Received: 25 February 2023 | Accepted: 19 October 2023

DOI: 10.1002/mar.21935

RESEARCH ARTICLE

Psychology & Marketing WILEY

What is driving consumer resistance to crypto-payment? A multianalytical investigation

Mohamad Sadegh Sangari | **Atefeh Mashatan**

Cybersecurity Research Lab, Ted Rogers School of Management, Toronto Metropolitan University (Formerly Ryerson University), Toronto, Ontario, Canada

Correspondence
Atefeh Mashatan, Cybersecurity Research Lab, Ted Rogers School of Management, Toronto Metropolitan University (Formerly Ryerson University), Toronto, ON, Canada.
Email: amashatan@torontomu.ca

Funding information
Social Sciences and Humanities Research Council of Canada; Natural Sciences and Engineering Research Council of Canada; University Blockchain Research Initiative of Ripple Inc.

Abstract

Despite the extensive interest in cryptocurrencies over the past years, their application as a means of payment in e-commerce and retail purchases continues to be much slower than anticipated. This paper investigates the underlying mechanisms and elements that drive consumer resistance in this space. Drawing upon the stimulus-organism-response paradigm and the innovation resistance theory, the paper explores how the characteristics of the current cryptocurrency landscape contribute to different factors associated with crypto-payment rejection. Our findings from empirical and experimental studies reveal how ecosystem volatility and the lack of structural assurances for cryptocurrencies foster negative consumer perceptions, leading to resistance against crypto-payment use. The paper develops new insights into the main predictors of consumer resistance to crypto-payment, which is a precursor to the mainstream use of cryptocurrencies. Moreover, it sheds light on the interactions among context-specific, psychological, and functional determinants of behavioral consumer response.

KEYWORDS
crypto-payment, innovation resistance, perceived volatility, psychological barriers, structural assurances

1 | INTRODUCTION

Driven by its trading surge, burgeoning investment, and the dynamic advent of cryptocurrencies and new opportunities like nonfungible tokens, cryptocurrency's allure remains strong. The most famous cryptocurrency, Bitcoin, has reached the total market value of more than 70 times in less than 4 years (CoinMarketCap, 2023), while Ethereum records more than 1.6 million daily transactions, corresponding to above 1100 transactions per second (BitInfoCharts, 2023). Cryptocurrencies are built on blockchain technology which is an append-only chain of confirmed blocks that are stored in a distributed ledger and sequentially organized with cryptographic links (International Organization for Standardization, 2020). Cryptocurrencies offer reduced processing times and costs, and are not inflationary due to the inability to manipulate their quantity of supply (Joo et al., 2020).

Despite such advantages, the application of cryptocurrencies in e-commerce and retail transactions as a means of payment for consumer purchases (i.e., crypto-payment) remains much slower than other use-cases (Mashatan et al., 2022). Recent data indicates that 85% of online retailers with annual sales above $1 billion offer their customers with direct or indirect crypto-payment options (PYMNTS, 2022), yet encounter limited consumer interest. The US Federal Reserve (2023) reports that only 2% of American adults

utilize crypto-payment. A survey by the Bank of Canada indicates that only one out of every 13 Bitcoin owners in Canada uses it for making payments (Henry et al., 2023). Furthermore, only 11% of Canadian crypto asset owners intend to use it for paying for goods or services (Ontario Securities Commission, 2022). Research highlights that the lack of consumer demand is a significant hurdle for crypto-payment (Jonker, 2019). The disparity between cryptocurrency adoption and crypto-payment use calls for an investigation into consumer resistance toward this specific use-case. However, research in this area is scarce, particularly on consumer barriers that contribute to crypto-payment resistance behavior and on consumer perceptions of the current cryptocurrency landscape that influence consumer psychology toward crypto-payment. To fill these gaps, the present research aims to address the following questions:

RQ1: What are the main factors that contribute to crypto-payment resistance among retail consumers?

RQ2: How do context-specific barriers drive consumer psychology for crypto-payment resistance?

Cryptocurrencies exhibit high levels of market instability and uncertainty (Katsiampa, 2019). The volatility in market and prices may lead consumers to regard cryptocurrencies as an asset, better suited for investment or related use-cases, rather than as a form of money to be used for daily purchases. The cryptocurrency landscape also suffers from legal and regulatory issues and ambiguities (Akyildirim et al., 2020), which may raise consumer resistance and negative perceptions toward their application in payment transactions. These characteristics dominate the current cryptocurrency landscape, thus, inviting a lot of discussion.

The present research contributes to the extant literature in multiple ways. It investigates how consumer perceptions of volatility and the lack of structural assurances, as the primary attributes of the cryptocurrency landscape, may foster consumer rejection of crypto-payment. The focus is on the specific use-case of crypto-payment rather than cryptocurrency resistance in general. The research explores different factors that drive consumer rejection behavior, investigates consumer psychology toward crypto-payment and its impact on their functional evaluation, and examines how cryptocurrency ownership status impacts consumer beliefs and decision-making about the use of crypto-payment versus traditional payment methods.

To answer the research questions, we employ a hybrid perspective of the stimulus-organism-response paradigm (Jacoby, 2002; Mehrabian & Russell, 1974) and the innovation resistance theory (Ram, 1987; Ram & Sheth, 1989). Following the stimulus-organism-response paradigm, cryptocurrency volatility and the lack of structural assurances can act as stimuli influencing individuals' evaluations and behaviors regarding crypto-payment. The innovation resistance theory can explain individuals' evaluations of crypto-payment in terms of the functional and psychological factors leading to resistance behavior. To the best of the authors' knowledge, this is the first study that integrates both psychological and functional dimensions of the innovation resistance theory with the stimulus-organism-response framework. This novel approach comprehensively unravels how the main ecosystem attributes of an emerging digital innovation can simultaneously shape consumers' psychology and cognitive evaluations toward its specific use-cases. It unveils the antecedents of different types of innovation barriers and captures the complex mechanisms that drive consumer resistance behavior. We also employ the prospect theory (Kahneman & Tversky, 1979) to understand the consequences of the uncertainties stemming from volatility and the lack of structural assurances in this space. We conduct two complementary studies, employing empirical and experimental approaches to create insights.

