation, and transparency in building trust. The significant factors from UTAUT, such as social influence, facilitating conditions, effort expectancy, and performance expectancy, are influential factors in promoting acceptance from the user’s perspective. While some other factors are universally important, it is crucial to acknowledge that the contextual complexities of security and privacy substantially impact the dynamics of trust and acceptance. This study suggests that firms can enhance user trust by prioritising security, privacy, regulation, and transparency. When contemplating potential areas for future study, it is advisable to investigate the long-term consequences of trust and acceptance factors on the rates of practical implementation. A comprehensive analysis of the impact of facilitating conditions on user perspectives would yield significant findings. This descriptive study offers valuable insights that have the potential to inform decision-making processes. This proposal presents a viable approach for successfully integrating blockchain technology inside the ever-evolving domain of digital payments.

This study aimed to examine the various factors that influence the adoption of blockchain technology. The findings revealed various factors that can support the widespread implementation of blockchain technology in digital payment systems. These factors significantly impact trust and acceptance, and are hence crucial in adopting blockchain technology inside payment systems.

6.1. Factors That Influence Trust for Blockchain Adoption in Digital Payment Systems

RQ1 pertains to investigating the factors that influence trust for adopting blockchain technology in digital payment systems. From the selected articles, among many factors that impact trust shown in Figure 3, four factors that significantly play a role are security, privacy, transparency, and regulation. Table 2 below gives insight into the selected articles.

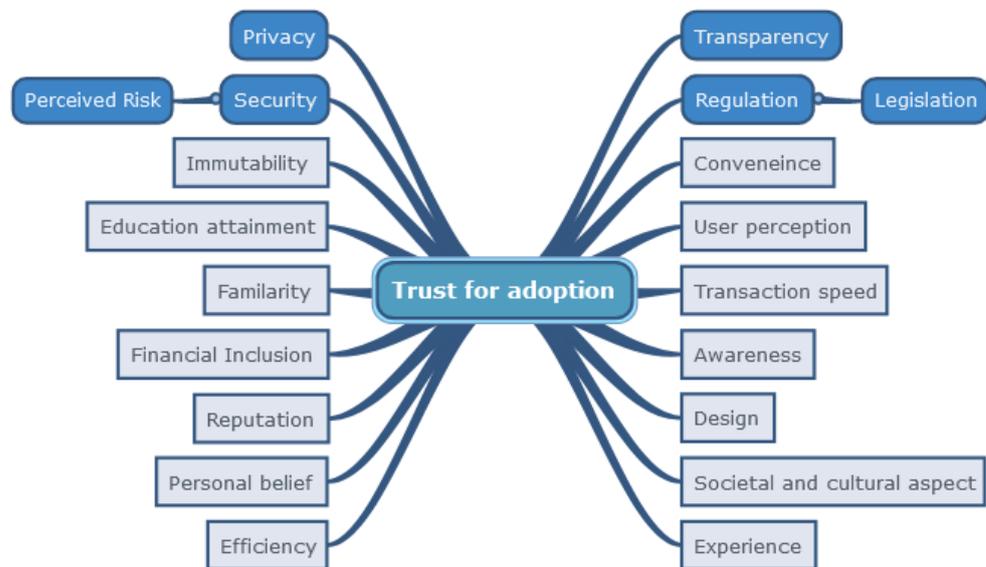


Figure 3. Factors influencing trust for the blockchain adoption.

Table 2. Significant factors influencing the trust for blockchain adoption according to the selected articles.

Factors	Articles	Insights
Security	[2,3,9,19,21,22,25,29–40,50–77]	Trust can be fostered by highlighting the need for further development to create security.
Privacy	[2,3,9,19,21,25,29–31,34,35,37–39,54–62,65,69,72,74–78]	Consumers look for control and authorisation for sharing transactions to prevent privacy leaks.
Transparency	[2,3,9,21,22,25,29,31,34,36,37,40,51,58,59,63,65,72,74–77]	Banks implement blockchain-based payment services for safe, transparent, efficient, and cost-effective financial transactions.
Regulation	[2,21,25,30,31,34,36,37,39,40,50,53,55,56,58,60,62,64,65,69,73,77]	With effective government regulations, using blockchains can offer security for adoption.

