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# Examining the Antecedents of Blockchain Usage Intention: An Integrated Research Framework

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**Abstract:** Blockchain is considered one of the key technologies that can accelerate the Industrial Revolution 4.0. The intention to use Blockchain can still be improved in several ways, and how users perceive Blockchain is likely to be influenced by how well they understand the underlying theory. This study examines several important factors, namely government regulation, social influence, perceived security, and Blockchain functional benefits, to measure trust and satisfaction with relationship quality, which may influence the intention to use Blockchain. A sample of 460 people participated in the online questionnaire survey, which was then evaluated with SmartPLS 3. The findings reveal that the social influence and Blockchain functional benefits have a substantial impact on relationship quality, which further results in a positive impact on Blockchain usage intention as well. This study can serve as a reference for companies that need to consider the factors discussed in this study when implementing Blockchain technology to achieve marketing goals and generate sustainable Blockchain usage intentions.

**Keywords:** Blockchain usage intention; Blockchain functional benefits; relationship quality; perceived security



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## 1. Introduction

Blockchain is now regarded as one of the primary technologies driving the fourth industrial revolution in transactions and currency. Many industry analysts believe that once implemented, the Blockchain initiative will serve as a platform that may be used in any industry where transactions occur between individuals or companies [1]. Blockchain, in particular, offers new mechanisms for the simultaneous movement of value and digital information, fostering digitalization and convergence across many industries, including finance, manufacturing, distribution, and the public sector. Knowledge of the intended uses of new technologies for value creation in this context is becoming more and more crucial, particularly in information technology [2,3]. Blockchain blocks store transaction data that is encrypted as a string of letters and numbers and organized chronologically. The general use of Blockchain can yet be enhanced in various ways, and users' perceptions of it will rely on how well they comprehend the underlying theory [4].

Meanwhile, government regulation plays a critical role in assuring the long-term viability of Blockchain [5]. This government regulatory construct serves as the originator and holder of regulations governing how Blockchain can be operated and developed in a country. The previous study indicates that other factors, such as social influence and perceived security, play an essential role in providing users with a positive perception of Blockchain [6]. It is crucial to judge and evaluate how users intend to use Blockchain

because the opinions in social media can encourage and determine whether new users will come. Meanwhile, the perceived security will determine whether users will use Blockchain repeatedly or not because of its security aspects [7–9]. On the other hand, the primary benefits of Blockchain play a role in users' understanding of Blockchain usage in general, affecting the overall perception of how users can use Blockchain in their lives. The above four initial constructs would only be perfect with a good mediating construct in the form of relationship quality, which is used to mediate the main construct about Blockchain usage intentions [10].

Several paucities in the research on Blockchain usage intentions can be addressed, such as research [11,12] that examines Blockchain usage in light of entrepreneurial and institutional factors. Another study [8,13,14] found that the intention to use Blockchain is influenced by how the government thinks about it, which ultimately encourages people to use it themselves. While the above studies have been conducted and have contributed significantly to the literature, to our knowledge, there are still few studies that empirically and thoroughly examine the intention to use Blockchain by considering several important factors simultaneously. Thus, this study specifically aims to explore the various research frameworks that have been conducted on Blockchain usage intentions, with the research filling in the unanswered paucity. This study will therefore propose a more comprehensive research framework that addresses the role of government regulation, social influence, perceived security, Blockchain functional benefits, relationship quality, and Blockchain usage intentions.

Several models of user adoption and a set of independent variables that influence user adoption can be used to predict user adoption of Blockchain technology. Following the lack of previous research on Blockchain adoption, in order to give empirical data on the factors that influence users' intention to adopt Blockchain, this study evaluates a number of independent variables. Specifically, this study aims to determine the correlation between seven variables: perceived operational benefits, trust in privacy and security, facilitating conditions, perceived ease of use, and intention to adopt Blockchain technology.

This study aims to test a new research framework for the factors influencing the intention to use Blockchain. It comprises government regulation, social influence, perceived security, Blockchain functional benefits, and relationship quality. This study uses new combinations and variables that have never been tested in other studies of Blockchain usage intentions.

## 2. Literature Review

### *2.1. Government Regulation*

Since it is important to understand the role of cryptocurrencies in the monetary system, we will now discuss the role of regulation that needs to be considered if such currencies are to be increasingly used in the real economy [15]. Albayanti et al. [16] provided a detailed overview of certain aspects of the regulatory response to blockchain and cryptocurrencies.

Prior to the existence of cryptocurrencies, there were concerns that concentrated digital currencies might impair a country's ability to regulate inflationary pressures. The Chinese Q currency has been widely used as a form of payment by online shops, i.e., outside of the online messaging context for which it was designed. The Chinese central bank restricted the circulation of this currency [17–19], citing concerns about an uncontrolled increase in the money supply and fiscal difficulties.

In recent years, regulators worldwide have become increasingly concerned with virtual currencies and cryptocurrencies. Batista et al. [20] outlined the responses of several regulators, from which it can be inferred that there are different interpretations of cryptocurrencies (e.g., as electronic money, personal money, as commodities or personal property, or as units of a personal account) that also determine their fiscal treatment.