The structure of the paper is as follows: Section 2 presents a brief review of the related research and the theoretical underpinnings of the study. Section 3 develops the research model and hypotheses. Section 4 details the first study, which tests the hypotheses and the proposed model. Section 5 presents the second study, which employs an experimental vignette-based method on a different sample to generate further insights. Section 6 discusses the findings, research implications, limitations, and future directions.

2 | BACKGROUND

2.1 | Related works

Although a large body of research on blockchain technology focuses on cryptocurrencies, scholars have not extensively studied consumer perceptions and behaviors toward cryptocurrencies. The existing literature in this domain focuses on the determinants of cryptocurrency adoption by individuals, and there exists a gap in understanding the drivers of cryptocurrency resistance. Abramova and Böhme (2016) reveal that individuals' perceptions of risks, which include operational risk, transaction risk, privacy risk, market risk, counterparty risk, and regulatory and legal risk, negatively influence cryptocurrency usage behavior. Walton and Johnston (2018) show that individuals' perception of the risk of trust negatively influences their attitude and subjective norm regarding the use of Bitcoin. Presthus and O'Malley (2017) identify that perceptions of stability, security, value, usefulness, and ease of use drive Bitcoin nonusers toward adoption. Practitioners in the cryptocurrency domain remark that unpredictability and insecurity are the major deterrents to adoption of Bitcoin as a digital currency (Ermakova et al., 2017). In particular, insecurity and discomfort as inhibiting dimensions of technology readiness result in negative perceptions about crypto-currency usefulness and ease of use (Sohaib et al., 2019).

Understanding individuals' perceptions of cryptocurrencies has attracted more scholarly attention in recent years (e.g., Koroma et al., 2022; Yeong et al., 2022). However, few studies distinguish between cryptocurrency use in general and in specific applications such as crypto-payment. Mashatan et al. (2022) reveal that perceived anonymity and perceived traceability of payment transactions positively impact consumers' trust in crypto-payment, while perceived information privacy risk has a negative impact. Chen et al.

(2022) prove that attitude, social influence, price value, and traceability drive customer satisfaction with using cryptocurrencies as a payment method.

Understanding individuals' perceptions and behaviors toward crypto-payment is crucial, as crypto-payment can substantially contribute to the mainstream use of cryptocurrencies. Previous research also reflects on a lack of consumer interest in crypto-payment (Jonker, 2019). Currently, individuals largely accept cryptocurrencies as a store of value rather than for transactional purposes (Henry et al., 2018, 2023). Therefore, their perceptions and behaviors toward cryptocurrencies can vary for other use-cases. The existing literature lacks an exploration of consumer resistance behavior and its determinants in the crypto-payment context.

2.2 | Innovation resistance theory

According to innovation resistance theory, consumer resistance occurs when individuals refrain from adopting innovation and instead preserve the status quo due to fear of disrupting the existing norms and conflicting with their values and beliefs (Ram, 1987). Consumer rejection, as a form of resistance, reflects consumers' opposition toward an innovation. It occurs when consumers actively show reluctance or a lack of intention to adopt an innovation (Leong et al., 2020; Pal et al., 2021). The innovation resistance theory posits that resistance behavior generally occurs because of functional and psychological barriers. The functional barriers create an active resistance stemming from the characteristics of an innovation (Ram & Sheth, 1989). The functional barriers consist of usage, value, and risk barriers. According to Laukkanen et al. (2007) and Leong et al. (2020), the usage barrier indicates obstacles that challenge consumer adoption and use of an innovation, such as technical difficulties and lack of training or support. It arises when consumers perceive that utilizing an innovation is inconvenient, inefficient, or leads to more issues compared to existing practices. Value barriers reflect consumer evaluation of the performance, cost, and benefits of an innovation compared to its existing substitutes. The risk barrier refers to perceived or actual risks associated with adopting an innovation. Rather than relying on a broad conceptualization of risk, our research investigates the security and privacy risks, which are prominent considerations when making cryptocurrency transactions (e.g., Abramova & Böhme, 2016; Mashatan et al., 2022). Previous studies employing the innovation resistance theory specifically emphasize the security and privacy aspects of the risk barrier associated with new payment systems. Such risks involve uncertainties and potential negative consequences related to information security and privacy aspects that are inherent to the use of an innovation (e.g., Kaur et al., 2020; Leong et al., 2020).

Additionally, psychological barriers rooted in contradictory beliefs may cause innovation resistance (Heidenreich & Handrich, 2015). According to innovation resistance theory, psychological barriers consist of tradition and image barriers. The tradition barrier refers to the resistance to change due to long-standing beliefs, practices, habits, or tendencies to maintain the status quo. The deviations in established routines and habitual behaviors can be stressful. Therefore, the tradition barrier leads consumers to place more value on the status quo to avoid potential losses (Laukkanen et al., 2007; Nel & Boshoff, 2021). The image barrier represents negative impressions or opinions associated with an innovation (Laukkanen et al., 2007; Ram & Sheth, 1989). It exists when consumers express an unfavorable impression and a negative "hard-to-use" perception of an innovation (Laukkanen et al., 2007; Leong et al., 2020). Innovation resistance theory is becoming a popular approach to understand consumer resistance behavior in emerging domains, such as mobile payment solutions (Kaur et al., 2020). In this study, we apply the theory to understand the considerations that shape crypto-payment resistance.

