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Analysis of Consumer Innovation Resistance to the Commercialization of Bitcoin Payments in the Distribution Industry

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Abstract

Purpose: Despite the rapid digital transformation in the distribution industry fueling expectations, the widespread adoption of Bitcoin payment systems remains limited. This study investigates consumer-perceived barriers to the commercialization of Bitcoin payments, empirically analyzing their influence on perceived ease of use, perceived risk, and overall innovation resistance. **Research design, data and methodology:** A survey was conducted with 497 adult men and women in South Korea who had an understanding and usage experience of Bitcoin. The collected data was analyzed using the SPSS 27.0 and Amos 23.0 programs. Specifically, Structural Equation Modeling (SEM) was performed to estimate the path coefficients of the research model, and Bootstrapping was applied to test the mediation effects. **Results:** The results indicate that institutional trust positively influences perceived ease of use and negatively impacts perceived risk. Conversely, complexity and status quo bias negatively affect perceived ease of use while positively influencing perceived risk. Furthermore, the results indicate that perceived ease of use reduces innovation resistance, whereas perceived risk increases it. **Conclusions:** This study highlights the critical role of innovation resistance in designing effective Bitcoin payment systems and fostering consumer adoption, contributing to the distribution industry's sustainable growth through innovative payment solutions.

Keywords : Distribution Industry, Bitcoin Payments, Consumer Resistance to Innovation, Perceived Ease of Use, Perceived Risk

JEL Classification Code: L81, G20, O33, D12, C38

1. Introduction

Recently, with the acceleration of digital transformation worldwide, there has been a rapid increase in contactless and non-face-to-face online consumption and financial transactions. This change is rapidly transforming the paradigm of digital payment services across various industries, including the financial sector (Sidley & Dingle, 2022). Especially, digital cryptocurrencies, as decentralized digital currencies based on blockchain technology, enable direct peer-to-peer transactions without intermediaries, unlike traditional card payment systems (Wang et al., 2018; Viriyasitavat et al., 2019). This is expected to reduce intermediary fees paid by consumers, greatly improve convenience, and provide high security, transparency, and anonymity (Böhme et al., 2015; Nelms et al., 2017).

Bitcoin, a prominent digital currency with excellent global liquidity and circulation among digital cryptocurrencies, is rapidly increasing in use as a payment method across various industries including finance, insurance, distribution, and healthcare (Albayati et al., 2020;

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Amponsah et al., 2021; Elangovan et al., 2020; Holotiuk et al., 2017; Javaid et al., 2022; Polasik et al., 2015). According to a report by Allied Market Research, the Bitcoin payment market reached $850.6 billion in 2022 and is projected to grow by 16.3% to $3,788.2 billion by 2031.

In particular, the distribution industry is focusing on the use and potential impact of Bitcoin as an effective solution to various problems seen in traditional centralized payment systems, such as high intermediary fees, delayed payment processing, and service instability due to theft and hacking (Müßigmann et al., 2020). Direct transactions based on distributed ledger technology can minimize intermediary fees and transaction times (Cai et al., 2023), providing economic benefits and efficiency to both distributors and consumers. Additionally, distributors and consumers can easily verify information about purchased products during the transaction and distribution process (Werbach, 2018), ensuring data integrity and transparency, and ultimately enhancing customer experience. As a result, numerous empirical analyses on acceptability have been conducted recently to promote the introduction and widespread adoption of Bitcoin payment services in the distribution and logistics industries (Al-Jaroodi & Mohamed, 2019; Folkinshteyn & Lennon, 2016). Acceptability studies can contribute to developing sustainable business models and achieving technological innovation by understanding consumers' and organizations' perceptions and attitudes towards specific technologies or products.

In related previous studies, Müßigmann et al. (2020) analyzed potential benefits such as improved supply chain transparency and enhanced data integrity resulting from the application of blockchain technology in logistics and supply chain management. Cai et al. (2023) empirically verified the intention to adopt blockchain-based systems due to their potential benefits, such as improved transparency and operational efficiency in supply chain management. Additionally, Choi et al. (2020) analyzed resistance factors hindering the adoption of Bitcoin payment services by organizations within the supply chain. Jonker (2019) and Wu et al. (2022) analyzed factors influencing the adoption of Bitcoin payments by online distributors from technological and regulatory environmental perspectives, focusing on transaction cost reduction and attracting new customers. Dwivedi et al. (2023) analyzed resistance factors perceived by distributors regarding the adaptation of blockchain technology.

Despite the technological innovation of Bitcoin payment services and multifaceted efforts to transform the overall distribution industry paradigm, the widespread commercialization of Bitcoin in the distribution industry remains stagnant (McKinsey & Company, 2019; Werbach, 2018). This can be seen as a transitional phenomenon that may occur in the adoption process of innovative technologies, and it is necessary to pay attention to the fact that the widespread adoption of Bitcoin use can be hindered by complex factors including technical, regulatory, social, and psychological aspects (Böhme, 2016). Moreover, most of the studies described so far have examined acceptance and resistance factors from the perspective of distributors, with very few studies conducted from the consumer perspective. Understanding consumer attitudes and behaviors in the distribution industry is essential for the successful implementation of Bitcoin payment methods, enhancing customer experiences, and building sustainable business models (Loh et al., 2023). Especially, considering the slow commercialization of Bitcoin payments, understanding and analyzing the barriers consumers perceive in terms of innovation resistance to identify the root causes of this situation can be a crucial strategic element for maintaining competitiveness and sustainable development through future technological innovation in the distribution industry (Mattke et al., 2018).

Therefore, this study aims to empirically explore and identify the fundamental factors influencing innovation resistance among consumers to promote the introduction and widespread commercialization of Bitcoin payment services in the distribution industry. This is an attempt to expand Rogers' (2002) Innovation Diffusion Theory and Ram & Sheth's (1989) Innovation Resistance Model by applying them to the Bitcoin payment context. To this end, this study will examine the impact of potential determinants affecting consumers' perceived innovation resistance, including innovation characteristics factors (consisting of personal information leakage risk, complexity, institutional trust, and uncertainty) and personal characteristic factors (consisting of psychological distance and status quo bias). These innovation and personal characteristic factors are multi-dimensionally constructed based on the potential barriers to Bitcoin use presented in Böhme's (2016) study and the innovation resistance models of Ram (1987), Sheth (1981), and Ram and Sheth (1989).

Furthermore, to enhance the explanatory power of the relationship between potential determinants and innovation resistance, this study incorporates perceived ease of use and perceived risk as mediating variables. This approach is grounded in the Technology Acceptance Model by Moore & Benbasat (1991) and the Dual-Factor Theory proposed by Cenfetelli (2004) and Bhattacherjee and Hikmet (2007). These mediating variables facilitate a more nuanced understanding of the process by which consumers form attitudes towards Bitcoin payment services. Consequently, they contribute to a more accurate comprehension of the mechanisms underlying innovation resistance.

The results of this study will provide a more balanced understanding of the acceptance of Bitcoin payment services by analyzing innovation resistance from the consumer

Table 1 : Potential Resistance Factors to the Commercialization of Bitcoin Payments

Classification	Resistance Factor		Reference
Innovation Characteristics	Risk of Personal Information Leakage	· Possibility of tracking individual transactions · Risk of leaking personal financial information through hacking or security vulnerabilities	Böhme et al. (2015)
	Complexity	· Difficulty in payment processes due to a lack of technical understanding · Challenges in acquiring new knowledge and learning burdens	Meuter et al. (2005)
	Institutional Trust	· Uncertainty in institutional protection due to legal status and regulatory uncertainty · Lack of consumer protection mechanisms in case of disputes in Bitcoin transactions	Folkinshteyn & Lennon (2016)
	Uncertainty	· Price instability due to the high volatility of Bitcoin value · Potential asset value fluctuation due to the time lag between actual product purchase and Bitcoin payment	Polasik et al. (2015), Rogers (2002)
Personal Characteristics	Psychological Distance	· Bitcoin is still perceived as a difficult-to-understand new concept · Resistance and difficulty in adapting to unfamiliar technology	Zhang & Wang (2009)
	Status Quo Bias	· Preference for familiar and convenient existing payment methods · Tendency to avoid discomfort and effort associated with the introduction of new technology	Samuelson & Zeckhauser (1988), Polites & Karahanna (2012)

perspective, unlike existing distribution-centric studies (Choi et al., 2020; Wu et al., 2022). Furthermore, this will enable the presentation of practical strategies to overcome consumer innovation resistance and promote the wider adoption of Bitcoin payment services.