Recent regulatory responses have cited the technology underlying virtual currencies as a reason for their promising prospects. The term "virtual currency system" also encompasses the technologies and mechanisms used to facilitate currency transactions.

In addition to identifying barriers to the widespread adoption of digital currencies, the government has cited blockchain and distributed ledger technology as promising for the future of payments. In response to the survey on blockchain technology, the government has issued a series of recommendations to fund research institutions to study the potential of digital currency technology.

### *2.2. Social Influence*

Social influence refers to individuals' norms, roles, affiliations, and values that influence their perceptions of what they should do [21]. Social influence factors have been considered in the most successful Internet services that allow customers to interact with the platform in a timely manner while influencing customer loyalty to the company or technology [18,20,22]. Moreover, social influence is a unique concept as it reflects the level of trust in the technology and has a real impact on it [23].

This environment of interaction and communication encourages customers to seek information, evaluate risks, and place their trust to decide whether to use the service [24–27]. Understanding how social influence affects blockchain technology will provide us insights into how consumers feel about new technologies and the advantages they may expect.

The influence of social factors on user behavior in new technologies is enormous. Many studies and methodologies emphasize the importance of social influence in describing customers' behavioral intentions [28–30]. According to a study on Blockchain, social factors positively influence the technology's usability. Social factors also facilitate the formation of supportive beliefs through collaboration [31]. The blockchain technology model explains that subjective norms and attitudes can influence users' behavioral intentions [30]. Researchers found that the social environment, which goes beyond IT properties and customer decisions, directly influences users' decisions and behavior [14,15,32].

Social influence is reflected in various public environments facilitating participation and engagement with blockchain technology. These organizational processes can be valuable tools to facilitate the adoption of information technology [33]. In addition, Deflabbro et al. [33] found that more tools are needed to facilitate an understanding of the relationship between social influence and technology acceptance behavior. It is hypothesized that most employees will direct their positive social influence toward colleagues to use blockchain [14]. In many cases, risk perception related to Blockchain may develop later as part of a person's behavioral logic [22].

### *2.3. Perceived Security*

Perceived security is influenced by perceived control, perceived interface design characteristics, and awareness. In addition, perceived security has been found to strongly influence the intention to use blockchain technology [34]. The results of an online survey by Kumar et al. [35] clearly showed that trust influences the intentions to use blockchain technology. It has a decisive significance for blockchain companies that want to attract more customers to use blockchain technology. The study also showed a clear relationship between blockchain users' privacy and perceived security and their trust in blockchain technology [36]. It showed that the study confirmed all three of the researcher's hypotheses, specifically that perceived security increases trust, that trust increases loyalty, and that perceived security and personal data handling increase loyalty.

The implications of these findings for blockchain technology are to increase customer trust and satisfaction by improving their perception of security. This increased perception of security can be achieved through legislation or the implementation of technical systems that protect privacy or enhance security [37–39]. Finally, this study does not identify the specific factors that increase users' perception of security. Similarly, it would be an interesting research direction to determine what factors contribute to this default. Whether it is brand awareness, trust signals, recommendations, privacy policies, or other factors, blockchain is considered a reliable technology due to all of these factors and more.

### *2.4. Blockchain Functional Benefits*

The Blockchain can be thought of as a peer-to-peer distributed ledger made up of connected, replicated data blocks. At its core, the integrity of the Blockchain is maintained by encrypting all network interactions and changes with a public key [14]. From an architectural and structural perspective, the blockchain configuration consists of a distributed database, a decentralized and immutable consensus mechanism, and a cryptographic algorithm that controls each block in the chain [6,18,20].

Although blockchain technology and cryptocurrencies, in general, have been widely reported in recent years, research has shown that transformative applications still need to be commercially available, and few companies have developed blockchain solutions beyond the feasibility or prototype stage [6,18,21]. When benefits are uncertain, it can be challenging for businesses to align their plans around blockchain solutions, which have known integration, performance, and scalability issues. In addition, legal, cultural, logistical, and regulatory issues must be addressed to pave the way for the widespread adoption of the technology. Given these obstacles, it is unsurprising that only some companies are willing to make significant investments beyond the prototype stage to close the gap between promised and actual business values [11]. Despite this uncertainty, the advantages of blockchain technology make it a desirable choice for many businesses. Due to the enormous number of potential uses and perceived advantages, blockchain is also currently experiencing great momentum and drawing significant interest from all around the world.

Articles on blockchain technology and its applications have been published in the academic literature. The study by Hawlitschek et al. [14] analyzed Blockchain and its key features, with a particular focus on the importance of trust in the sharing economy. The study by Kumar et al. [35] examined various use cases in the business-to-government, business-to-business, and business-to-consumer domains to illustrate the technology's great potential and its applications. The study expands on many of the key aspects of previous review studies. It provides a more comprehensive analysis and presentation highlighting several key issues related to Blockchain. The study analyzes the extent to which Blockchain's functional benefits play an essential role in the intention to adopt Blockchain.