2.3 | The stimulus-organism-response paradigm

Mehrabian and Russell (1974) develop the stimulus-organism-response paradigm in the environmental psychology domain. Jacoby (2002) adapts the original framework and applies it to modeling consumer psychology. The framework suggests that certain environmental features can trigger emotional and cognitive reactions resulting in a specific consumer behavior. Causal links between dimensions of stimulus, organism, and response elucidate this sequential mechanism. The stimulus dimension represents influences and motivations in terms of information load or sensory variables that arouse the individual. Organism refers to the individual's feelings, emotions, and thoughts that shape their judgments and decisions. The response dimension embodies actual behavior, often manifesting as approach or avoidance (Kamboj et al., 2018).

The stimulus-organism-response framework provides a more nuanced account of consumer behavior, spotlighting the roles of external stimuli and internal reactions. Researchers widely apply the framework to investigate consumer psychology and behavior across different domains such as consumer interaction with smart technologies (Hernandez-Ortega & Ferreira, 2021). Tandon et al. (2021) integrate innovation resistance theory's functional barriers into the organism dimension, studying hindrances to buying organic food products due to health consciousness as an environmental stimulus. In the current research, we use the stimulus-organism-response framework to grasp how stimuli from the characteristics of the current cryptocurrency landscape motivate consumer psychology and behavior for crypto-payment resistance.

3 | MODEL

Figure 1 provides an overarching representation of the research framework. Applying the stimulus-organism-response theory, we select model constructs based on the following considerations: To frame the organism dimension, we use the functional and psychological barriers postulated by the innovation resistance theory (Ram & Sheth, 1989). This aligns with existing literature on consumer

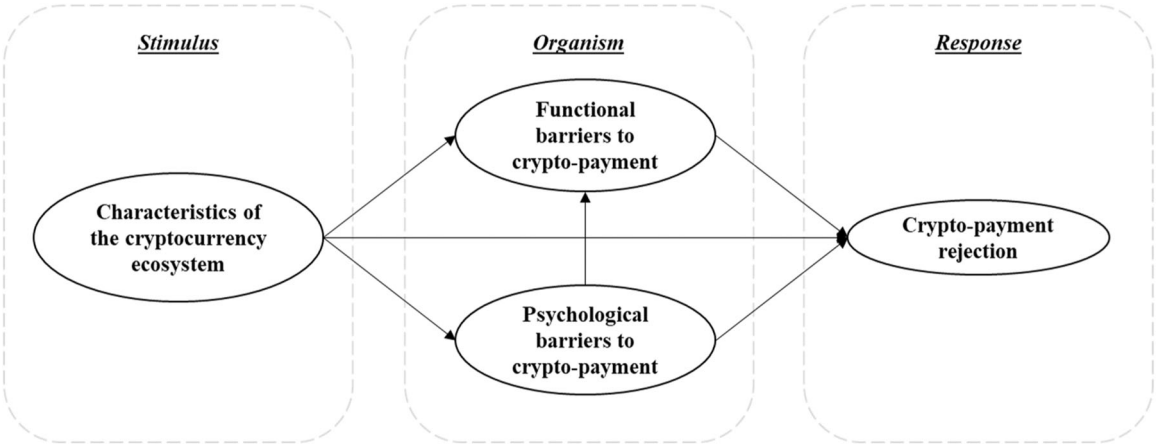

FIGURE 1 The overarching research framework.

resistance behavior across various domains, affirming the relevance of the value, usage, risk, tradition, and image barriers as determinants of innovation rejection (e.g., Laukkanen et al., 2007; Leong et al., 2020; Nel & Boshoff, 2021). Incorporating these elements into our model, we systematically explore different aspects of consumer resistance to crypto-payment. This approach highlights practical aspects and functional limitations, while also considering cognitive and psychological aspects. Moreover, it facilitates the structured analysis of interactions between external stimuli and the factors driving consumer rejection, giving way to more generalizable insights. Regarding the stimulus dimension, we center on two key characteristics of the present cryptocurrency ecosystem: volatility and the lack of structural assurances (Akyildirim et al., 2020; Katsiampa, 2019). This aligns with our primary research objective to investigate how the main ecosystem attributes drive consumer rejection in a specific use-case of cryptocurrencies.

3.1 | Cryptocurrency market volatility

The cryptocurrency domain is extremely volatile due to rapid market changes and price instability (Katsiampa, 2019). When first introduced, Bitcoin's price was $0.008. In 2021, it soared to over $60,000, only to plummet by over two-thirds of its value in less than a year (CoinMarketCap, 2023). In line with Ganesan (1994), Yin and Paswan (2007), and Matanda and Freeman (2009), we define perceived cryptocurrency volatility as the extent to which consumers perceive uncertainty and unpredictability in the cryptocurrency landscape, particularly associated with the rapid and unpredictable changes in cryptocurrency prices and market activities.

Perceived volatility can have a direct impact on consumer rejection of crypto-payment. Massive volatility swings limit cryptocurrency application as a substitute for traditional money (Ayedh et al., 2021), and negatively influence consumer intentions (Ermakova et al., 2017; Presthus & O'Malley, 2017). Moreover, people principally recognize cryptocurrencies as a means of investment rather than payment due to the high price volatility (Henry et al., 2018, 2023). The substantial, rapid changes in cryptocurrency prices have fueled adoption as a means of investment to obtain high gains (Katsiampa, 2019). Price volatility positively influences the intention to invest in cryptocurrencies (Miraz et al., 2022), fostering a preference for holding them as opposed to spending.