6.1.1. Security

Blockchain technology enhances trust between different players in e-services by providing security as the underlying technology [51]. Trust in technology is influenced by privacy and security, with higher levels leading to increased trust [2]. Blockchain technology, which operates on code rather than personal information, is crucial in financial systems and applications for secure, transparent, efficient, and cost-effective transactions. Ensuring the security and accuracy of transactional information in cross-border trading companies is a significant challenge due to the numerous business nodes involved in the business process [71]. The problem of addressing security levels in single blockchains is challenging but could potentially address existing issues, requiring further investigation and efficient solutions for widespread cryptocurrency adoption [66].

Security and privacy are essential in interoperable blockchain networks, highlighting the potential risks of attacks [59]. While there is limited research on these issues, it underscores the need for further research and development to create well-regulated blockchain networks, highlighting the need for a more secure and transparent system. Understanding blockchain's security and privacy properties is crucial for its widespread deployment. Online transactions require seven security and privacy requirements [38]. Nick Szabo, a cryptographer, warned that rapidly increasing the block size could pose a significant security risk to the entire network [56]. Factors like perceived risk are found to significantly impact the security [69].

6.1.2. Privacy

Consumers want control and authorisation for each sharing transaction to prevent privacy leaks like the Facebook–Cambridge Analytica data disaster [30]. Home payments hide bank or credit card information on a familiar device, providing privacy and security [55]. Decentralisation, immutability, and tamper proofing in blockchain systems endanger privacy and secrecy. These qualities improve data security but also constitute a risk. For “peaceful” blockchain cohabitation, Manteghi advocates changing privacy legislation [39]. Blockchain solutions challenge data governance, privacy, security, and compliance. Despite transparency and scalability, privacy and compliance issues remain. Blockchains can improve applications and solve distributed systems difficulties like successful technologies [37]. Online payment service providers offering safe transactions and personal information confidentiality gain client confidence and improve service [9]. Public blockchains limit user privacy since transactions propagate validation to network members. Several methods increase privacy while retaining availability and consistency [61]. It is argued that privacy and security concerns would affect public adoption, improving user experience through interface design and privacy protection advocacy [19]. Blockchain technology's code-based approach and crypto hashes increase security and privacy, which boosts technological trust [2]. Blockchain offers decentralised peer-to-peer financial transaction security; however, security and privacy remain problems. Since public blockchain

access may compromise financial transaction data privacy, blockchain growth depends on security, privacy, and secrecy [31].

6.1.3. Transparency

Blockchain technology is immutable, transparent, and decentralised [7]. Blockchain is known for its security, dependability, transparency, and capacity to trace transactions [3]. The second most essential blockchain technology attribute is distributed ledger transparency, which enables transaction record immutability and auditability [59]. Although transparent in transaction review, blockchain systems generally keep consensus techniques confidential, which raises trust and privacy problems in government applications [37]. All participants must approve and verify blockchain systems, enhancing transparency. Blockchain-based payment systems improve user experience by simplifying transactions and increasing transparency, efficiency, and immutability [9]. Five criteria drive banks to implement blockchain-based remittance services, stressing the relevance of essential blockchain technology in safe, transparent, efficient, and cost-effective financial transactions [2]. Due to its traceability, transparency, and stability, users would embrace blockchain payment methods and pay transaction fees without considering blockchain congestion [63]. An orchestrator establishes successful connections between peers without precisely stating rights and responsibilities in P2P transactions [73].

6.1.4. Regulation

Banks struggled to share sensitive data because of rising transaction volume, data policies, and government rules protecting customer privacy [30]. Financial institutions regulate payment systems to provide settlement and finality from trust and coordination. Consumer experience is improving as consumer protection regulation grows. Institutions in payment systems establish societal trust. Without governance, trustless trust is sluggish yet necessary for durable public infrastructure and consumer protection. Payment systems that are predictable and regulated satisfy businesses and society [55].