2. Theoretical Background

2.1. Bitcoin and the Distribution Industry

In the distribution industry, payment services represent both the final gateway of consumer experience and a crucial element in the purchasing process. Even if product acquisition is satisfactory, any inconvenience arising during the payment process can significantly diminish a customer's intention to revisit. Moreover, although payment services in the distribution sector are meant to be a means rather than an end in themselves, they possess the potential to create a lock-in effect, retaining customers and consequently establishing market dominance.

Over the past several decades, the payment market in the distribution industry has undergone rapid transformation, evolving in tandem with technological advancements and shifts in consumer value paradigms. Credit cards have long been the exemplar of electronic payment services, with a diverse array of types and applications ranging from retailer-specific cards to universally accepted ones (Chakravorti & To, 2007). The dawn of the 21st century, marked by the advent of smartphones and the subsequent inauguration of the Mobile First era, has precipitated a gradual shift towards mobile and digital payment methods. Consequently, payment systems are swiftly evolving into mobile-based, simplified payment solutions (Patil et al., 2017).

While the rapid restructuring of the payment market towards online, particularly mobile-centric platforms, has significantly enhanced consumer convenience in transactions, payment services continue to operate under complex structures and inefficient processes (Liu et al., 2015). The intricacies of authentication, settlement, payment, disbursement, and reconciliation have further complicated the payment process, ultimately serving as a catalyst for a vicious cycle that reinforces a high-cost system. As the number of intermediaries—such as smartphone manufacturers, operating system providers, and application developers—increases in simplified payment systems, not only do overall costs rise, but settlement periods also extend. Although goods or services are immediately delivered at the point of transaction, electronic payments, unlike real-time cash transactions, experience progressively longer settlement periods as intermediary stages multiply. Consequently, payment innovations primarily driven by intermediaries' business expansion ambitions have paradoxically resulted in high-cost, low-efficiency outcomes, with the burden ultimately transferred to merchants and financial consumers.

Recently, as an alternative to address various issues inherent in traditional payment models, there has been growing interest in the utilization of cryptocurrencies, such as Bitcoin and Ethereum, which operate on blockchain networks and can be transacted online (Nakamoto, 2008; Radziwill, 2018). Cryptocurrencies can be defined as digital currencies that can be issued without a central bank and transacted by anyone without intermediary institutions, based on blockchain-distributed ledger technology (Bech & Garratt, 2017). Moreover, the movement of goods and services occurring between suppliers and users can be recorded and viewed on the blockchain. Particularly, there is significant interest in implementing payment systems using Bitcoin, which boasts the highest global liquidity and preference among digital virtual currencies. According to a survey of BitPay, a leading cryptocurrency payment processor, Bitcoin accounts for the largest proportion of processed transactions at 56%, followed by Litecoin (16%), Ethereum (10%), Bitcoin Cash (7%), and Dogecoin (7%).

Despite significant interest in Bitcoin payment systems within the distribution industry, the rate of technology adoption and diffusion has been slower than anticipated, with the exception of a few large corporations (McKinsey & Company, 2019; Werbach, 2018). Consequently, to expedite the commercialization of Bitcoin payment methods, a thorough investigation into factors contributing to technology adoption resistance and innovation diffusion delay is necessary (Böhme, 2016; Ram & Sheth, 1989). This study aims to explore these innovation resistance factors from a consumer perspective, specifically analyzing them by categorizing them into innovation characteristics (comprising personal information leakage risk, complexity, institutional trust, and uncertainty) and individual characteristics (comprising psychological distance and status quo bias). Table 1 illustrates the potential resistance factors affecting the commercialization of Bitcoin payments from a consumer standpoint.

2.2. Innovation Resistance Theory

Innovation refers to new products or technologies that possess the potential to create new markets or change the current competitive landscape and consumer behavior (Rogers, 2002). In contrast, innovation resistance signifies resistance to changes induced by innovation. It is not merely considered the opposite concept of innovation acceptance but rather reflects a natural psychological state that consumers experience during the acceptance process, indicating varying levels of acceptance (Ram, 1987). Ram (1987), Sheth (1981), and Sheth and Stellner (1979) criticized the limitations of pro-innovation research, asserting that psychological conflicts surrounding innovation resistance must be explored in early studies on innovation adoption.

Moore and Benbasat (1991) and Rogers (2002) noted that individuals might accept new changes according to their personal characteristics; however, they may also resist due to factors like uncertainty or doubt regarding the changes. Schiffman and Kanuk (2007) argued that when the perceived benefits offered to consumers compared to existing products are low, the attractiveness of the new products diminishes, resulting in consumer innovation resistance. Efforts to introduce and commercialize Bitcoin payments in the distribution sector are in the nascent stage, and it is crucial to consider the duality of positive technology acceptance as well as technological resistance at this point.

Research employing innovation resistance theory has applied various variables depending on individual researchers; however, most studies have been conducted within the foundational context proposed by Ram (1987) and Sheth (1981), and Ram and Sheth (1989). Sheth (1981) introduced dual innovation resistance, constituted by habitual biases toward existing products (Habit Toward Existing Bias) and perceived risk (Perceived Risk), emphasizing the significance of incorporating individual characteristics regarding consumer resistance during the diffusion and acceptance processes of innovations. In a similar vein, Ram (1987) categorized the inducing factors of innovation resistance into innovation characteristics and consumer characteristics. Innovation characteristics are changing variables depending on consumers, which include relative advantage, compatibility, perceived risk, and complexity. Consumer characteristics consist of variables that help identify the intention to adopt and accept innovations, including consumers' values and tendencies.

In their study, Ram and Sheth (1989) differentiated the influencing factors of innovation resistance into functional barriers and psychological barriers. Functional barriers were categorized into usage barriers, value barriers, and risk barriers, while psychological barriers were divided into traditional barriers and image barriers (Kuisma et al., 2007; Laukkanen et al., 2008).

2.2.1. Innovation Characteristics

In this study, we considered the resistance factors based on innovation characteristics, including the risk of personal information leakage, institutional trust, uncertainty, and complexity.

The risk of personal information leakage refers to the potential dangers associated with the unauthorized use of one’s information due to specific actions (Featherman & Pavlou, 2003). Despite the high security of blockchain technology, cryptocurrencies face issues such as information leakage and financial problems stemming from the exchanges and service systems that support their usage (Böhme et al., 2015). Particularly, many consumers in the distribution sector tend to consider potential losses associated with payment actions that they may not fully recognize, making the possibility of personal information leakage during the Bitcoin payment process a negative factor impacting consumers' acceptance of innovation.

Complexity refers to the level of understanding and execution associated with a specific technology (Ram, 1987). The Bitcoin payment process may be perceived as complex due to the unfamiliar concepts of blockchain and cryptocurrency, potentially leading users to perceive a high level of complexity in the payment process. Moreover, concerns about potential losses and responsibilities arising from a lack of technological understanding can heighten anxiety. Thus, the technical difficulties and high complexity associated with Bitcoin payment methods in the distribution sector are expected to serve as negative factors influencing consumer acceptance of innovation.