### *2.5. Relationship Quality*

Blockchain is a financial technology (FinTech) innovation initially developed as a distributed ledger for Bitcoin. Since the information stored in the Blockchain cannot be falsified, this technology provides a trustworthy, consistent, and transparent means of protecting data [40]. Encryption, which ensures the accuracy of the records, is one of blockchain's essential technologies. Smart contracts can automatically perform transactions based on predefined conditions as well. This system improves work efficiency and allows users to receive products that better meet their expectations [41]. In addition, Blockchain can significantly increase efficiency by reducing transaction and processing times [42].

According to Shin and Bianco [43], blockchain technology can provide users with privacy, security, transparency, and other technical features. As a result of these advantages, users' satisfaction with blockchain technology will rise, influencing their trust in blockchain-based products. It must comprehend user interactions with technical functions as a blockchain company and carefully consider the type of those interactions.

However, blockchain technology represents a potential solution to this perennial problem of trust and satisfaction [44]. Specifically, blockchain technology can solve problems related to trust and satisfaction [45]. In many implementations, trust and satisfaction come from knowing one's blockchain partner, believing in the Blockchain's good intentions, and sharing standard norms, leading to the expectation that everyone will behave in a trustworthy and satisfied manner when trading [46]. However, building trust is often limited to a small scale and becomes more difficult as the number of participants increases [47]. In contrast, trust occurs when the trusting parties place their trust in the technology rather

than in human actors. In this scenario, the technology (such as blockchain technology) serves as the trustee and is given the benefit of the doubt.

The Blockchain relies heavily on trust; thus, it is important to comprehend how it develops and how it influences user interactions. Trust is created through blockchain adoption and use and is not created by Blockchain itself [48]. According to Sharma's study [49] on trust in algorithmic journals, users are willing to allow more data to be collected and processed if it confirms the characteristics of transparency and accuracy; thus, the trust between users and algorithms is strengthened. The value of security, transparency, and privacy can also be offered to users via the technical features of blockchain. The psychological view of the blockchain problem suggests that trust and satisfaction can be built if users understand how the blockchain system works, how it is constructed, and what errors are possible. Trust and satisfaction from the user perspective can contribute to the classification and description of the relationship quality variables in this study.

### *2.6. Blockchain Usage Intention*

Interest is an indication of how hard one tries to perform a behavior [7]. To put it another way, interest may also be thought of as a propensity to be interested in something that is mostly fixed, to pay greater attention to it, and to continually recall it, followed by the pleasure of receiving satisfaction from performance. Interest is an intense desire that arises in a person due to an interest and preference for achieving a specific goal [11].

Blockchain has recently generated controversy due to losses from speculative investments in cryptocurrencies such as Bitcoin, illegal transactions, and sluggish transaction flows due to low capacity. Nevertheless, there is a growing consensus that Blockchain will be critical to future economic and social development. Therefore, efforts are needed at the government level to expand the range of Blockchain applications by influencing organizations' intentions to adopt Blockchain. This study serves as a basis for future theoretical studies, especially with regards to the government or corporate strategies for implementing Blockchain applications or developing adoption models for Blockchain technology. In Table 1, the conceptual definitions are displayed

**Table 1.** Conceptual definitions.

| Construct | Definition | Source |
| --- | --- | --- |
| Government Regulation | Sustained information management and communication to gain public understanding and support for Government Programs and Policies. Government regulation in the form of laws to control blockchain technology. | [17–20] |
| Social Influence | Social influence, or the environment of blockchain technology that influences the adaptation, implementation, and development of blockchain from the perspective of users and developers. | [18,21,22] |
| Perceived Security | Perceived security is defined as the level of security perceived by users when using blockchain technology. It is influenced by the users' perceived security level of the blockchain. | [34,37–39] |

**Table 1.** *Cont.*

| Construct | Definition | Source |
| --- | --- | --- |
| Blockchain Functional Benefits | The contribution that blockchain plays in facilitating cross-border trader inclusion by offering safe and cost-effective solutions, allowing them to fully engage in the global economy. | [14,18,21] |
| Relationship Quality | The performance appraisal of the relationshiplevel between blockchain users and enterprises as the main focus of blockchain technology, which includes cooperative intentions, mutual disclosure, and intensive follow-up contact. | [41–43] |
| Blockchain Usage Intention | Blockchain users' willingness to use the blockchain repeatedly rather than just once. | [7,11] |

## 3. Hypothesis Development

Government regulation refers to laws designed to control people's behavior. Governments should draft laws to regulate blockchain technology to facilitate collaborative peer-to-peer communication between actors rather than subjecting it to legal restrictions [11]. Applicable laws should be drafted or amended to facilitate the widespread adoption of blockchain technology [17]. Albayanti et al. [16] suggested six regulatory/legal challenges to address before blockchain technology. Studies that employ a similar research approach as this one have yet to look at government legislation as a factor to predict blockchain adoption. Therefore, the following hypothesis is proposed to determine how these government rules and regulations may influence users' intentions to use Blockchain technology through the construct of relationship quality:

**Hypothesis 1 (H1).** *Government regulations are positively related to relationship quality.*

Social influence plays a huge role in how potential blockchain users view blockchain technology offerings. Research [21] has shown that the social environment of crypto usage plays a role in developing cryptocurrency as an intermediary and currency in digital business. Social influence, as a construct of social interaction, positively influences users' perceptions and ultimately affects their behavior. In this research, the role of social influence is considered the main factor in blockchain usage intentions rather than as a mediator or facilitator. Therefore, the following hypotheses are made to determine how these social influences and perceptions significantly affect the relationship quality with blockchain technology.