Blockchains were checked for General Data Protection Regulation compliance and highlighted concerns. Privacy-by-design blockchain concepts and technologies were proposed. Third-party audits require rules and laws. Organisational norms include territorial breadth and processing lawfulness [39]. Security features like viability, risk of third-party service failure, user error, privacy loss, counter-party fraud, and illicit association, and convenience features like free participation, instant transfers, and disintermediation, characterise blockchain and cryptocurrency payments. However, they also have limitations and higher price volatility. Every node on a permissionless blockchain may observe all transactions and study their history. However, the General Data Protection Regulation prohibits European Union individuals' data use and storage [34]. Countries adopt regulations but lack an implementation strategy for blockchain, which concerns data governance, privacy, security, and cryptocurrency regulation [37]. Lack of technological innovation and country-specific legislation have hampered technology adoption [64]. The trust mechanism must be improved to support FinTech development as current financial regulation approaches cannot [31]. Regulation helps enterprises to adapt IT and business processes for Green IT adoption and influences regulatory changes owing to disruptive technologies [21].

6.1.5. Other Factors Influencing Trust

Apart from the significant factors like security, privacy, transparency, and regulation, various other factors could also impact the trust for adopting blockchain in digital payment systems. Figure 3 also shows some prominent factors mentioned in the selected articles that could impact the trust for the adoption. Factors like the quality of the system [19,55,71], design [19,62], immutability [21,52], familiarity [63,65], experience [29–31], and awareness [33,62] of the technology, along with others, are factors that could potentially help to strengthen factors such as security, privacy, transparency, and regulation to enhance the trust for the blockchain adoption in digital payment systems.

6.2. Factors That Influence Acceptance for Blockchain Adoption in Digital Payment Systems

RQ2 seeks to identify the elements that affect the acceptance of blockchain technology in digital payment systems. Based on the selected articles, it has been determined that four key variables have four key factors that substantially influence trust: performance expectancy, effort expectancy, social influence, and facilitating conditions. Table 3 shows the significant factors that impact the acceptance of blockchain adoption from selected articles.

Table 3. Significant factors influencing the acceptance of blockchain adoption according to the selected articles.

Factors	Articles	Insights
Performance Expectancy	[2,21,25,33,72]	The degree to which individuals believe that technology can assist them in accomplishing their professional goals.
Effort Expectancy	[2,21,25,32,33,71,72]	An individual’s personal assessment of the technology’s usability, which includes their perception of the technology’s simplicity and the lack of mental or physical effort needed to operate it.
Social Influence	[2,21,25,33,62,69,71,72]	Individuals’ perceptions of the degree to which others assist them in adopting a particular technology
Facilitating conditions	[2,21,25,33,71,72]	Pertains to the evaluation made by users regarding the infrastructure support provided for utilising a particular technology or system.

6.2.1. Performance Expectancy

The UTAUT model, comprising performance expectancy, effort expectancy, social influence, and facilitating circumstances, emerges as the most robust determinant of adoption intention [33]. The adoption of blockchain technology is heavily influenced by intrinsic motivation, particularly hedonic motivation. The application is also influenced by extrinsic motives, such as performance expectancy [25]. Performance expectancy refers to individuals’ assessment of the extent to which technology can enable them to achieve their work objectives [25].

6.2.2. Effort Expectancy

Effort expectancy is an individual’s subjective evaluation of the usability of technology, encompassing their sense of its ease of use and the absence of cognitive or physical exertion required to interact with it. The UTAUT theory is a prominent framework in technology acceptance [25]. It centres around four key factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. This factor directly influences the desire to embrace and use technology [25]. This implies that when individuals view technology as simple to comprehend and use, they exert less effort than when dealing with intricate systems [21].

6.2.3. Social Influence

The concept of social influence pertains to how individuals perceive the level of support from others about utilising a specific technology [69]. Irani et al. [79] augmented the conventional technology acceptance model (TAM) by integrating self-efficacy and social influence constructs—this modification aimed to enhance the comprehension of client adoption determinants. The study’s findings indicate that social influence and self-efficacy benefit customers’ inclinations to adopt disruptive technologies. To optimise the adoption of technology, it is essential to recognise the significance of self-efficacy with social influence on blockchain technology [63]. The concept is closely linked to the inclination to embrace technological innovation. Social influence may be described as the extent to which an individual feels that significant individuals believe they should utilise a specific technology [21].