From the stimulus-organism-response perspective, the high volatility in the cryptocurrency landscape can also act as an external stimulus that shapes consumer evaluations regarding crypto-payment. The prospect theory can elucidate how volatility, as a source of uncertainty, can influence perceptions of different functional and psychological characteristics of crypto-payment. The prospect theory explains human behavior in uncertain situations (Kahneman & Tversky, 1979), which is driven by their perceptions of gains and losses, rather than solely the final outcome (Cai et al., 2022). When individuals perceive cryptocurrency as unpredictably fluctuating in value, they may focus on the prospect of financial loss by spending their cryptocurrency. They may find spending cryptocurrencies on retail purchases uneconomical, thus demonstrating a value barrier to crypto-payment. For cryptocurrency owners, this could manifest as the endowment effect (Morewedge & Giblin, 2015), causing an overvaluation of owned cryptocurrencies.

Consumer perception of potential loss can also trigger psychological barriers concerning the use of crypto-payment. From a prospect theory perspective, it can cause unfavorable impressions toward crypto-payment, and lead individuals to anchor to their existing payment method as a reference point or as a means of avoiding potential regret. Therefore, it can create image and tradition barriers toward crypto-payment use. Price volatility can further foster image and tradition barriers because it negatively influences consumer knowledge by creating consumer confusion (Yin & Paswan, 2007). This confusion can breed reluctance to use crypto-payment due to stimulating negative internal beliefs, such as uncertainty and cognitive dissonance. These factors can anchor consumers to retain their traditional method of payment. This is underscored by the negative link between consumer confusion and

perceptions of relative advantage (Johnson et al., 2021). Consequently, we argue that not only do consumers tend to favor traditional money rather than cryptocurrencies in their purchases, but they also develop a more negative image toward making payments using cryptocurrencies. Therefore, we put forth the following hypotheses:

H1: Perceived volatility has a positive impact on consumer rejection of crypto-payment.

H2: Perceived volatility has a positive impact on value barrier to crypto-payment.

H3: Perceived volatility has a positive impact on (a) tradition barrier and (b) image barrier to crypto-payment.

3.2 | Lack of structural assurances

Another prominent attribute of the current cryptocurrency landscape is the lack of regulatory support, therefore, amplifying uncertainties on the user side (Dabbous et al., 2022). Although efforts in this area are progressing by introducing legal and regulatory regimes, they remain largely inadequate. The lack of regulations offers flexibility to some use-cases, but it facilitates illicit activities including money laundering and fraud (Albrecht et al., 2019). This can result in positive or negative effects on user behavior, depending on the specific context or application.

The absence of regulations contributes to the lack of adequate structural assurances in the cryptocurrency landscape. According to McKnight et al. (2002), structural assurances represent institutional structures, such as regulations, legal resources, rules, policies, guarantees, and other procedures that exist in an environment to ensure success. They encompass necessary safeguards designed to ensure the overall robustness and safety of an environment. Structural assurances serve as a key determinant of consumers' behavioral intentions (McKnight et al., 2002). With regard to blockchain technology, uncertainties surrounding regulation and standardization constitute a significant adoption barrier (Dehghani et al., 2022). Therefore, they can prompt consumer rejection of crypto-payment. This aligns with existing evidence on the negative impacts of trust-related issues on consumer intentions toward cryptocurrencies (Walton & Johnston, 2018). Beyond this direct influence, structural assurances are associated with individuals' beliefs and consumer decision making in different contexts, according to the stimulus-organism-response paradigm (Wang et al., 2019). Research demonstrates that regulatory support reduces perceived cryptocurrency risk (Dabbous et al., 2022). A lack of safeguards and institutional structures raises risk perceptions, including exposure to breaches and financial losses (Mashatan et al., 2022). Therefore, we anticipate that the lack of structural assurances contributes to security and privacy risk barriers to crypto-payment.

The uncertainties due to inadequate structural assurances can also cultivate image and tradition barriers. Consumers assess crypto-payment as a deviation from their reference point, which is the use of traditional money. From the prospect theory perspective, the uncertainties stemming from the lack of safeguards and protection can amplify their perception of potential losses rather than potential gains, which in turn activates loss aversion (Nel & Boshoff, 2021). It deters change from the status quo and creates psychological uncertainties that foster inertia (Kim & Kankanhalli, 2009). Additionally, the heightened potential for loss and the unregulated cryptocurrency domain cast an unfavorable consumer impression of crypto-payment use for their purchases. Hence, we propose H4 to H6 as follows:

H4: The lack of structural assurances has a positive impact on consumer rejection of crypto-payment.

H5: The lack of structural assurances has a positive impact on security and privacy risk barrier to crypto-payment.

H6: The lack of structural assurances has a positive impact on (a) tradition barrier and (b) image barrier to crypto-payment.

3.3 | Psychological and functional barriers

Consumer resistance research suggests that psychological barriers can further amplify functional barriers to innovation (Nel & Boshoff, 2021). First, higher levels of tradition barrier can result in higher perceptions of value, usage, and risk barriers associated with an innovation. Research indicates that those who prefer to maintain the status quo tend to attribute lower levels of performance to an innovation, allowing them to uphold consistent beliefs about the innovation and eliminate cognitive dissonance (Montoya-Weiss et al., 2003). Due to the inertia, people underestimate the innovation's benefits and overestimate the required effort and associated risks (Falk et al., 2007). As a result, consumers perceive that maintaining the status quo is more beneficial than switching to the innovation (Nel & Boshoff, 2021). These findings suggest that retail consumers with stronger tradition barrier beliefs can perceive less benefits in using cryptocurrency payment and instead perceive it as riskier, inefficient, and inconvenient compared to using traditional money.

Second, perceptions of image barrier can give rise to functional barriers to an innovation. Negative impressions about an innovation influence consumer decision-making through stereotyped thinking (Laukkanen et al., 2007; Ram & Sheth, 1989). They act as cues for the overall quality of an innovation and trigger negative perceptions about the task fit, higher levels of anxiety from uncertainty and fear of risk exposure, and a perception of difficulty (Featherman et al., 2006; Mathieson & Keil, 1998). Therefore, we anticipate that consumers with a more negative

image about crypto-payment attribute higher levels of usage, value, and risk barriers to the technology. In view of these arguments, we propose H7 and H8:

H7: Tradition barrier to crypto-payment has a positive impact on (a) usage barrier, (b) value barrier, and (c) security and privacy risk barrier.