Institutional trust relates to the sense of security that users feel through guarantees, safety nets, or institutional arrangements (McKnight et al., 1998). Specifically in online contexts, it is associated with the reassurance derived from processes concerning guarantees or safety (Shapiro, 1987; Zucker, 1986). Generally, the institution-based characteristics rooted in the online service environment must ensure that factors such as guarantees, regulations, commitments, and legal resolutions operate effectively to achieve specific goals (Shapiro, 1987). In the cryptocurrency market, Bitcoin is often utilized as a refuge for personal assets and risk diversification; however, this implies that any potential losses occurring during transactions are the individuals' responsibility, not that of a central bank or state (Bouri et al., 2017). Therefore, the lack of adequate institutional arrangements related to Bitcoin usage means that consumers may bear the responsibility for mistakes or unexperienced situations occurring during the distribution process without institutional protections. As a result, uncertain institutional trust is expected to negatively affect consumers' acceptance of Bitcoin payment in distribution transactions.

Uncertainty refers to a state in which it is difficult to accurately predict the outcomes of specific actions or events (Bhattacherjee, 2001). In relation to Bitcoin payment services in the distribution sector, there is uncertainty arising from the high volatility of Bitcoin's value and the time lag between the product purchase and payment. In reality, Bitcoin prices can fluctuate significantly in the cryptocurrency market due to various external factors and market adjustments, leading to uncertainties regarding consumers' purchasing power and payment capabilities. Additionally, this price volatility may result in consumers experiencing fluctuations in asset value between the purchase and payment times. Such concerns can create a disparity between the actual payment amount and the purchasing power, diminishing the stability and reliability of Bitcoin as a payment method (Polasik et al., 2015). Therefore, the uncertainties arising from the high volatility of Bitcoin's value and the time lag between product purchase and payment are expected to negatively impact consumers' acceptance of Bitcoin payment services.

2.2.2. Personal Characteristics

In this study, we considered psychological distance and status quo bias as personal characteristics influencing resistance factors.

Psychological distance refers to the extent of divergence in distance that emerges from one's direct experiences (Liberman & Trope, 1998). It signifies an individual's subjective feelings about proximity and distance concerning a given object. Psychological distance has been addressed through various terms, such as perceived distance and social distance (Trope et al., 2007). According to Construal Level Theory, how an event or object is mentally associated varies depending on the psychological distance one feels; individuals perceive objects or events that are temporally and spatially close as tangible and concrete, while those that are temporally and spatially distant are viewed as abstract and vague, making them harder to grasp (Liberman & Trope, 1998; Zhang & Wang, 2009). In other words, consumers' evaluations of events, objects, or situations can differ based on how proximal or distant they perceive them to be (Liberman et al., 2007). Håkanson and Ambos (2010) defines psychological distance as a factor that interferes with the flow of information between potential or actual suppliers and customers. In this context, the acceptance of new technologies, particularly services combined with technology, may be influenced by psychological distance (Kreilkamp, 1984). Despite positive expectations about the technological innovation of cryptocurrencies, consumers still perceive cryptocurrencies as challenging new concepts to understand, and this perceptual gap may lead to resistance and difficulties in adaptation to unfamiliar technologies. Thus, the high psychological distance perceived by consumers toward Bitcoin payments in the distribution sector is anticipated to act as a negative factor affecting technological acceptance.

Status quo bias refers to the tendency to maintain the current state even when new technologies or systems are introduced (Polites & Karahanna, 2012). This bias can stem from rational decision-making, psychological commitment, and cognitive misunderstandings (Samuelson & Zeckhauser, 1988). Rational decision-making involves choosing among alternatives by considering the costs and benefits associated with new options, where status quo bias appears when costs outweigh benefits. Additionally, psychological commitment refers to a strong investment in the current option, with greater commitment leading to a heightened status quo bias. Cognitive misunderstanding involves the erroneous perception that costs associated with switching to a new option are greater than the benefits, leading to an increased likelihood of status quo bias the greater the cognitive errors. Ultimately, maintaining the existing system can negatively impact the acceptance of new systems. In line with this notion, Sheth (1981) suggested that the desire to uphold familiar behaviors can also act as a factor of innovation resistance. Consequently, consumers' status quo bias regarding existing payment systems in the distribution sector is expected to negatively influence the acceptance of Bitcoin payments.

2.3. Dual-Factor Theory

The Dual-Factor Theory is an evolved concept based on Herzberg(1966)'s Two-Factor Theory that has developed within the field of information systems. It asserts that, in addition to motivating factors, there are inhibiting factors that influence the acceptance or rejection of information systems (Cenfetelli, 2004). Notably, the Dual-Factor Theory posits that motivating and inhibiting factors are not opposing concepts like satisfaction and dissatisfaction; rather, they are qualitatively distinct independent concepts that can independently and concurrently affect the use of information systems, each having different antecedents. In their research applying the Dual-Factor Theory, Bhattacherjee and Hikmet (2007) identified motivating factors as perceived usefulness and ease of use, while inhibiting factors were presented as resistance to change. In this study, we aim to enhance the explanatory power of the relationships between innovation resistance and the factors influencing it, based on Moore and Benbasat's (1991) Technology Acceptance Model and the Dual-Factor Theory presented by Cenfetelli (2004) and Bhattacherjee and Hikmet (2007). Specifically, we will examine perceived ease of use and perceived risk as mediating effects to better understand these relationships.

2.3.1. Perceived Ease of Use

Perceived ease of use refers to the belief that using information technology will not require a significant amount of effort and that it will assist in improving work performance (Davis, 1986; Koufaris & Hampton-Sosa, 2004; Venkatesh & Davis, 2000). It represents the degree to which one believes that using a specific system will not be time-consuming or burdensome. When users feel that a particular system is easy to use, their intention to use that system is likely to increase. Numerous prior studies have demonstrated that perceived ease of use is a critical variable affecting consumers' attitudes toward technology acceptance and their intention to adopt (Davis et al., 1989; Koufaris & Hampton-Sosa, 2004). In this context, the innovation characteristics and personal characteristics that inhibit the acceptance and diffusion of Bitcoin payment systems in the distribution sector are expected to negatively impact perceived ease of use, thereby increasing innovation resistance.

2.3.2. Perceived Risk

Perceived risk refers to the uncertainty associated with the potential outcomes of using innovative products and services, as perceived by the user (Havlena & DeSarbo, 1991; Meuter et al., 2005). In general, the emergence of innovative technologies in mobile payment services and information systems is accompanied by a certain degree of uncertainty, which has been identified as a variable negatively affecting consumers' intentions to use (Anderson et al., 1994; Ram & Sheth, 1989). Anol and Neset (2007) described perceived risk as a significant antecedent influencing innovation resistance, while Ram (1987) suggested that the relationship between perceived risk and innovation resistance may promote innovation resistance depending on the characteristics of the innovative product, or it may have no significant influence at all. In this context, the innovation characteristics and personal characteristics that inhibit the acceptance and diffusion of Bitcoin payment systems in the distribution sector are expected to act as factors that elevate perceived risk, thereby increasing innovation resistance.

3. Methods

3.1. Research Model

The purpose of this study is to empirically identify the factors that hinder the diffusion and commercialization of Bitcoin payment services in the distribution industry from the consumer perspective. For this research model, perceived innovation resistance is designated as the dependent variable, while innovation characteristics (risk of personal information leakage, complexity, institutional trust, uncertainty) and personal characteristics (psychological distance, status quo bias) are selected as independent variables. Additionally, perceived ease of use and perceived risk are designated as mediating variables in the relationship between independent and dependent variables.