**Hypothesis 2 (H2).** *Social influence is positively related to relationship quality.*

Kumar et al. [35] defined perceived security as the extent to which individuals believe the technology, service, or product they use is safe to disclose essential data, such as transaction information or credit card details via blockchain technology. Perceived security can also be described as a user's assessment of protection from security threats and control over personal data on an online platform [34]. Therefore, users' perception or confidence of being protected by using the technology may lead them to feel safer from intimidating threats to their personal or financial data when using blockchain technology. Perceived

security is an important factor influencing the intention to use new technologies or trust and satisfaction with third parties [36]. Therefore, customers should trust that the third party storing confidential financial data is working legally and honestly. Based on the above arguments, the following hypothesis is proposed.

**Hypothesis 3 (H3).** *Perceived security is positively related to relationship quality.*

According to [14], the Blockchain functional benefits or net benefits are the impact that information systems (IS) have on individuals, often measured by organizational performance, perceived usefulness, and impact on work practices or the extent to which IS contributes to individual success, for example, improved decision-making and productivity, increased sales, market efficiency, customer satisfaction, job opportunities, and economic growth [21]. The greater the Blockchain functional benefits, the higher the quality of blockchain users' relationships. Therefore, the following hypothesis is proposed.

**Hypothesis 4 (H4).** *Blockchain functional benefits are positively related to the relationship quality.*

Several studies have found that trust is an essential mediator between usage intention and its predictors [14,20,24]. The study by Kumar et al. [35] investigated the role of trust as a mediator between ease of use and intention to use cloud storage. Their results provided evidence for the role of trust as a mediator. Initial trust was found to play an important role in predicting intention to use mobile banking. Adoption of blockchain technology is the trust and satisfaction of users in a ground-breaking technology. In order to forecast the desire to adopt blockchain, this study introduces trust and satisfaction with blockchain technology as mediators of the relationship quality. Therefore, we expect that:

**Hypothesis 5 (H5).** *The relationship quality is positively related to blockchain usage intentions.*

## 4. Research Method

An online self-assessment questionnaire was used as part of a cross-sectional survey conducted from August to October 2022 to gather the sample data. The data dissemination method is based on convenient sampling. This study's participants are blockchain users with experience with blockchain-linked functions or services. According to a survey conducted by [25], Southeast Asian countries, including Indonesia, rank third in the world after the US and India in terms of growth of Blockchain usage. Furthermore, Indonesia currently has the fourth largest population in the world. Thus, it is appropriate to use Indonesians as the study context to represent blockchain users. The data were filtered to exclude inexperienced blockchain users, so only 489 respondents were eligible for data analysis. The reason for this is that inexperienced users might not have enough knowledge about blockchain and its applications when answering our survey questionnaire, thus affecting the validity and reliability of our study.

In Table 2, the respondents' demographic compositions are displayed.

**Table 2.** Sample demographics.

| Characteristic | Items | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 308 | 63% |
| | Female | 181 | 37% |
| Age | <20 | 49 | 10% |
| | 21–30 | 196 | 40% |
| | 31–40 | 98 | 20% |
| | 41> | 146 | 30% |
| Education Level | High-school | 49 | 10% |
| | Undergraduate | 210 | 43% |
| | Postgraduate | 230 | 47% |

The questionnaire consisted of two parts: demographic questions and hypothesis measurement questions. In the present study, the entire framework was structured according to the framework used in previous studies. The questions were developed from prior research and scales that have been approved. The questionnaire's content validity was then thoroughly examined. This study utilized seven Likert scales to increase the scale's accuracy. Figure 1 show the research frameworks and hypothesis development.