H8: Image barrier to crypto-payment has a positive impact on (a) usage barrier, (b) value barrier, and (c) security and privacy risk barrier.

Based on the innovation resistance theory, usage, value, risk, tradition, and image barriers can function as determinants of crypto-payment rejection. The usage barrier to crypto-payment may arise from the perceived inconvenience and complexity of using crypto-payment compared to traditional payment methods. The value barrier may stem from the belief that utilizing cryptocurrencies for retail purchases lacks monetary value and is not advantageous to payment by traditional money. The security and privacy risk barrier may arise from the perceived exposure to security and privacy breaches, fraud, and loss of money by making payment transactions using cryptocurrencies. Security and privacy concerns are a major determinant of negative intentions toward cryptocurrencies (Abramova & Böhme, 2016; Ermakova et al., 2017; Sohaib et al., 2019). Prior studies also indicate that usage, value, and risk barriers contribute to consumer rejection of new payment methods (Kaur et al., 2020; Laukkanen et al., 2007; Leong et al., 2020). Therefore, we expect that they fuel crypto-payment rejection for daily purchases.

Regarding psychological barriers, the use of traditional money to buy goods and services is one of the most long-standing traditions. Therefore, the tradition barrier can be highly relevant to crypto-payment resistance. Consumer rejection behavior can also be associated with the negative impressions toward the idea of using cryptocurrency in retail purchases or a general skepticism toward cryptocurrencies. This aligns with prior studies on new payment methods and digital-only financial solutions, providing evidence on the positive impacts of tradition and image barriers on consumer opposition (Kaur et al., 2020; Leong et al., 2020; Nel & Boshoff, 2021). Therefore:

H9: (a) Usage barrier, (b) value barrier, (c) security and privacy risk barrier, (d) tradition barrier, and (e) image barrier positively influence consumer rejection of crypto-payment.

Figure 2 represents the research model.

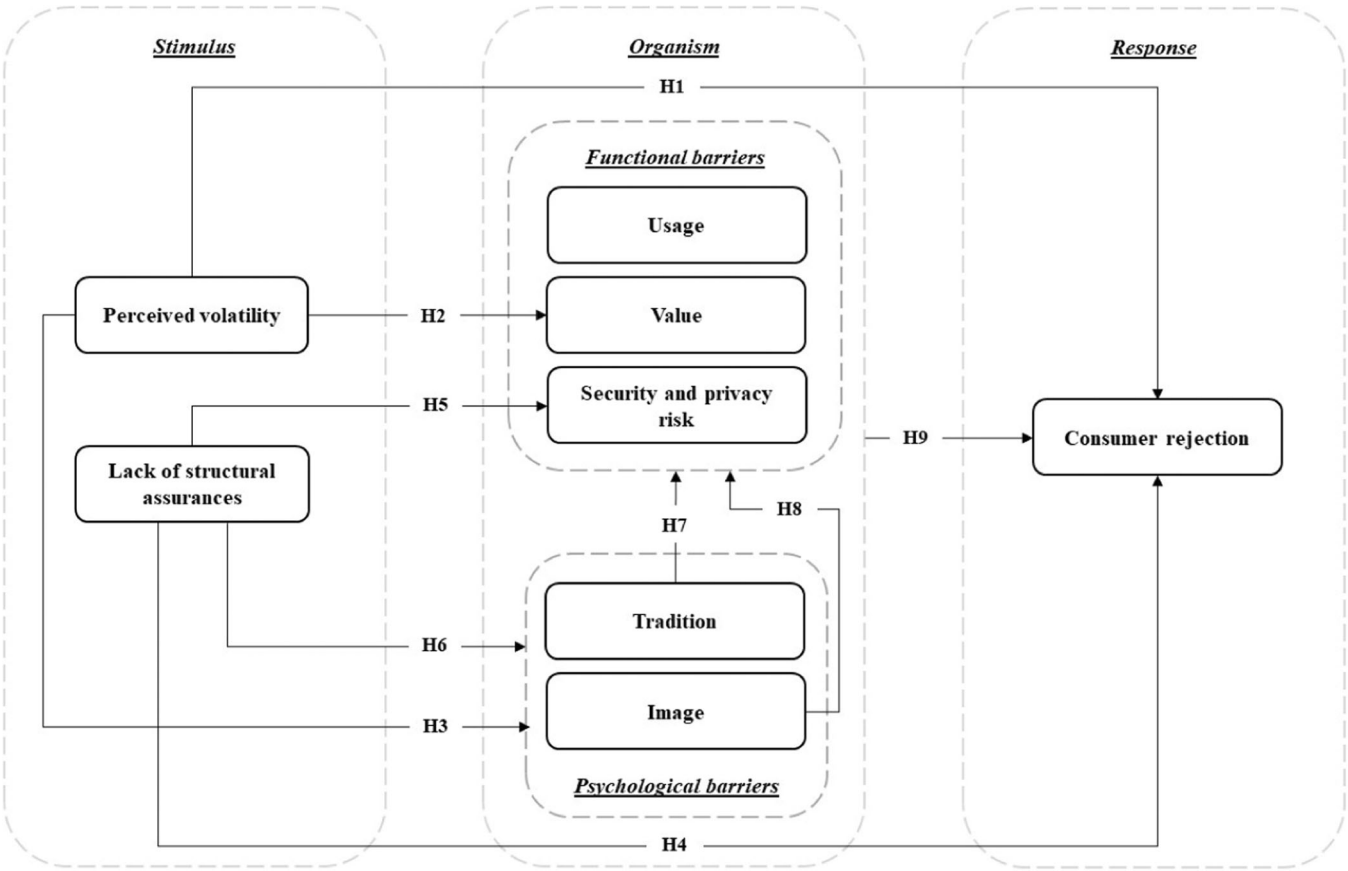

FIGURE 2 The research model.