6.2.4. Facilitating Conditions

The UTAUT theory is one of the significant frameworks in technology acceptance [25]. Facilitating conditions refer to users’ assessment of the level of infrastructural support

available for using a given technology or system. The factors directly influence the desire to embrace and use technology [25]. Facilitating condition, in this context, pertains to the perception held by users regarding the availability of resources and assistance that enables them to participate in performance behaviour and utilise technology effectively. The findings argue that facilitating conditions have a direct impact on behaviour [2].

6.2.5. Other Factors Influencing Acceptance

There are also other prominent factors apart from social influence, effort expectancy, performance expectancy, and facilitating conditions that can influence the acceptance of the adoption of blockchain in digital payment systems. Figure 4 shows some prominent factors mentioned in the selected articles that could impact the acceptance of the adoption. Factors like quality of the transaction cost [38,66], interoperability [77,78], scalability [37], usability [62], and perceived ease of use [21,29,33], along with others, are factors that could potentially help to strengthen the factor mentioned above to enhance the acceptance for blockchain adoption in digital payment systems. Factors like social norms and the social circle were also found to influence the social influence for the acceptance [69]. The ease of use is another crucial factor of the technology acceptance model that has been used in UTAUT as effort expectancy [25].

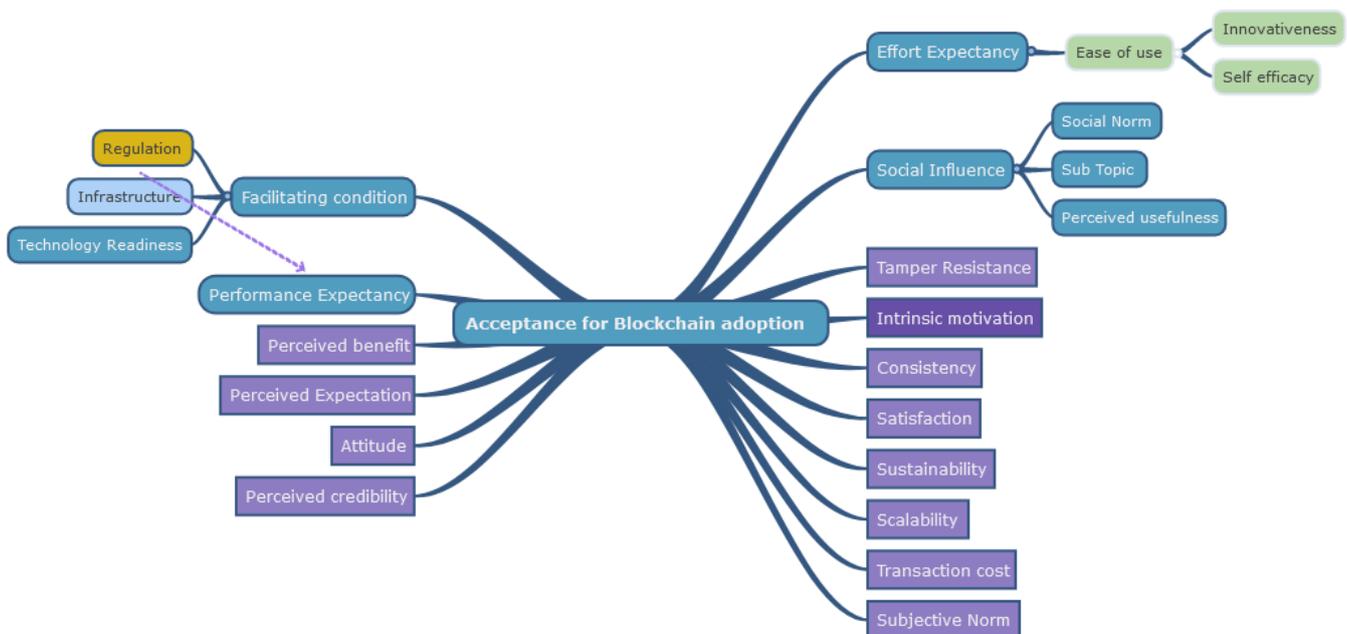


Figure 4. Factors influencing acceptance of blockchain adoption.