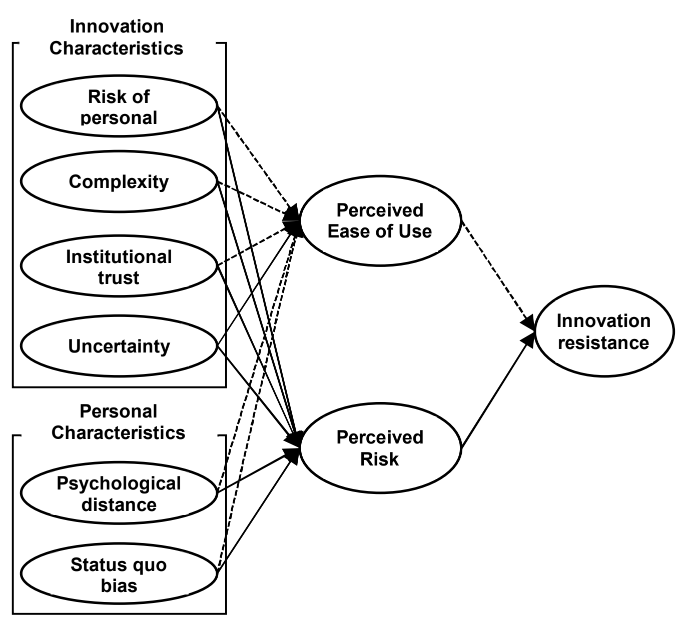

Figure 1 : Research Mode

Table 2 : Hypothesis Development

Hypothesis		Description
H1	H1-1	The risk of personal information leakage will have a negative (-) impact on perceived ease of use.
	H1-2	Complexity will have a negative (-) impact on perceived ease of use.
	H1-3	Institutional trust will have a positive (+) impact on perceived ease of use.
	H1-4	Uncertainty will have a negative (-) impact on perceived ease of use.
H2	H2-1	Psychological distance will have a negative (-) impact on perceived ease of use.
	H2-2	Status quo bias will have a negative (-) impact on perceived ease of use.
H3	H3-1	The risk of personal information leakage will have a positive (+) impact on perceived risk.
	H3-2	Complexity will have a positive (+) impact on perceived risk.
	H3-3	Institutional trust will have a negative (-) impact on perceived risk.
	H3-4	Uncertainty will have a positive (+) impact on perceived risk.
H4	H4-1	Psychological distance will have a positive (+) impact on perceived risk.
	H4-2	Status quo bias will have a positive (+) impact on perceived risk.
H5		Perceived ease of use will have a negative (-) impact on innovation resistance.
H6		Perceived risk will have a positive (+) impact on innovation resistance.
H7	H7-1	Perceived ease of use will mediate the relationship between the risk of personal information leakage and innovation resistance.
	H7-2	Perceived ease of use will mediate the relationship between complexity and innovation resistance
	H7-3	Perceived ease of use will mediate the relationship between institutional trust and innovation resistance.
	H7-4	Perceived ease of use will mediate the relationship between uncertainty and innovation resistance
	H7-5	Perceived ease of use will mediate the relationship between psychological distance and innovation resistance
	H7-6	Perceived ease of use will mediate the relationship between status quo bias and innovation resistance
H8	H8-1	Perceived risk will mediate the relationship between the risk of personal information leakage and innovation resistance.
	H8-2	Perceived risk will mediate the relationship between complexity and innovation resistance
	H8-3	Perceived risk will mediate the relationship between institutional trust and innovation resistance.
	H8-4	Perceived risk will mediate the relationship between uncertainty and innovation resistance
	H8-5	Perceived risk will mediate the relationship between psychological distance and innovation resistance
	H8-6	Perceived risk will mediate the relationship between status quo bias and innovation resistance

3.2. Hypothesis Development

Based on the theoretical review and research model design described earlier, the following research hypotheses were established (Table 2). H1 and H2 represent hypotheses regarding the impact of innovation characteristic factors and personal characteristic factors on perceived ease of use, respectively. H3 and H4 pertain to the hypotheses concerning the effects of innovation characteristic factors and personal characteristic factors on perceived risk. In addition, H5 and H6 address the hypotheses regarding the impacts of perceived ease of use and perceived risk on innovation resistance, respectively. Furthermore, the H7 and H8 hypotheses focus on the role of mediating variables. H7 posits that perceived ease of use will mediate the relationship between the risk of personal information leakage, complexity, institutional trust, uncertainty, psychological distance, and status quo bias, and innovation resistance. H8 suggests that perceived risk will act as a mediator in the relationship between the risk of personal information leakage, complexity, institutional trust, uncertainty, psychological distance, and status quo bias, and innovation resistance.

3.3. Operational Definitions of Variables

3.3.1. Innovation Resistance

Innovation resistance is generally defined as the behavior of consumers attempting to maintain the previous state when faced with new changes (Ram, 1987; Sheth, 1981). Based on this, this study defines innovation resistance as "the psychological backlash and behavioral rejection that consumers feel toward the new innovation of Bitcoin payment services in the distribution industry." This includes consumers' intentions to avoid using Bitcoin payment services, discomfort or anxiety regarding usage, and the tendency to adhere to existing payment methods. The measurement items for innovation resistance were modified and supplemented based on prior studies by Kleijnen et al. (2009), Marakas and Hornik (1996), and Ram (1987) to include four items: rejection of Bitcoin payments, lack of perceived necessity for Bitcoin, preference for existing payment methods, and skepticism regarding Bitcoin usage. Each item was measured using a 5-point Likert scale.

3.3.2. Risk of Personal Information Leakage

Generally, the risk of personal information leakage refers to the potential associated with the control of personal information and the risks of one's information being used without consent due to specific actions (Featherman & Pavlou, 2003). Based on this previous research, this study defines the risk of personal information leakage as the losses or risks associated with personal data breaches and hacking during the payment process utilizing Bitcoin. The measurement items for risk of personal information leakage were modified and supplemented based on Featherman and Pavlou (2003) to include four items: unauthorized use of personal information, leakage of transaction information, misuse of information, and monetary loss due to hacking. Each item was measured using a 5-point Likert scale.

3.3.3. Complexity

According to prior studies (Davis et al., 1989; Moore & Benbasat, 1991; Rogers, 2002; Venkatesh et al., 2003), complexity refers to the difficulty in understanding and executing specific technologies. In this study, complexity is defined as the understanding and inconvenience related to the use of Bitcoin for product and service payments. The measurement items for complexity were referenced from prior studies by Davis et al. (1989), Moore and Benbasat (1991), and Schiffman and Kanuk (1991), and consist of five items: difficulty in using Bitcoin, difficulty in understanding Bitcoin, difficulty in learning about Bitcoin, inconvenience in using Bitcoin, and complexity of using Bitcoin. Each item was measured using a 5-point Likert scale.

3.3.4. Institutional Trust

Generally, institutional trust refers to the confidence in the appropriate control mechanisms that encourage future transactions between users and sellers (Bhattacherjee, 2002; Suh & Han, 2003). Based on this definition, this study defines institutional trust as the trust in institutions that support the safe use of Bitcoin payment systems in the distribution industry. The measurement items for institutional trust were constructed based on McKnight et al. (2002) and included four items: trust in Bitcoin safety measures, trust in protection against problems that may occur with Bitcoin, trust in institutional safety regarding Bitcoin, and overall trust in Bitcoin's safety. Each item was measured using a 5-point Likert scale.

3.3.5. Uncertainty

According to prior research (Morgan & Hunt, 1994), uncertainty refers to the anxiety induced by a lack of prior knowledge, unfamiliarity, and inexperience in the domain of products and services. In this context, this study defines uncertainty as the degree of concern regarding the future value and stability of Bitcoin payments in the distribution industry. The measurement items for uncertainty were based on Moore and Lehmann (1980) and Reilly and Conover (1983), and consist of four items: premature timing of Bitcoin payments, hesitation regarding the usefulness of Bitcoin, uncertainty regarding the Bitcoin payment system, and anxiety about Bitcoin's volatility. Each item was measured using a 5-point Likert scale.

3.3.6. sychological Distance

Psychological distance refers to the extent to which consumers perceive themselves as distant or close to other objects or events using reference points (Zhang & Wang, 2009). In this study, psychological distance is defined as the degree of psychological disconnection and discomfort that consumers feel toward Bitcoin payments. The measurement items for psychological distance were developed based on previous research by Cho (2008), and Zhang and Wang (2009), and consist of four items: concern about Bitcoin's risk factors, perceived high risk associated with Bitcoin, the perceived time required for Bitcoin to become mainstream, and the negative image of Bitcoin. Each item was measured using a 5-point Likert scale.