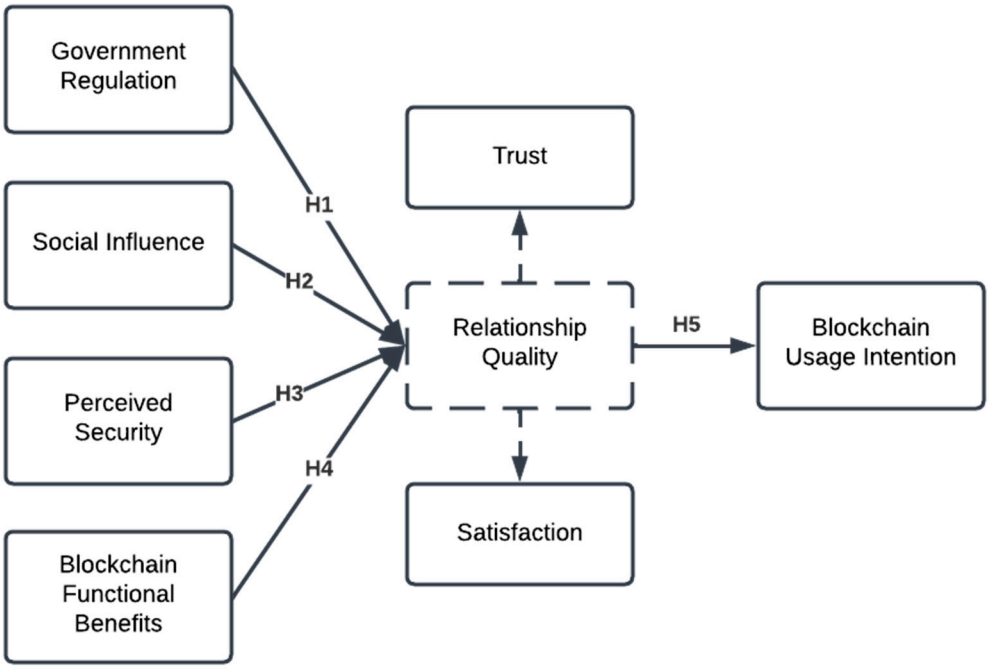


**Figure 1.** Research frameworks.

The VIF analysis was performed to validate the model's application and to test for multicollinearity among the constructs. The SmartPLS calculation results provided a low VIF value. According to Hair et al. [50], the VIF value for variables should be 5.0. According to Table 3, the inner VIF value for variables should be 5.0. In this research, the inner VIF value ranged from 1.000 to 2.640, as shown in Table 3, indicating that there was no multicollinearity effect among the latent constructs.

**Table 3.** Inner VIF results.

| | Name of Construct | VIF |
|---|---|---|
| H1 | GR → RQ | 2.640 |
| H2 | SI → RQ | 2.450 |
| H3 | PS → RQ | 2.750 |
| H4 | BB → RQ | 1.000 |
| H5 | RQ → BU | 1.000 |

## 5. Data Analysis

SmartPLS 3 was used for measurement and partial least squares (PLS) analyses. Table 4 contains a list of the measurement tools that were used for this study. The measurement phase involved reliability and validity assessments, and the analysis phase focused on path coefficients and the feasibility of the given structural model. These two stages are meant to examine the relationships between the constructs and verify their validity and reliability. This study examined the causal interactions between government regulation, social influence, perceived security, blockchain functional benefits, relationship quality, and blockchain usage intentions, all of which encompass the various metrics discussed in previous research.

**Table 4.** Questionnaire measurement items.

| | Measurement Items |
|---|---|
| | government regulation [18–20] |
| GR1 | Government regulation is my decisive factor in using blockchain |
| GR2 | In my opinion, a good Blockchain is legal within the framework of government regulation. |
| GR3 | Blockchain users need to be protected by state laws |
| GR4 | Blockchain providers should have specific laws for providing blockchain |
| | social influence [21,22] |
| SI1 | The opinion of my neighbors decides whether I will use Blockchain |
| SI2 | If my friends don't use Blockchain, I won't use it either. |
| SI3 | I would recommend Blockchain to my friends |
| SI4 | The environment plays a good role in spreading information about Blockchain |
| SI5 | Social media is the best place to learn about the usability of Blockchain |
| | perceived security [34,37,39] |
| PS1 | I want the security of the blockchain I use to be guaranteed. |
| PS2 | The quality of blockchains is determined by the security they provide |
| PS3 | I will stop using the Blockchain if there is a data leak in the Blockchain. |
| PS4 | I believe that Blockchains will flourish if the security they provide is guaranteed. |
| | blockchain functional benefits [18,21] |
| BB1 | I use Blockchain because of the features it offers |
| BB2 | I will stop using Blockchain when its features no longer help me. |
| BB3 | Companies need to communicate well the functions that Blockchain offers |
| BB4 | The more functions Blockchain offers, the better |
| BB5 | Blockchain needs to focus on a single function, and that is finance |
| | relationship quality [41–43] |
| SAT 1 | I am satisfied if the blockchain service I receive meets my criteria. |
| SAT 2 | I think user satisfaction can be measured by the quality of the blockchain. |
| SAT 3 | Overall, I am satisfied with what the blockchain has to offer so far |
| TRU 1 | My trust in the blockchain can be measured by the security of the blockchain |
| TRU 2 | As long as blockchains adequately guarantee the trust of their users, they will thrive. |
| TRU 3 | Overall, I trust what the blockchain has to offer so far |
| | blockchain usage intention [7,11] |
| BU1 | I intend to use Blockchain repeatedly if the services provided are satisfactory. |
| BU2 | I will use Blockchain repeatedly |
| BU3 | I will use other features of Blockchain |
| BU4 | I will try to use Blockchain in different areas of my life |
| BU5 | I feel that life will be easier if I use Blockchain |

Note: GR: Government Regulation, SI: Social Influence, PS: Perceived Security, BB: Blockchain Functional Benefits, RQ: Relationship Quality, and BU: Blockchain Usage Intention.

For the following reasons, PLS is more suited for this investigation than other structural equation modeling (SEM) methods. First, PLS can handle both built models and measured items simultaneously, making it perfect for examining causal relationships between variables. In addition, PLS can evaluate complex predictive models (with multiple constructs and research variables). To perform the PLS analysis, the sample size must be at least 5 to 10 times the total paths in the model. In this study, the sample size is 460, and the total number of paths is 6, which is eligible for a PLS analysis. In addition, PLS is superior to covariance-based SEM, because the reflective and formative indicators can be processed simultaneously. Other nonanalytic methods, however, can only assess reflective indicators.