7. Discussion

The need to enhance the current payment system with blockchain technology is found to be revolutionary. However, it is imperative to understand the factors that can lead to the successful adoption of blockchain technology in the digital payment system. It would be vital to gain insights about the factors that can lead to user’s trust [62] and acceptance of the adoption of blockchain. Hence, this systematic review was conducted and the results from various studies shed light on the importance of blockchain adoption in digital payment systems from the user’s trust and acceptance perspective. It finds that the significant factors from the UTAUT models [45], like performance expectancy, effort expectancy, social impact, and facilitating conditions [25], need to be studied with other factors influencing trust, like security, privacy, regulation, and transparency [38,54,59], for the better adoption of blockchain technology in the digital payment system. The practical implications of these findings are substantial, offering guidance to enhance user trust and acceptance. This

systematic review also underscores the need for further research to explore the long-term implications of these factors on the adoption from user perspectives.

7.1. Trust Enhancement

This study shows that various factors, including security, privacy, regulation, and transparency, greatly influence the adoption of blockchain technology in digital payment systems. These factors are crucial in bolstering user trust. It identifies security and privacy challenges in interoperable blockchains, including hash time lock contracts, private key attacks, and network analysis [31]. Security and privacy measures, such as the implementation of consensus algorithms, mixing, anonymous signatures, encryption, secure multiparty computation, non-interactive zero-knowledge proof, and secure verification of smart contracts [38], can be employed to offer users the confidence that their transactions are impervious to unauthorised modifications and that records remain unchangeable. This measure successfully reduces the likelihood of fraudulent acts and promotes an atmosphere characterised by heightened trust. The implementation of robust privacy protocols with adherence to data protection regulations like the General Data Protection Regulation (GDPR) of the European Union [37,39] engenders a sense of confidence among consumers that their personal information and financial transactions are shielded from unauthorised intrusion.

Furthermore, well-defined regulatory frameworks provide clients with a sense of legal certainty, incorporating measures to protect consumers and address the issue of money laundering [55]. The inherent transparency of blockchain technology is derived from its publicly available ledger and decentralised system [29,40]. This feature enables users to independently verify transactions and uphold the system's integrity. As a result, this fosters an elevated level of assurance in the digital payment system.

Proposition 1. *Trust in blockchain technology for digital payments relies on security, privacy, regulation, and transparency. When used responsibly, blockchain can instil trust in digital payment systems. However, stakeholders must address these critical aspects to ensure widespread implementation and reception of blockchain technology.*

7.2. Strengthening Acceptance

The results of the systematic review support that the factors that influence consumer acceptance of the adoption of blockchain in digital payment systems are four factors of UTAUT: performance expectancy, effort expectancy, social influence, and facilitating conditions. The performance expectancy significantly influences the adoption of digital payment. To be accepted, digital systems must be designed to be constantly valuable to users. Key performance expectancy elements include time-saving features, lower transaction fees, the non-physical presence of traders, and flexibility in payment, which attract users to adopt this payment system [25]. Effort expectancy, including ease of use and user-friendly features like easy navigation, speed of connection, and a quicker response, can significantly influence user behaviour towards adoption [25]. This study also highlights that the effort expectancy of the technology is directly related to its efficacy, with more accessible technology leading to higher acceptance rates. This encompasses the anticipated benefits of quicker and more efficient transactions and cost savings. The impact of anticipated effort on user acceptance is significant since delivering a user-centric experience prioritising ease of use, intuitive interfaces, and minimal technological barriers is crucial. The facilitating condition for blockchain usage is primarily influenced by IT infrastructure and organisation factors such as computers, Internet speed, and communication integration [2]. Blockchain-based adoption is directly influenced by providing the proper infrastructure, including technical and managerial support, which can significantly drive its adoption [25]. Social influence can also positively influence the acceptance of blockchain technology [69]. Furthermore, the influence of social factors on individuals' adoption of blockchain-based payment systems has considerable importance. The impact stems from several origins, including peer recommendations, endorsements from industry leaders, and the existence

of engaged user communities. These factors are essential in cultivating acceptance and utilisation of blockchain-based payment systems [2,25]. These elements are of utmost importance in facilitating a smooth and user-friendly migration to payment systems based on blockchain technology, hence fostering increased levels of user adoption.