4 | STUDY 1

4.1 | Materials and methods

4.1.1 | Measures

We develop a survey questionnaire with self-assessed items to measure the research constructs. To measure the items, we use a seven-point Likert scale where one is equivalent to strongly disagree and seven is equivalent to strongly agree. We adopt the measurement items for the image barrier, usage barrier, and value barrier constructs from Leong et al. (2020). For the security and privacy risk barrier construct, we adopt the measurement items from Kaur et al. (2020) and Leong et al. (2020). We measure the tradition barrier construct based on four items from Laukkanen et al. (2007) and Nel and Boshoff (2021). We adopt the items for the lack of structural assurances from the scale established by McKnight et al. (2002). In addition, we formulate six items to measure the construct of perceived volatility based on the scales for price volatility and environmental volatility from Ganesan (1994), Yin and Paswan (2007), and Matanda and Freeman (2009). Finally, we measure the construct of consumer rejection behavior using seven items from Leong et al. (2020) and Pal et al. (2021). We conduct a pilot test with 17 participants to identify potential issues with clarity and content validity of the measures and survey. Supporting Information: Section A represents the measurement items.

4.1.2 | Sampling and data collection

The study examines survey data collected from undergraduate students at a large Canadian university, and there are several reasons for this choice. First, university students serve as a fairly representative sample for online consumers (Wu et al., 2015), and constitute a major retail consumer group (He & Mukherjee, 2007). Second, they demonstrate a higher level of cryptocurrency awareness (Henry et al., 2018). Third, university students represent diverse social and economic groups with varying backgrounds (Yan et al., 2018). Researchers extensively employ university students as a suitable sample for studying individuals' intentions toward new technologies (Alam et al., 2020).

We receive approval for study materials and ethical procedures from the research ethics board of the respective university. We administer the online survey in Qualtrics, utilizing the university-sanctioned participant pool where students receive a 0.25% bonus course credit for their participation in the survey. The initial page of the questionnaire gives a brief overview of the study objectives and other essential information. The survey invitation is available to all students with an account in the pool, but only those who provide their full consent to participate have access to the questionnaire. The questionnaire contains two main sections. The first section involves questions related to demographic characteristics and cryptocurrency use, both in general and when purchasing a product or service. The second section contains the measurement items for the research constructs.

We receive 607 submitted responses to our survey, out of which we drop 102 responses due to various reasons, including repeated failure in attention checks, expressing extreme response behaviors (either too fast or too slow), or responding with recognizable patterns. A total of 505 responses are deemed appropriate for the subsequent analysis.

4.2 | Results

Using Harman's one factor test, we check the potential for common method bias (Podsakoff & Organ, 1986). The first factor accounts for 18.4% of the total variance, therefore, common method bias is not a major issue. Additionally, we conduct the nonresponse bias test by comparing early and late respondent groups (Armstrong & Overton, 1977), and confirm that there is no significant difference, thus suggesting that the nonresponse bias does not significantly influence the results. Of the entire sample, 53.6% identify as female and 45.3% identify as male, with the remaining participants choosing not to specify their gender. The mean age for the participants is 20.9 with the standard deviation of 4.2. Regarding cryptocurrency adoption, 78.7% of participants are non-adopters. Of the users' group, only 30.8% have experience of using cryptocurrency for making payment in retail purchases. While this number may surpass existing estimates for crypto-payment use by Canadian cryptocurrency owners (Henry et al., 2023), it still indicates a low rate.

The descriptive statistics provided in Table 1 reveal that perceived volatility and tradition barrier receive the highest ratings among the hypothesized predictor variables. Notably, perceived volatility exhibits the minimum standard deviation among other constructs. Additionally, respondents demonstrate a higher-than-average level of consumer rejection. On the other hand, respondents report relatively lower degrees of image barrier and value barrier among psychological and functional barriers. The descriptive statistics also highlight the highest level of variation in respondents' opinions concerning image barrier.

4.2.1 | Assessment of the measurement model

We evaluate the proposed model using the standard partial least squares-structural equation modeling, which suits testing models with complex structural relationships (Hair et al., 2011). The procedure involves testing the measurement model and structural model. We assess the measurement model for the reliability and validity of the constructs. The factor loadings are greater than 0.7 (Hair et al., 2021), except for one item for each of the value barrier, image barrier, perceived volatility, and consumer rejection constructs (see Supporting Information: Sections A and B). Therefore, we

remove these items from the model. To examine the internal consistency, we use Cronbach's α. Seven constructs show Cronbach's αs ranging from 0.805 to 0.891, confirming high reliability and internal consistency (Hair et al., 2021). For the image barrier construct, the obtained Cronbach's α is 0.647, which is deemed acceptable because it is above 0.6 (Churchill, 1979). Additionally, we check composite reliability scores to ensure construct reliability. All values are above the threshold of 0.7 (Hair et al., 2021). We also assess convergent validity using the average variance extracted measure. All values are above 0.5, indicating that the constructs meet the convergent validity requirements (Hair et al., 2021). Table 1 gives the Cronbach's αs, composite reliability scores, and average variance extracted values for the validated model.

We apply the Heterotrait–Monotrait measure to assess the discriminant validity. According to Table 2, the Heterotrait–Monotrait ratios are less than 0.85 as per the recommended threshold (Henseler et al., 2015). Therefore, we can confirm the discriminant validity of the model.