3.3.7. Status Quo Bias

Status quo bias generally refers to the tendency to maintain existing services despite knowing that new services offer better options (Polites & Karahanna, 2012; Sheth, 1981). In this study, status quo bias is defined as the tendency to continue using existing payment methods despite the numerous advantages of Bitcoin payment methods. The measurement items for status quo bias were constructed based on prior studies by Polites and Karahanna (2012), and Samuelson and Zeckhauser (1988), consisting of three items: preference for the convenience of existing payment methods, habitual reliance on existing payment methods, and the tendency to stick to existing payment methods regardless of comparisons. Each item was measured using a 5-point Likert scale.

3.3.8. Perceived Ease of Use

Perceived ease of use generally reflects the degree to which an individual believes that using a specific technology will be easy and effortless (Venkatesh & Davis, 2000). In this study, perceived ease of use is defined as the extent to which one believes using Bitcoin payment services is easy and convenient. The measurement items for perceived ease of use were developed by referencing studies by Davis et al. (1989), and Venkatesh and Davis (2000) and consist of four items: ease of understanding Bitcoin, ease of learning how to use Bitcoin, simplicity of learning about Bitcoin, and convenience of using Bitcoin. Each item was measured using a 5-point Likert scale.

3.3.9. Perceived Risk

According to Ram (1987), perceived risk refers to the uncertainty and potential negative outcomes that consumers feel when adopting new products or services (innovations). In this study, perceived risk is defined as the uncertainty regarding hacking and personal information leakage risks during the Bitcoin payment process. The measurement items were developed by referencing prior studies conducted by Moore and Benbasat (1991), Rogers (2002), and Schiffman and Kanuk (2007) and consist of four items: risk of hacking, potential for monetary loss, risk of information leakage, and potential for misuse of personal information. Each item was measured using a 5-point Likert scale.

3.4. Data Analysis

In this study, the collected data were analyzed using SPSS 27.0 and Amos 23.0 programs, and the specific analysis methods are as follows. First, to verify the validity of the measurement tool, Exploratory Factor Analysis was conducted, and Cronbach's α coefficient was calculated to verify the reliability. Second, Descriptive Statistical Analysis was performed to confirm the general trend and normality of the main variables, and Pearson Correlation Analysis was conducted to identify the correlations between the main variables. Third, CFA (Confirmatory Factor Analysis) was performed, and fourth, SEM (Structural Equation Modeling) was performed to verify Convergent Validity and Discriminant Validity. The path coefficients of the research model were calculated, and the Mediation Effect was verified by applying Bootstrapping.

4. Analysis Results

4.1. Demographic Characteristics

The gender distribution of the study participants was relatively balanced, with 249 males (50.1%) and 248 females (49.9%). In terms of age, there were 76 respondents (15.3%) in their 20s, 111 respondents (22.3%) in their 30s, 122 respondents (24.5%) in their 40s, 147 respondents (29.6%) in their 50s, and 41 respondents (8.2%) aged 60 or older, with the highest representation in the 50s age group and the lowest in the 60s and above. Regarding educational background, the majority were bachelor's degree holders (331 respondents, 66.6%), followed by 56 respondents (11.3%) with master's degrees, 95 respondents (19.1%) with high school diplomas or lower, and 15 respondents (3.0%) with doctoral degrees. As for occupations, the sample included 31 students (6.2%), 267 general employees (53.7%), 6 individuals working in the financial sector (1.2%), 5 individuals from the distribution sector (1.0%), 87 self-employed individuals (17.5%), and 101 individuals in other professions (20.3%). This comprehensive demographic breakdown provides valuable insights into the perceptions and resistance factors regarding Bitcoin payment commercialization in the distribution sector, enabling a better understanding of consumer attitudes toward this innovative payment method.

Table 3: Measurement Items for Each Variable

Variable	Measurement Items	References
Innovation Resistance	1. Rejection of Bitcoin payments 2. Lack of perceived necessity for Bitcoin 3. Preference for existing payment methods 4. Skepticism regarding Bitcoin usage	Kleijnen et al. (2009), Marakas & Hornik (1996), Ram (1987)
Risk of Personal Information Leakage	1. Unauthorized use of personal information 2. Leakage of transaction information 3. Misuse of information 4. Monetary loss due to hacking	Featherman & Pavlou (2003)
Complexity	1. Difficulty in using Bitcoin 2. Difficulty in understanding Bitcoin 3. Difficulty in learning about Bitcoin 4. Inconvenience in using Bitcoin 5. Complexity of using Bitcoin	Davis et al. (1989), Moore & Benbasat (1991), Schiffman & Kanuk (2007)
Institutional Trust	1. Trust in Bitcoin safety measures 2. Trust in protection against problems that may occur with Bitcoin 3. Trust in institutional safety regarding Bitcoin 4. Overall trust in Bitcoin's safety	McKnight et al. (2002)
Uncertainty	1. Premature timing of Bitcoin payments 2. Hesitation regarding the usefulness of Bitcoin 3. Uncertainty regarding the Bitcoin payment system 4. Anxiety about Bitcoin's volatility	Moore & Lehmann (1980), Reilly & Conover (1983)
Psychological Distance	1. Concern about Bitcoin's risk factors 2. Perceived high risk associated with Bitcoin 3. The perceived time required for Bitcoin to become mainstream 4. The negative image of Bitcoin	Cho (2008), Zhang & Wang (2009)
Status Quo Bias	1. Preference for the convenience of existing payment methods 2. Habitual reliance on existing payment methods 3. Tendency to stick to existing payment methods regardless of comparisons	Polites & Karahanna (2012), Samuelson & Zeckhauser (1988)
Perceived Ease of Use	1. Ease of understanding Bitcoin 2. Ease of learning how to use Bitcoin 3. Simplicity of learning about Bitcoin 4. Convenience of using Bitcoin	Davis et al. (1989), Venkatesh & Davis (2000)
Perceived Risk	1. Risk of hacking 2. Potential for monetary loss 3. Risk of information leakage 4. Potential for misuse of personal information	Moore & Benbasat (1991), Rogers (2002), Schiffman & Kanuk (2007)

4.2. Variables Validity and Reliability of Measurement

To verify the validity and reliability of the measurement tools, we conducted Exploratory Factor Analysis (EFA) and Reliability Analysis. EFA was performed using the Principal Component Analysis method, which maximizes the preservation of data variance, and the Varimax rotation

method was employed to simplify the interpretation of the factors. Factors were extracted based on an Eigen value of 1.0, and items with factor loadings of .4 or higher were interpreted as belonging to the corresponding factor (Ford et al, 1986). Additionally, an internal consistency coefficient of .6 or higher was deemed acceptable for reliability (Nunnally, 1978). EFA was conducted solely for the dimensions with sub-factors, specifically the innovation characteristics and personal characteristics.

4.2.1. Innovation Characteristics

To validate the innovation characteristics scale, EFA was conducted (Table 4). The KMO value was .972, which is greater than the minimum threshold of .6, and the Bartlett's test for sphericity was significant at the .05 level, confirming that the collected data and measurement items were suitable for performing EFA. Four factors were extracted with Eigenvalues above 1.0, classified into the following: four items for the risk of personal information leakage, five items for complexity, four items for institutional trust, and four items for uncertainty. All items had factor loadings of .4 or higher, and the Cronbach's α coefficients were .86 for the risk of personal information leakage, .89 for complexity, .88 for institutional trust, and .82 for uncertainty, indicating that the validity and reliability of the scale were confirmed (Table 3).