Proposition 2. *The success of blockchain technology in digital payment systems depends on the alignment between factors affecting adoption and consumer expectations. To make blockchain a viable choice, it is essential to consider augmenting trust and acceptance models to enhance the adoption of disruptive technology like blockchain in digital payment systems. This approach can expand the use of blockchain technology and make it a preferred method for digital transactions.*

7.3. Integrating Trust and Acceptance Factors to Reinforce Blockchain Adoption

RQ3 aims to explore integrating the trust model with the acceptance model to enhance blockchain adoption in digital payment systems by observing the factors influencing the users' trust in and acceptance of blockchain technology in digital payment systems. The findings of the systematic review indicate a strong and beneficial relationship between trust and acceptance factors within the domain of blockchain-based digital payment systems. This implies that users' inclination to adopt and accept technology is influenced by their high degree of trust in several aspects of these systems, including transparency, security, privacy, and regulation. The conclusions are substantiated by several investigations, encompassing the works of [2,21,62].

The adoption of blockchain-based payment systems is significantly influenced by the level of trust exhibited by users. The propensity of consumers to adopt this technology is highly influenced by their trust in the security and transparency of transactions, as emphasised by previous studies conducted by [76,78]. Conversely, in the absence of trust within these pivotal domains, the study conducted by Wong et al. [21] highlights that it can impede the process of acceptance and implementation. Instances of apprehension regarding the security of blockchain-based systems or scepticism regarding the veracity of transactions have the potential to dissuade users from embracing those systems.

Trust forms the foundation upon which user acceptance is constructed, with users needing trust in various aspects, such as security and transparency. This trust-building process aligns with the UTAUT model, which states that performance expectancy, effort expectancy, social influence, and facilitating conditions contribute to user acceptance. Another study [3] conducted demonstrates that privacy exerts a notable impact on the perceived usefulness, thereby influencing the adoption. In addition, it is worth noting that the factors of security and privacy exert a significant and beneficial influence on the level of customer satisfaction. This, in turn, has the potential to foster increased acceptance and adoption rates. This assertion is backed by the empirical findings [9].

Blockchain technology provides a diverse array of services encompassing robust security measures, dependable performance, enhanced transparency, unalterable data integrity, and streamlined operational efficiency. According to [9], these characteristics have garnered substantial recognition and are crucial for fostering consumer loyalty.

The presence of regulatory support is a contributing factor in influencing the inclination to embrace payment systems based on blockchain technology. In one study [21], the authors discovered a significant correlation between favourable conditions and the intention to adopt. Notably, regulatory support emerged as a crucial determinant within this association. Regulatory support was also found to influence and impact the enhancement of infrastructure and lead towards technology readiness [2], and it also impacted the performance expectancy [25]. In brief, the acceptance and implementation of blockchain-based digital payment systems are influenced by the interplay of trust, privacy, security, regulatory support, and the advantages inherent in blockchain technology.

Security and transparency are pivotal factors influencing trust, as users need to be assured that their financial transactions are secure and transparent. Privacy considerations are recognised as a crucial dimension of trust and acceptance in the context of blockchain

payment systems, as users’ confidence in the protection of their personal information significantly influences their willingness to adopt and use blockchain technology.

Regulatory support is also emphasised in the UTAUT model, as favourable regulatory conditions can significantly influence users’ intentions to adopt blockchain-based payment systems. The findings offer valuable insights for stakeholders involved in blockchain adoption for payments, helping policymakers design regulations that promote trust and facilitate adoption. Businesses can leverage these findings to tailor their blockchain payment systems to prioritise trust, security, transparency, privacy, and regulatory compliance, which are key determinants according to the UTAUT model.

This study highlights the importance of trust in blockchain adoption. Trust is a multi-faceted factor that includes aspects such as security, transparency, privacy, and regulatory compliance. The UTAUT model, a well-established framework for understanding technology adoption and usage, has the potential to be integrated with trust models, as proposed in Figure 5, by reviewing and synthesising the reviews that could provide depth and structure to the study of blockchain adoption in payment systems.