The PLS approach has some disadvantages in addition to its advantages. Before calculating the path coefficients of the structural model in the subsequent step, PLS-SEM optimizes the model's variables. To avoid this problem, some researchers who are experts in the field of organizational innovation review the questionnaire to ensure that the measurement points are appropriate for the study and lead to accurate results. The lack of a suitable global measure of model fit further limits the applicability of the model.

### *5.1. Outer Model and Validation*

The reliability analysis, convergent validity, and discriminant validity are the fundamental features assessed under the outer model. All constructs had acceptable construct reliability, as measured by composite reliability criterion values of 0.7 and above. A construct has convergent validity, following Fornell and Larcker's approach, if the AVE and predictor factor loading are greater than 0.5. Table 5 displays the findings of the factor

loading and reliability tests for the different construct items. In addition, discriminant validity determines the degree of discrimination between the measured variables and different construct criteria. Each variable suggests a corresponding discriminant validity if the factor loading of each latent item for each assigned construct is greater than the factor loading of any other construct. Table 6 presents the results of the Larcker criterion discriminant validity analysis.

**Table 5.** Convergent validity and reliability analyses.

| Measurement Items | Loading Factors | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|---|---|
| BB1 | 0.800 | 0.855 | 0.898 | 0.639 |
| BB2 | 0.838 | | | |
| BB3 | 0.862 | | | |
| BB4 | 0.822 | | | |
| BB5 | 0.657 | | | |
| BU1 | 0.685 | 0.867 | 0.905 | 0.659 |
| BU2 | 0.888 | | | |
| BU3 | 0.768 | | | |
| BU4 | 0.783 | | | |
| BU5 | 0.912 | | | |
| GR1 | 0.826 | 0.884 | 0.92 | 0.743 |
| GR2 | 0.882 | | | |
| GR3 | 0.868 | | | |
| GR4 | 0.870 | | | |
| PS1 | 0.815 | 0.865 | 0.908 | 0.712 |
| PS2 | 0.828 | | | |
| PS3 | 0.848 | | | |
| PS4 | 0.883 | | | |
| SAT1 | 0.852 | 0.737 | 0.853 | 0.663 |
| SAT2 | 0.909 | | | |
| SAT3 | 0.661 | | | |
| SI1 | 0.808 | 0.881 | 0.913 | 0.679 |
| SI2 | 0.793 | | | |
| SI3 | 0.818 | | | |
| SI4 | 0.880 | | | |
| SI5 | 0.818 | | | |
| TRU1 | 0.858 | 0.825 | 0.895 | 0.74 |
| TRU2 | 0.841 | | | |
| TRU3 | 0.882 | | | |

Note: GR: Government Regulation, SI: Social Influence, PS: Perceived Security, BB: Blockchain Functional Benefits, RQ: Relationship Quality, and BU: Blockchain Usage Intention.

**Table 6.** Discriminant validity Fornell–Larcker criterion.

| | BB | BU | GR | PS | RQ | SAT | SI | TRU |
|---|---|---|---|---|---|---|---|---|
| BB | 0.799 | | | | | | | |
| BU | 0.739 | 0.812 | | | | | | |
| GR | 0.775 | 0.808 | 0.862 | | | | | |
| PS | 0.735 | 0.803 | 0.751 | 0.844 | | | | |
| RQ | 0.742 | 0.687 | 0.704 | 0.677 | 0.79 | | | |
| SAT | 0.756 | 0.691 | 0.726 | 0.693 | 0.743 | 0.814 | | |
| SI | 0.730 | 0.779 | 0.746 | 0.63 | 0.708 | 0.724 | 0.824 | |
| TRU | 0.617 | 0.583 | 0.569 | 0.56 | 0.744 | 0.783 | 0.588 | 0.860 |

Note: GR: Government Regulation, SI: Social Influence, PS: Perceived Security, BB: Blockchain Functional Benefits, RQ: Relationship Quality, and BU: Blockchain Usage Intention.

### *5.2. Testing of Hypotheses and Result of Inner Model*

This study used the inner PLS model analysis to test the hypotheses. Table 7 displays the results of the hypothesis test, as well as the *p*-values, *t*-values, and path coefficients. All of the hypotheses are significant and supported by the findings. The hypothesized outcomes are also depicted in Figure 2.