Table 4: Validity and Reliability of the Innovation Characteristics Scale

Factor	Item	Factor Loading	Eigen Value	Variance (%)	Cronbach's α
Complexity	Complexity 3	.866	3.53	20.74	.89
	Complexity 2	.837			
	Complexity 5	.801			
	Complexity 4	.782			
	Complexity 1	.756			
Institutional Trust	Institutional Trust 3	.845	3.08	18.11	.88
	Institutional Trust 1	.825			
	Institutional Trust 2	.805			
	Institutional Trust 4	.780			
Risk of Personal Information Leakage	Leakage Risk 2	.863	2.90	17.04	.86
	Leakage Risk 1	.838			
	Leakage Risk 3	.808			
	Leakage Risk 4	.731			
Uncertainty	Uncertainty 2	.813	2.52	14.85	.82
	Uncertainty 3	.723			
	Uncertainty 1	.705			
	Uncertainty 4	.676			
Total				70.74	
KMO		.872			
Bartlett's Test		$\chi^2(136) = 4699.32$ ($p < .000$)			

4.2.2. Personal Characteristics

To personal characteristics scale, EFA was conducted (Table 4). The KMO value was .842, which is greater than the minimum threshold of .6, and the Bartlett's test for sphericity was significant at the .05 level, confirming that the collected data and measurement items were suitable for performing EFA. Two factors were extracted with Eigenvalues above 1.0 and were classified into the following: four items for psychological distance and three items for status quo bias. All items had factor loadings of .4 or higher, and the Cronbach's α coefficients were .80 for psychological distance and .80 for status quo bias, indicating that the validity and reliability of the scale were confirmed (Table 5).

Table 5: Validity and Reliability of the Personal Characteristics Scale

Factor	Item	Factor Loading	Eigen Value	Variance (%)	Cronbach's α
Psychological Distance	Psychological Distance 1	.841	2.50	35.72	.80
	Psychological Distance 2	.778			
	Psychological Distance 4	.747			
	Psychological Distance 3	.657			
Status Quo Bias	Status Quo Bias 1	.820	2.21	31.51	.80
	Status Quo Bias 2	.814			
	Status Quo Bias 3	.792			
Total				67.23	
KMO		.842			
Bartlett's Test		$\chi^2(21) = 1359.61$ ($p < .000$)			

4.2.3. Perceived Ease of Use, Perceived Risk, and Innovation Resistance

The Cronbach's α coefficient for perceived ease of use was .89, indicating good reliability.

The Cronbach's α coefficient for perceived risk was .87, also indicating good reliability.

The Cronbach's α coefficient for innovation resistance was .85, reflecting good reliability as well.

4.3. Descriptive Statistics and Correlation of Variables

To examine the general tendency and assess the normal distribution of the variables, Descriptive Statistics Analysis was conducted, and Pearson Correlation Analysis was performed to determine the correlations among the variables. The skewness values ranged from -.77 to -.33, and the kurtosis values ranged from -1.30 to -.68. Since the absolute value of skewness is less than 3 and kurtosis is less than 7, it can be concluded that all variables are normally distributed (Kline, 2005). Additionally, all variables showed significant correlations with one another (Table 6).

Table 6 : Descriptive Statistics and Correlations of Variables

Variables	1-1	1-2	1-3	1-4	2-1	2-2	3	4	5
1-1	1								
1-2	.24***	1							
1-3	-.36***	-.30***	1						
1-4	.46***	.34***	-.56***	1					
2-1	.53***	.44***	-.61***	.75***	1				
2-2	.35***	.36***	-.37***	.57***	.56***	1			
3	-.22***	-.61***	.55***	-.37***	-.47***	-.38***	1		
4	.75***	.35***	-.46***	.50***	.61***	.33***	-.38***	1	
5	.39***	.48***	-.54***	.60***	.64***	.54***	-.57***	.52***	1
M	3.69	3.21	2.36	3.84	3.79	3.71	2.57	3.82	3.72
SD	.80	.81	.83	.75	.73	.77	.86	.76	.82
Skewness	-.46	-.20	.46	-.78	-.52	-.43	.35	-.42	-.47
Kurtosis	-.26	-.21	-.17	.34	.12	-.26	-.28	-.49	-.47

***p < .001
1-1: Risk of Personal Information Leakage, 1-2: Complexity, 1-3: Institutional Trust, 1-4: Uncertainty, 2-1: Psychological Distance, 2-2: Status Quo Bias, 3: Perceived Ease of Use, 4: Perceived Risk, 5: Innovation Resistance.

4.4. Measurement Model Validation

To verify the convergent validity and discriminant validity of the measurement model, CFA was conducted. The model fit was assessed using the IFI, CFI, SRMR, and RMSEA fit indices. According to Bentler (1990) and Bollen (1989), values of IFI and CFI above .90 indicate acceptable fit; while Browne and Cudeck (1992) and Hu and Bentler (1999) suggest that SRMR and RMSEA values below .08 are considered indicators of good fit. Initially, the fit indices of the model fell slightly below the minimum criteria, prompting the implementation of the Modification Index method. This method involved allowing covariance between the error variances of measurement variables to iteratively improve the fit indices. Ultimately, the modified model demonstrated a satisfactory fit, with IFI = .901, CFI = .901, SRMR = .059, and RMSEA = .065.

For convergent validity, it is considered adequate when the Standardized Regression Coefficient and Average Variance Extracted (AVE) are above .5, and the Construct Reliability (CR) is above .7 (Anderson & Gerbing, 1988). The Standardized Regression Coefficients ranged from .61 to .86, AVE values were between .51 and .65, and CR values ranged from .80 to .88, all satisfying the minimum criteria, thus confirming the convergent validity (Table 7).

Discriminant validity is considered adequate when the square root of the Average Variance Extracted (AVE) is greater than the absolute values of the correlation coefficients among the latent variables (Fornell & Larcker, 1981). It was confirmed that the square roots of the AVE values were higher than the corresponding correlation coefficients in their respective rows and columns, thereby establishing the discriminant validity (Table 8).

Table 7 : Standardized Regression Coefficient, AVE, and CR of the Measurement Model

Latent Variable	Measurement Variable	β	AVE	CR
Risk of Personal Information Leakage	Risk of Leakage 1	.70	.58	.85
	Risk of Leakage 2	.79		
	Risk of Leakage 3	.86		
	Risk of Leakage 4	.69		
Complexity	Complexity 1	.70	.60	.88
	Complexity 2	.73		
	Complexity 3	.77		
	Complexity 4	.83		
	Complexity 5	.82		
Institutional Trust	Institutional Trust 1	.76	.65	.88
	Institutional Trust 2	.78		
	Institutional Trust 3	.82		
	Institutional Trust 4	.85		
Uncertainty	Uncertainty 1	.81	.55	.83
	Uncertainty 2	.61		
	Uncertainty 3	.79		
	Uncertainty 4	.74		
Psychological Distance	Psychological Distance 1	.72	.51	.80
	Psychological Distance 2	.75		
	Psychological Distance 3	.62		
	Psychological Distance 4	.75		
Status Quo Bias	Status Quo Bias 1	.82	.59	.81
	Status Quo Bias 2	.83		
	Status Quo Bias 3	.63		
Perceived Ease of Use	Perceived Ease of Use 1	.74	.62	.87
	Perceived Ease of Use 2	.79		
	Perceived Ease of Use 3	.76		
	Perceived Ease of Use 4	.86		
Perceived Risk	Perceived Risk 1	.79	.56	.87
	Perceived Risk 2	.67		
	Perceived Risk 3	.80		
	Perceived Risk 4	.75		
	Perceived Risk 5	.73		
Innovation Resistance	Innovation Resistance 1	.73	.56	.84
	Innovation Resistance 2	.79		
	Innovation Resistance 3	.64		
	Innovation Resistance 4	.82		

Table 8 : Correlation Coefficients Between Latent Variables and Square Roots of AVE

Variables	1-1	1-2	1-3	1-4	2-1	2-2	3	4	5
1-1	(.76)								
1-2	.28	(.77)							
1-3	-.41	-.36	(.81)						
1-4	.54	.44	-.67	(.74)					
2-1	.65	.52	-.74	.90	(.71)				
2-2	.41	.42	-.46	.68	.70	(.77)			
3	-.29	-.67	.69	-.51	-.60	-.51	(.79)		
4	.91	.39	-.53	.58	.73	.42	-.29	(.75)	
5	.50	.55	-.66	.74	.82	.59	-.72	.65	(.75)

Note: The values in parentheses represent the square roots of the Average Variance Extracted (AVE).
1-1: Risk of Personal Information Leakage, 1-2: Complexity, 1-3: Institutional Trust, 1-4: Uncertainty, 2-1: Psychological Distance, 2-2: Status Quo Bias, 3: Perceived Ease of Use, 4: Perceived Risk, 5: Innovation Resistance.