4.2.2 | Structural model assessment

Following Hair et al. (2021), we employ the variance inflation factor as the reciprocal of tolerance to ensure that collinearity is not affecting the results. We calculate the measure separately for predictors that constitute segments of the structural model. The obtained values range from 1.2 to 2.2 and therefore, meet the requirement of being less than 5.0 (Hair et al., 2021). The standardized root mean square residual measure tests for any potential issue with the overall fit. The obtained value is 0.069, thus satisfying the conservative threshold of 0.08 applied in covariance-based structural equation modeling (Hu & Bentler, 1998).

Using 1000 subsamples to generate path coefficients, *t*-statistics, and standard errors, we conduct a bootstrapping procedure. Results confirm that perceived volatility has significant associations with value barrier and tradition barrier, providing support for H2 and H3(a). However, there is no significant association between perceived volatility and consumer rejection

TABLE 1 Mean, standard deviation, reliability, and validity results.

Construct	Mean	Standard deviation	Cronbach's α	Composite reliability	Average variance extracted
Consumer rejection	4.83	1.22	0.891	0.917	0.648
Perceived volatility	5.05	1.07	0.851	0.893	0.626
Lack of structural assurances	4.60	1.14	0.851	0.900	0.692
Image barrier	4.14	1.32	0.647	0.850	0.739
Tradition barrier	5.04	1.27	0.854	0.902	0.697
Usage barrier	4.75	1.24	0.854	0.902	0.696
Value barrier	4.18	1.14	0.805	0.872	0.631
Security and privacy risk barrier	4.93	1.29	0.881	0.914	0.679

TABLE 2 Heterotrait-Monotrait results.

	Consumer rejection	Image barrier	Lack of structural assurances	Perceived volatility	Security and privacy risk barrier	Tradition barrier	Usage barrier
Image barrier	0.665						
Lack of structural assurances	0.633	0.710					
Perceived volatility	0.430	0.392	0.520				
Security and privacy risk barrier	0.464	0.537	0.699	0.423			
Tradition barrier	0.630	0.687	0.654	0.451	0.675		
Usage barrier	0.569	0.735	0.593	0.441	0.529	0.731	
Value barrier	0.636	0.814	0.621	0.473	0.482	0.690	0.768

or between perceived volatility and image barrier. This provides no support for H1 and H3(b). The results show that the lack of structural assurances is a significant predictor of security and privacy risk barrier, tradition barrier, and image barrier constructs, as well as consumer rejection behavior, as hypothesized in H4–H6. Regarding psychological barriers, the tradition barrier significantly influences all functional barriers, thus supporting H7. In addition, image barrier has significant associations with usage and value barriers, supporting H8(a) and H8(b). However, the construct does not have a significant impact on security and privacy risk barrier as proposed in H8(c). Regarding H9, the results provide evidence for the impacts of tradition and image barriers on consumer rejection, but the value barrier is the only significant predictor of consumer rejection among functional barriers. Table 3 provides the results for testing the proposed hypotheses.

As for the coefficient of determination (R^2), we obtain 0.335 and 0.283 for the tradition barrier and image barrier constructs, respectively. For the functional barriers, the value barrier construct has the highest R^2 (0.475), followed by the constructs of usage barrier (0.462) and security and privacy risk barrier (0.458). Consumer rejection as the target construct has the R^2 value of 0.450. These are all high values based on the thresholds of 0.02, 0.13, and 0.26 for small, moderate, and substantial R^2 values, as recommended by Cohen (2013), and compared to R^2 values reported in consumer behavior studies (Hair et al., 2011; Henseler et al., 2009). In addition, we implement the blindfolding procedure to evaluate the predictive relevance of the model (Henseler et al., 2009). The obtained Stone-Geisser's Q^2 values are positive for all endogenous constructs, ranging from 0.205 for the image barrier construct to 0.317 for the usage barrier construct, providing evidence for the predictive validity of the model.

5 | STUDY 2

5.1 | Materials and methods

Study 2 expands upon Study 1 to further examine how perceived volatility and the lack of structural assurances contribute to consumer rejection of crypto-payment and what happens at the fine-grained level using a more generalizable participant pool. To this end, we conduct an experimental vignette-based survey study to manipulate consumer perceptions of volatility in cryptocurrency prices and the lack of structural assurances. Researchers widely use the vignette-based method in experimental research to design hypothetical settings and examine respondents' perceptions, beliefs, and decision-making in specific situations (Aguinis & Bradley, 2014). The study also examines the role of cryptocurrency ownership in shaping consumer resistance behavior toward

TABLE 3 Results of testing the hypotheses.

Hypothesis		Path coefficient	*p*-Value	*t*-Value	Result
H1	Perceived volatility » Consumer rejection	0.077	0.064	1.891	Not supported
H2	Perceived volatility » Value barrier	0.165	0.000	4.497	Supported
H3	(a) Perceived volatility » Tradition barrier	0.174	0.000	4.053	Supported
	(b) Perceived volatility » Image barrier	0.090	0.052	1.915	Not supported
H4	Lack of structural assurances » Consumer rejection	0.235	0.000	3.927	Supported
H5	Lack of structural assurances » Security and privacy risk barrier	0.400	0.000	7.478	Supported
H6	(a) Lack of structural assurances » Tradition barrier	0.479	0.000	9.562	Supported
	(b) Lack of structural assurances » Image barrier	0.485	0.000	9.675	Supported
H7	(a) Tradition barrier » Usage barrier	0.465	0.000	10.256	Supported
	(b) Tradition barrier » Value barrier	0.323	0.000	7.919	Supported
	(c) Tradition barrier » Security and privacy risk barrier	0.359	0.000	7.469	Supported
H8	(a) Image barrier » Usage barrier	0.312	0.000	6.564	Supported
	(b) Image barrier » Value barrier	0.375	0.000	9.625	Supported
	(c) Image barrier » Security and privacy risk barrier	0.012	0.780	0.278	Not supported
H9	(a) Usage barrier » Consumer rejection	0.049	0.349	0.931	Not supported
	(b) Value barrier » Consumer rejection	0.174	0.002	3.056	Supported
	(c) Security and privacy risk barrier » Consumer rejection	−0.023	0.654	0.429	Not supported
	(d) Tradition barrier » Consumer rejection	0.206	0.000	3.593	Supported
	(e) Image barrier » Consumer rejection	0.133	0.006	2.732	Supported

crypto-payment. Therefore, it involves balanced sub-samples of cryptocurrency owners and nonowners to conduct a comparative analysis of their perceptions regarding crypto-payment resistance, functional and psychological barriers, and the outcomes of volatility and the lack of structural assurances. This dual perspective allows for a more comprehensive understanding of crypto-payment resistance.