**Table 7.** Summary of the inner model results.

| Hypothesis | | Path Coefficient | T statistics | *p* Values | Results |
|---|---|---|---|---|---|
| H1 | GR → RQ | 0.531 | 3.431 | 0.015 | Accepted |
| H2 | SI → RQ | 0.547 | 4.299 | 0.022 | Accepted |
| H3 | PS → RQ | 0.377 | 3.853 | 0.000 | Accepted |
| H4 | BB → RQ | 0.804 | 4.219 | 0.027 | Accepted |
| H5 | RQ → BU | 0.687 | 2.532 | 0.012 | Accepted |

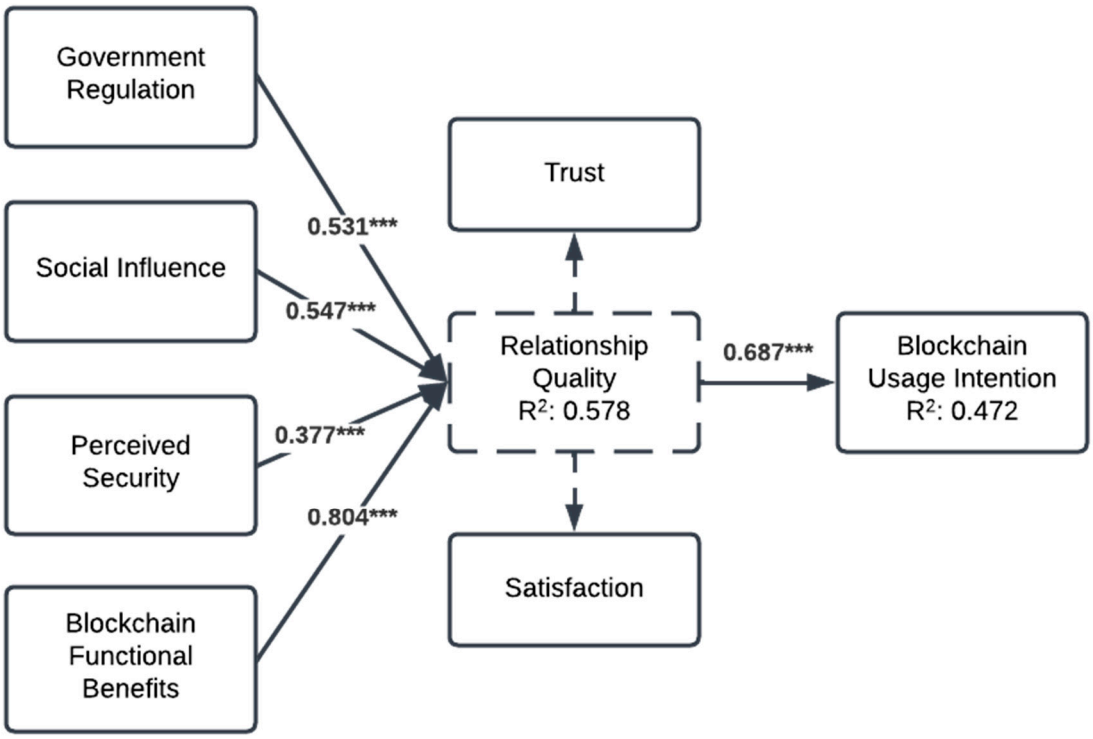


**Figure 2.** The inner model result framework. *** *p*-value < 0.001.

Figure 2 and Table 7 show that government regulation positively and significantly impacts the relationship quality, supporting H1 (GR → RQ: β = 0.531, *t*-value = 3.431). In addition, the analysis shows that social influence has a positive and significant impact on the relationship quality, supporting H2 (SI → RQ: β = 0.547, *t*-value = 4.299). Then, the analysis shows that perceived security has a positive and significant impact on the relationship quality, which supports H3 (PS → RQ: β = 0.377, *t*-value = 3.853), and the analysis shows that blockchain functional benefits have a positive and significant impact on the relationship quality, which supports H4 (BB → RQ: β = 0.804, *t*-value = 4.219). Finally, the relationship quality has a significant and positive impact on the intention to use Blockchain (RQ → BU: β = 0.687, *t*-value = 2.532). In addition, the $R^2$ value reveals 0.578 for RQ and 0.472 for BUI. This means RQ can be explained by the four antecedents for 57.8%. Meanwhile, BUI can be explained by RQ for 47.2%.

### *5.3. Testing of Mediation Effects*

To ascertain whether or not the mediating variables described in this study are statistically significant, a path analysis and the Sobel test are applied. Table 8 displays the Sobel test results' *p*-value estimates, which reveal if there are significant indirect effects. All mediator values are greater than 2.01, indicating a significant mediating effect between the independent and dependent variables.

**Table 8.** Mediation test results.

| Construct | Construct Relationship | *t*-Value of Path Coefficient | Sobel Test's | *p*-Value |
|---|---|---|---|---|
| GR → RQ → BU | GR → RQ | 3.431 | 2.037 | 0.041 |
| | RQ → BU | 2.532 | | |
| SI → RQ → BU | SI → RQ | 4.299 | 2.181 | 0.029 |
| | RQ → BU | 2.532 | | |
| PS → RQ → BU | PS → RQ | 3.853 | 2.115 | 0.034 |
| | RQ → BU | 2.532 | | |
| BB → RQ → BU | BB → RQ | 4.219 | 2.171 | 0.029 |
| | RQ → BU | 2.532 | | |

## 6. Discussion

This research focused on the integration of government regulation, social influence, perceived security, and Blockchain functional benefits. Then, these four factors were combined with relationship quality as a factor influencing four types of Blockchain usage outcomes to examine Blockchain usage intentions. Good blockchain usage and customer experience depend on what kind of content (functions) is provided on the blockchain [26]. Several important insights and contributions emerge from the empirical results of this study for both researchers and practitioners.