4.5. Hypothesis Verification

To examine the effects of innovation characteristics, personal characteristics, perceived ease of use, and perceived risk on innovation resistance, SEM was conducted (Table 9). The model fit indices were satisfactory, with IFI = .902, CFI = .901, SRMR = .060, and RMSEA = .064, confirming it as an adequate model.

Table 9: Path Coefficients of the Research Model

Path	B	SE	β	t	Result
Risk of Personal Information Leakage → Perceived Ease of Use	.04	.06	.04	.77	R
Complexity → Perceived Ease of Use	-.46	.05	-.43	-9.18***	A
Institutional Trust → Perceived Ease of Use	.40	.05	.45	7.83***	A
Uncertainty → Perceived Ease of Use	-.13	.12	-.13	-1.13	R
Psychological Distance → Perceived Ease of Use	.11	.14	.11	.77	R
Status Quo Bias → Perceived Ease of Use	-.12	.06	-.10	-1.97*	R
Risk of Personal Information Leakage → Perceived Risk	.75	.07	.73	11.44***	A
Complexity → Perceived Risk	.14	.04	.14	3.70***	A
Institutional Trust → Perceived Risk	-.10	.04	-.11	-1.99*	R
Uncertainty → Perceived Risk	.05	.10	.05	.50	R
Psychological Distance → Perceived Risk	.17	.12	.18	1.41	R
Status Quo Bias → Perceived Risk	.16	.06	.14	2.71**	A
Perceived Ease of Use → Innovation Resistance	-.66	.07	-.69	-9.79***	A
Perceived Risk → Innovation Resistance	.41	.06	.40	7.06***	A

*Note: *p < .05, **p < .01, **p < .001, A: Accepted, R: Rejected

Complexity (β = -.43, p < .001) and status quo bias (β = -.10, p < .05) negatively impacted perceived ease of use, while institutional trust (β = .45, p < .001) positively affected perceived ease of use. Additionally, institutional trust (β = -.11, p < .05) negatively influenced perceived risk, whereas the risk of personal information leakage (β = .73, p < .001), complexity (β = .14, p < .001), and status quo bias (β = .14, p < .01) positively influenced perceived risk. Perceived ease of use (β = -.69, p < .001) negatively impacted innovation resistance, while perceived risk (β = .40, p < .001) had a positive effect on innovation resistance.

Consequently, H1-2, which posited that complexity would have a negative (-) impact on perceived ease of use; H1-3, which postulated that institutional trust would have a positive (+) impact on perceived ease of use; H2-2, which asserted that status quo bias would negatively (-) affect perceived ease of use; H3-1, which claimed that the risk of personal information leakage would positively (+) impact perceived risk; H3-2, which suggested that complexity would positively (+) influence perceived risk; H3-3, which stated that institutional trust would negatively (-) affect perceived risk; H4-2, which indicated that status quo bias would positively (+) impact perceived risk; H5, which claimed that perceived ease of use would negatively (-) influence innovation resistance; and H6, which stated that perceived risk would positively (+) impact innovation resistance were accepted.

In contrast, H1-1, which posited that the risk of personal information leakage would negatively (-) impact perceived ease of use; H1-4, which suggested that uncertainty would negatively (-) impact perceived ease of use; H2-1, which asserted that psychological distance would negatively (-) affect perceived ease of use; H3-4, which claimed that uncertainty would positively (+) influence perceived risk; and H4-1, which indicated that psychological distance would positively (+) affect perceived risk, were rejected.

Next, to verify the mediation effect, a phantom variable was established, and Bootstrapping (2,000 iterations) was applied, with the analysis results presented (Table 10). The indirect path from the risk of personal information leakage to innovation resistance through perceived risk (β = .39, p < .01) was significant, as was the indirect path from complexity to innovation resistance through perceived ease of use (β = .30, p < .01), the indirect path from complexity to innovation resistance through perceived risk (β = .06, p < .01), the indirect path from institutional trust to innovation resistance through perceived ease of use (β = - .31, p < .01), and the indirect path from status quo bias to innovation resistance through perceived risk (β = .06, p < .05).

Therefore, H7-2, which posited that perceived ease of use would mediate the relationship between complexity and innovation resistance; H7-3, which suggested that perceived ease of use would mediate the relationship between institutional trust and innovation resistance; H8-1, which claimed that perceived risk would mediate the relationship between the risk of personal information leakage and innovation resistance; H8-2, which posited that perceived risk would mediate the relationship between complexity and innovation resistance; and H8-6, which asserted that perceived risk would mediate the relationship between status quo bias and innovation resistance, were accepted. Meanwhile, H7-1, which claimed that perceived ease of use would mediate the relationship between the risk of personal information leakage and innovation resistance; H7-4, which posited that perceived ease of use would mediate the relationship between uncertainty and innovation resistance; H7-5, which suggested that perceived ease of use would mediate the relationship between psychological distance and innovation resistance; H7-6, which asserted that perceived ease of use would mediate the relationship between status quo bias and innovation resistance; H8-3, which claimed that perceived risk would mediate the relationship between institutional trust and innovation resistance; H8-4, which posited that perceived risk would mediate the relationship between uncertainty and innovation resistance; and H8-5, which indicated that perceived risk would mediate the relationship between psychological distance and innovation resistance, were rejected.

Table 10 : Analysis Results of Mediation Effect

Path	B	SE	β	Result
The risk of personal information leakage → Perceived Ease of Use → Innovation Resistance	-.03	.12	-.03	R
The risk of personal information leakage → Perceived Risk → Innovation Resistance	.31	.08	.39**	A
Complexity → Perceived Ease of Use → Innovation Resistance	.31	.10	.30**	A
Complexity → Perceived Risk → Innovation Resistance	.06	.03	.06**	R
Institutional Trust → Perceived Ease of Use → Innovation Resistance	-.26	.08	-.31**	A
Institutional Trust → Perceived Risk → Innovation Resistance	-.03	.03	-.04	R
Uncertainty → Perceived Ease of Use → Innovation Resistance	.09	1.13	.09	R
Uncertainty → Perceived Risk → Innovation Resistance	.02	.29	.02	R
Psychological Distance → Perceived Ease of Use → Innovation Resistance	-.07	1.17	-.08	R
Psychological Distance → Perceived Risk → Innovation Resistance	.07	.32	.07	R
Status Quo Bias → Perceived Ease of Use → Innovation Resistance	.08	.07	.07	R
Status Quo Bias → Perceived Risk → Innovation Resistance	.06	.04	.06*	A

*Note: *p < .05, **p < .01, A: Accepted, R: Rejected

4.6. Discussion

Recently, rapid digital transformation in the distribution industry has garnered significant attention for Bitcoin-based payment methods, aiming to enhance transparency and reliability in complex distribution processes and support optimal decision-making at the consumer purchasing stage. However, contrary to these expectations, the market penetration of Bitcoin payments in daily life has been limited due to various practical constraints and challenges. Therefore, this study sought to explore and identify resistance factors impeding the commercialization of Bitcoin payments in the distribution industry.