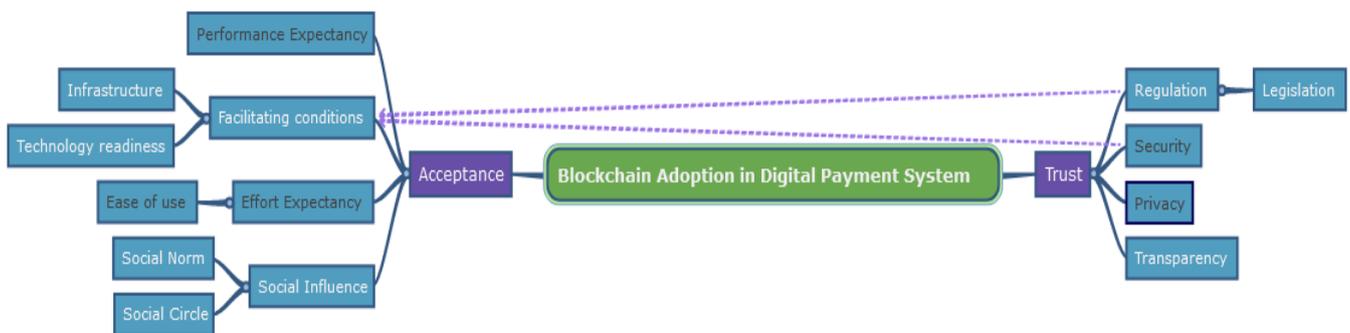


Figure 5. Potential integrated model for blockchain adoption for digital payment systems.

Proposition 3. *Trust sets the foundation for acceptance, and combining the trust and acceptance models can improve adoption efficiency. It is essential to recognise these interconnected factors and work together to create a conducive environment for the seamless integration of blockchain technology into the digital payment system.*

8. Future Research Directions

Some limitations have been identified in this investigation. Firstly, this study only utilised four databases, suggesting that the information gained might be further optimised by using more databases. Furthermore, the references utilised in this study exclusively consisted of peer-reviewed articles. However, it is worth noting that other types of articles may need to be included for a more comprehensive analysis. The variables identified in this study have not undergone statistical testing, so their validity and reliability have not been assessed.

Further research is needed to advance this current study and the propositions. This includes expanding the databases to obtain a more excellent pool of references and enhancing the content’s breadth. Additionally, employing a more comprehensive range of keywords beyond the anticipated ones may yield a larger body of literature with closer correlations. Furthermore, it is imperative to conduct validity tests and assess the reliability of the factors already obtained that will be crucial in validating propositions, including the proposed integrated models. It is imperative to have periodic systematic reviews as the field is continuously evolving in this field and area. Research should consider self-responsibilities, culture, and regional differences for understanding the factors influencing trust in and acceptance of blockchain adoption in digital payment systems. Understanding users’ perceptions of their responsibility for security and privacy, as well as cultural norms and

values, can provide valuable insights. Regional differences, such as regulatory frameworks and infrastructure availability, can also impact adoption patterns.

9. Conclusions

This systematic literature review aimed to gain insights into the many aspects influencing users' trust in and acceptance of digital payment systems. A total of 1859 publications were gathered, from which 48 papers were chosen as primary studies. Due to the nascent stage of blockchain technology's implementation, particularly in digital payment systems, most analyses conducted thus far have been theoretical. These analyses examine significant factors that can lead to the integration of trust and acceptance models for adopting blockchain technology digital payment systems. Limited studies have been conducted to investigate the implementation of blockchain technology inside digital payment systems. It was also observed that limited studies have been conducted on adopting blockchain technology for digital payment systems from the user's perspective. Therefore, focus should be given to advancing a blockchain-based digital payment system by first understanding whether the critical stakeholder, the user, is ready to accept and trust the technology change. A model with the integration of trust and acceptance can significantly promote the blockchain technology's viability in digital payment systems. It is posited that integrating blockchain technology with digital payment systems has the potential to bring about a transformative revolution in the field of payment systems.

Author Contributions: Conceptualization, T.N. and J.Y.P.; methodology, T.N., J.Y.P., K.W.W. and H.C.; software, T.N.; validation, T.N., J.Y.P., K.W.W. and H.C.; formal analysis, T.N.; investigation, T.N.; writing—original draft preparation, T.N.; writing—review and editing, T.N., J.Y.P., K.W.W. and H.C.; supervision, J.Y.P.; project administration, J.Y.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ongoing analysis for future publication. The data will be made available once the analysis is complete and the findings are published, ensuring that the data are shared in a comprehensive and scientifically rigorous manner.

Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

UTAUT	Unified Theory of Acceptance and Use of Technology
PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
FC	Facilitating Condition

Appendix A

The following table shows the most influential factors of trust and acceptance for the blockchain adoption in digital payment systems according to the analysis of 48 selected articles adhering to PRISMA protocols in the domain of blockchain adoption in digital payment systems.

Table A1. The significant factors influencing the trust in and acceptance of blockchain adoption of digital payment system from the selected articles.

Sl. No	Author and Year	Security	Privacy	Reg	Tra	PE	EE	SI	FC
1	Agbezoutsu et al., 2021 [51]	Y			Y				
2	Ahmed et al. [30]	Y	Y	Y					
3	Ahn et al., 2019 [52]	Y							
4	Al Karim et al., 2023 [9]	Y	Y		Y				
5	Auer and Tercero-Lucas, 2022 [53]	Y		Y					
6	Biryukov and Tikhomirov, 2019 [54]	Y	Y	Y	Y				
7	Br et al., 2023 [50]	Y		Y					
8	Butijn et al., 2020 [34]	Y	Y	Y	Y				
9	Campbell-Verduyn and Goguen, 2019 [22]				Y				
10	Chiu, 2017 [55]	Y	Y	Y					
11	Clavin et al., 2020 [37]	Y	Y	Y	Y				
12	De Filippi and Loveluck, 2016 [56]	Y	Y	Y					
13	Fan et al., 2020 [57]	Y	Y						
14	Guo, 2022 [19]	Y	Y						
15	Han et al., 2022 [58]	Y	Y	Y	Y				
16	Haugum et al., 2022 [59]	Y	Y		Y				
17	Hwang et al., 2021 [78]	Y	Y						
18	Knittel et al., 2019 [60]		Y	Y					
19	Kolb et al., 2020 [61]		Y						
20	Kowalski et al., 2023 [62]	Y	Y	Y				Y	
21	Li et al., 2021 [63]				Y				
22	Liao et al., 2021 [64]	Y		Y					
23	Lou et al., 2017 [32]						Y		
24	Malherbe et al., 2019 [65]		Y	Y	Y				
25	Mansoor et al., 2023 [2]	Y	Y	Y	Y	Y	Y	Y	Y
26	Mensah and Mwakapesa, 2022 [25]	Y	Y	Y	Y	Y	Y	Y	Y
27	Mercan et al., 2021 [66]	Y							
28	Mohanty et al., 2022 [35]	Y	Y						
29	Narendra and Aghila, 2021 [67]	Y							
30	Nerurkar et al., 2021 [68]		Y						
31	Nuryyev et al., 2020 [69]	Y	Y	Y				Y	
32	Pal et al., 2021 [29]	Y	Y		Y				
33	Palos-Sanchez et al., 2021 [29]	Y	Y		Y				
34	Purohit et al., 2022 [33]					Y	Y	Y	Y
35	Saxena et al., 2016 [70]	Y							
36	Song et al., 2022 [31]	Y	Y	Y	Y				
37	Stach et al., 2022 [39]	Y	Y	Y					
38	Tian et al., 2022 [71]	Y					Y	Y	Y
39	Trebat, 2023 [72]		Y		Y	Y	Y	Y	Y
40	Treiblmaier et al., 2021 [36]	Y		Y	Y				

Table A1. Cont.

Sl. No	Author and Year	Security	Privacy	Reg	Tra	PE	EE	SI	FC
41	Visconti-Caparros and Campos-Blazquez, 2022 [73]	Y		Y					
42	Waheed et al., 2020 [74]	Y	Y		Y				
43	Wang et al., 2019 [40]	Y		Y	Y				
44	Wong et al., 2020 [21]	Y	Y	Y	Y	Y	Y	Y	Y
45	Zhang et al., 2019 [38]	Y	Y						
46	Zhang, 2022 [75]	Y	Y		Y				
47	Zhu and Wang, 2019 [76]	Y	Y		Y				
48	Zutshi et al., 2021 [77]	Y	Y	Y	Y				

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