### *6.1. Theoretical Implications*

This study has several implications for theory. First, we add important constructs that have a significant impact on blockchain usage intentions—that is, government regulation, social influence, perceived security, and blockchain functional benefits. In particular, we present a holistic model of antecedents of blockchain user outcomes in response to blockchain usage intentions. Although blockchain usage intentions have attracted research interest, holistic models explaining the emergence of government regulation, social influence, perceived security, and blockchain functional benefits on the platform have been rare in the existing blockchain literature. Second, this study is the first to confirm government regulation, social influence, perceived security, and blockchain functional benefits on the relationship quality. While it is widely recognized in research that blockchain's functional benefits can lead to the relationship quality [2,4,5], as well as social influence on the relationship quality [7,9,17], this study also contributes by integrating government regulation,

social influence, perceived security, and blockchain's functional benefits into a research framework of relationship quality related to blockchain usage intentions. In addition, this study also contributes by drawing on new datasets on existing blockchain surveys so that this study can make an important contribution to the existing blockchain literature.

### *6.2. Managerial Implications*

This study mainly aims at companies considering using Blockchain as a medium for their transactions and payments. The results will point marketing managers to the importance of Blockchain implementation in influencing customer behavior and leading to sustainable usage goals.

Based on Hypothesis 1, the test revealed that government regulation significantly impacts the relationship quality. Hence, managers as business leaders must first ensure that the Blockchain implemented by the company complies with the regulations and standards set by the government, which is very important to ensure that users are not worried about whether the Blockchain they use is legal. Meanwhile, the results of testing Hypothesis 2 showed that social influence significantly and positively influences the relationship quality. As social influence has grown to be a significant predictor, social media user opinions have become the foundation for organizing Blockchain usage. Managers should be able to use people's five senses while creating blockchain applications to bring them to the stage of blockchain usage. However, in social media, people cannot perceive the senses of taste, smell, and touch. The remaining two senses, vision and hearing, should be fully utilized or be able to compensate for the deficiencies of the above three senses. Therefore, it is vital for blockchain users to give a positive opinion on social media.

Hypothesis 3: Perceived security also plays an important role in the relationship quality, leading to the intention to use Blockchain. This role is vital in maintaining Blockchain users' sense of security of their data and money when using Blockchain. Perceived security generally cannot be manipulated, because it is the user's perception. However, users' opinion of Blockchain security is guaranteed by providing information and ensuring the security of their data. The Hypothesis 4 plays the most prominent role among the other constructs: the Blockchain functional benefit shows how users view the use of Blockchain in their lives. In this case, management must be able to provide quality information about how Blockchain can support and improve users' quality of life. Hypothesis 5 explains that the relationship quality on the factors of the other four constructs in this study, namely government regulation, social influence, perceived security, and Blockchain functional benefits, can establish a sustainable relationship between the relationship quality and Blockchain usage intentions. It is important for management to recognize that the influence that relationships have is an essential determinant of users' intentions to use the Blockchain. Based on Hypotheses 1–4, we discovered that controlling the relationship quality is crucial, because favorable customer–business relationships boost consumers' desire to adopt blockchain technology, become loyal customers, and participate in company programs. Therefore, in this digital age, companies need to understand the quality of information related to Blockchain and ensure a sustainable performance for the company. The mediation test results show that the relationship quality matters as managers can improve users' positive relationships with Blockchain functions by assisting customers in identifying with the company's Blockchain facilities. Additionally, because there is a strong relationship between them, consumers can be kept devoted and participate in any company activities or programs.

## 7. Conclusions

During this digital age, more and more companies realize that Blockchain should promote commercially oriented aspects and socially oriented aspects that emphasize the interactions between Blockchain users. Using different aspects as information tools is a solid decision so long as the promotional material adheres to the government regulation, social influence, perceived security, and Blockchain's functional benefits. Therefore, companies

need to think critically and creatively to find a good approach that matches the personal preferences of the target customers. All these activities affect the relationship quality between customers and companies, and managing good relationships between customers and companies is a necessary strategy to achieve marketing goals. In addition, according to the results of this study, government regulation, social influence, perceived security, and Blockchain functional benefits positively impact the relationship quality previously established by a suitable Blockchain approach.

This study contains some limitations that may serve as guidance for future research despite efforts to use a thorough research framework, data collection, and research methodology. First, the differences between different types of blockchains were not explored. Some merchants have begun to employ cryptocurrencies as a transactional currency in light of the growing development of these digital assets. As a result, future research will likely need users from different platforms to provide more comprehensive results and consequences. Second, people in different regions or countries tend to prefer different blockchain properties. Research on whether people from various societies or nations favor blockchains and whether they have particular reasons for doing so will show whether a regional blockchain analysis is necessary. Third, by employing real technological evaluations to comprehend user experiences [21,22] and psychological self-assessments, the relationship between customer behavior and blockchain usage intentions can be strengthened. Business is ultimately about managing customers and fostering social, collaborative relationships and dialogues that appreciate the customer [22]. In order to understand how the relationship quality between businesses and their customers can be technologically maintained by applying customer satisfaction and loyalty to Blockchain, further research focusing on the relationship between Blockchain and customer satisfaction needs to be conducted in the future.

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