The summary and discussion of this study's results are as follows:

Firstly, regarding the analysis of the impact of potential resistance factors (innovation characteristics and personal characteristics) on perceived ease of use, it was found that higher complexity of Bitcoin payments leads to lower perceived ease of use among users. This aligns with previous research findings indicating that the complexity of new technologies negatively influences user acceptance (Alshamsi & Andras, 2019; Rogers, 2002; Davis, 1989). Additionally, consumers with higher status quo bias showed resistance to adopting new technologies, empirically validating assertion of Samuelson and Zeckhauser (1988), Kim and Kankanhalli (2009), Loh et al. (2023) that the tendency to avoid change is a primary factor in innovation resistance. Conversely, higher institutional trust was associated with higher perceived ease of use, consistent with Hsieh (2015) and McKnight et al. (1998) findings, highlighting the importance of institutional support in new technology adoption. However, personal information leakage risk, uncertainty, and psychological distance were found to have no significant impact on perceived ease of use. This somewhat contradicts propositions from innovation resistance theory and the technology acceptance model. Regarding personal information leakage risk, despite the high security provided by blockchain technology, consumers still express concerns about personal information exposure in Bitcoin transactions (Böhme et al., 2015; Raddatz et al., 2021). This contrasts with previous studies that identified perceived risk as a key factor negatively influencing technology adoption. Furthermore, the uncertainty due to Bitcoin's value volatility did not significantly affect perceived ease of use, differing from Bhattacherjee (2001) and Polites and Karahanna (2012) findings. Generally, uncertainty in technology adoption increases users' perceived risk, hindering adoption. However, this relationship was not established in the present study. This result can be interpreted as consumers not perceiving difficulties in payment usability despite Bitcoin's volatility. Lastly, psychological distance also did not significantly influence perceived ease of use. Contrary to the proposal of Zhang and Wang (2009) and Esfahbodi et al. (2022), this suggests that unfamiliarity with Bitcoin as a new technology does not significantly affect the perception of actual ease of use. In other words, even if consumers feel psychological distance towards Bitcoin, they may not experience significant difficulties with actual usage procedures and methods. These results demonstrate that some innovation characteristic variables do not significantly influence perceived ease of use, presenting a somewhat divergent pattern from existing theories.

Secondly, the analysis of the impact of innovation characteristics and personal characteristics on perceived risk showed that higher personal information leakage risk, complexity, and status quo bias increased perceived risk. This confirms Featherman and Pavlou (2003) argument that the possibility of personal information infringement and the complexity of technology use are key factors that increase users' perceived risk. It also supports Loh et al. (2023) and Samuelson and Zeckhauser (1988) theory that stronger status quo bias leads to greater resistance to new technologies, increasing perceived risk. Furthermore, higher institutional trust was found to decrease perceived risk. This suggests that institutional guarantees and safeguards for new technologies, as proposed by McKnight et al. (1998) and Shapiro (1987), can help alleviate users' anxiety and reduce their perceived risk. In other words, if clear regulations and institutional support are provided for Bitcoin payments, consumers' perceived risk is expected to decrease. These analysis results are meaningful in empirically confirming the influence of innovation characteristics and personal characteristics on perceived risk in technology adoption. Particularly, by examining the impact of these factors on consumers' psychological responses in the context of the new financial technology of Bitcoin, the study can contribute to extending existing theories. On the other hand, uncertainty and psychological distance were found to have no significant influence on perceived risk. This contrasts with some previous theories. Regarding uncertainty due to Bitcoin's high value volatility, prior research has presented such uncertainty as a key factor increasing users' perceived risk (Bhattacherjee, 2001; Polites & Karahanna, 2012). However, the present study found that uncertainty did not significantly affect perceived risk. This can be interpreted as consumers not perceiving significant risk in the payment usage itself, despite Bitcoin's value fluctuations. Additionally, psychological distance from the new Bitcoin technology was also found to have no impact on perceived risk. This suggests that contrary to Zhang and Wang (2009) argument, unfamiliarity with a technology does not necessarily increase users' perceived risk. Consumers may feel psychological distance towards Bitcoin, but not experience significant risk in the actual payment usage process.

Thirdly, the analysis of the impact of perceived ease of use and perceived risk on innovation resistance showed that higher perceived ease of use reduced innovation resistance. This is consistent with Davis (1989) TAM, which suggests that the more consumers perceive Bitcoin payment services as easy to use, the less resistant they are to the technology (Sangari & Mashatan, 2023). This empirically confirms the existing theory that the convenience of technology use is a critical factor in innovation adoption, in the context of Bitcoin payment services. Furthermore, the results indicate that higher perceived risk increases innovation resistance. This supports Bauer (1960), Havlena and DeSarbo (1991), and Choi et al. (2020) argument that the greater a consumer's concern about potential losses from using new technology, the higher their resistance to that technology. In the case of Bitcoin payment services, various risk factors such as personal information infringement and value volatility contribute to this resistance. The findings reveal that as consumers perceive greater risks, their willingness to adopt the technology diminishes. This reiterates the importance of addressing perceived ease of use and perceived risk in efforts to reduce innovation resistance during the technology adoption process.

Fourthly, the verification results regarding the mediation effects of perceived ease of use and perceived risk indicate that perceived ease of use mediates the relationship between complexity and innovation resistance. This suggests that the difficulty in using Bitcoin payment methods negatively impacts consumer acceptance. Additionally, the finding that institutional trust influences innovation resistance through perceived ease of use implies that institutional trust enhances consumers' perception of the ease of using Bitcoin payments, thereby reducing innovation resistance. Furthermore, the significant indirect path from the risk of personal information leakage to innovation resistance through perceived risk demonstrates that consumers' recognition of the risks associated with Bitcoin payments profoundly influences their innovation resistance. Similarly, the tendency of complexity to contribute to innovation resistance through perceived risk was also confirmed, indicating that the complexity of technology can act as a risk factor for users. Finally, the significant result showing that status quo bias leads to innovation resistance through perceived risk suggests that the tendency to maintain existing methods increases the perception of risk regarding the adoption of new payment methods, thereby strengthening resistance.

5. Conclusion

This study systematically analyzed the factors of consumer innovation resistance that hinder the commercialization of Bitcoin payment systems in the distribution industry, aiming to provide practical value in the context of the digital transformation of the distribution sector. Based on the analysis results of this study, the key implications derived are as follows.

First, to maximize the potential value of Bitcoin payments in the distribution industry, it is essential to enhance consumer technology acceptance. This study suggests providing a hybrid system that integrates Bitcoin payments with existing payment methods, thereby offering consumers a variety of options. This approach can help ensure that Bitcoin payment is not limited to a short-term alternative but is established as one of the various payment methods available.

Second, to increase perceived ease of use and reduce perceived risks, distributors need to incorporate consumer research and feedback regarding Bitcoin payments to improve their services. Especially, distributors should collaborate with financial institutions, technology providers, and government agencies to establish clear regulations and safety measures for Bitcoin payments, creating an environment where consumers feel interested and can trust the system. Enhanced legal protections and security measures will alleviate consumer anxiety and ultimately contribute to greater acceptance of Bitcoin payments. Additionally, there is a need to improve consumer awareness through campaigns emphasizing the safety and utility of Bitcoin payments, as well as real-life use cases.

Third, it is important to utilize the data generated from Bitcoin transactions to analyze consumer behavior and develop personalized marketing strategies, thus maximizing consumer experiences and enhancing service sustainability.

On the other hand, this study reflects the realities of the South Korean distribution industry and consumer characteristics, which makes it challenging to generalize the findings for the commercialization of Bitcoin payments across global distribution sectors. Specifically, factors influencing potential innovation resistance may vary due to cultural backgrounds, legal regulations regarding Bitcoin, technological infrastructure, and consumer trust levels differing by country. Nonetheless, this research contributes to bridging the gap between the potential advantages of Bitcoin payments in the distribution industry and their actual market acceptance. By identifying the psychological factors that hinder the commercialization of Bitcoin payments—which could serve as an innovative alternative to address high intermediary fees and delays in the payment process—this study provides strategic insights for overcoming these barriers. Furthermore, through the lens of innovation resistance theory and technology acceptance models, this research contributes to a deeper understanding of the anxieties and resistance factors faced by consumers, thereby providing essential foundational materials for distributors to implement Bitcoin payments more effectively and enhance their competitiveness in the market.

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