The vignettes correspond to each of the high and low levels of price volatility and the lack of structural assurances. For price volatility, the vignettes spotlight the level of day-to-day price fluctuation for a cryptocurrency and the stability of the value before payment processing. Regarding the lack of structural assurances, the focus is on the reliability and stability of the network, transaction speed, security, and support. The common module of the vignettes describes an online purchase situation where the retailer accepts both cryptocurrency and traditional payments. When designing the vignettes, we map each of the resulting scenarios to existing cryptocurrencies to ensure that they are adequately realistic but exclude naming of specific cryptocurrencies to avoid misperception. The vignettes undergo two rounds of expert review and a pilot test with 20 respondents, including both cryptocurrency owners and nonowners. We make modifications in the vignettes based on the feedback received from these exercises. Supporting Information: Section E provides the vignettes.

We use Prolific, a crowdsourcing platform to recruit survey participants, to collect data for Study 2. Consumer behavior studies increasingly use the platform for data collection. It is specifically suitable for scientific research and, compared to Amazon Mechanical Turk, it provides higher data quality and more representative samples (Peer et al., 2017). Our sample only uses Canadian participants to create a nationally representative sample and to avoid the impact of discrepancies in jurisdictional cryptocurrency landscapes. Additionally, we use the platform's cryptocurrency ownership screening criterion to create balanced sub-samples of cryptocurrency owners and nonowners. For each group, we administer a separate questionnaire in Qualtrics and randomly assign participants to one of the four scenarios using the Qualtrics Randomizer feature. In addition to the common elements in both questionnaires, we ask the participants from the owner group about their motivations to own cryptocurrency, the specific cryptocurrencies they own, and their prior experience with crypto-payment. Each respondent receives £1.5 for their participation in this study.

We employ the validated items from Study 1 to measure consumer rejection as well as the functional and psychological barriers. We include a realism check using three items developed by Dabholkar (1994) to ensure that participants consider the presented experimental settings as realistic (Rungtusanatham et al., 2011). We also include manipulation checks to test if respondents properly interpret and understand the level of the variables presented in the vignettes (Eckerd et al., 2021). To do so, we use single-item measurements for the variables using a seven-point Likert scale (see Supporting Information: Section E). Since we ask manipulation checks within the same survey and before measuring the dependent variables, there is a potential for experimenter demand effects. Recent observations suggest that demand effects are likely small in typical experiments, particularly in vignette-based studies (Eckerd et al., 2021; Mummolo & Peterson, 2019). However, we implement the recommended best practices to minimize the potential for demand effects in our experimental setup and survey design (e.g., Eckerd et al., 2021; de Quidt et al., 2019). This involves using a between-subjects design, which is more robust to demand effects, and conducting our experiment using an online platform (i.e., Prolific), which offers high degrees of anonymity and makes it impossible for participants to be identified by the researchers or other participants. We also provide participants with identical and neutral instructions and abstract framing of the decision environment to minimize impacts on their behavior. Moreover, we include both validation and attention checks in the survey to minimize data quality concerns. In total, 29 respondents fail the validation check for cryptocurrency ownership. We also exclude a single response because of failure in both attention checks. Overall, we collect 319 valid responses, including 158 responses from cryptocurrency owners and 161 responses from the nonowner group. Table 4 presents the demographic profile of the respondents.

5.2 | Results

The mean realism score is 5.41 on a seven-point Likert scale, indicating that participants perceive the scenarios to be realistic and could imagine themselves in the described situations. Regarding the manipulation checks, the mean score significantly differs between high and low levels of price volatility ($t = 22.697$; $p < 0.001$; $\text{Mean}_{|\text{High}-\text{Low}|} = 3.55$). The mean scores for the lack of structural assurances are also significantly different between the high and low levels ($t = 19.289$; $p < 0.001$; $\text{Mean}_{|\text{High}-\text{Low}|} = 2.90$).

The descriptive statistics given in Table 5 reveal a higher level of consumer resistance in comparison to Study 1 ($t = 7.419$; $p < 0.001$; $\text{Mean}_{|\text{Study 2}-\text{Study 1}|} = 0.68$). This aligns with observations on more positive perceptions among younger individuals toward cryptocurrency and their higher propensity to adopt it compared to older age groups (Blockchain Capital, 2020). It corresponds with the fact that they are generally more technology-savvy and less resistant to innovation due to their extensive experience with digital technologies (Alam et al., 2020). Participants' assessments of the functional and psychological barriers further confirm this observation, where they indicate a significantly higher level of value barrier ($t = 13.699$; $p < 0.001$; $\text{Mean}_{|\text{Study 2}-\text{Study 1}|} = 1.15$), tradition barrier ($t = 5.901$; $p < 0.001$; $\text{Mean}_{|\text{Study 2}-\text{Study 1}|} = 0.51$), and image barrier ($t = 3.934$; $p < 0.001$; $\text{Mean}_{|\text{Study 2}-\text{Study 1}|} = 0.40$), compared to the participants in Study 1. The descriptive statistics indicate that participants exhibit the highest level of variation in their opinions regarding the security and privacy risk barrier, as well as the image barrier. On the other hand, they express the least

TABLE 4 Demographic profile of the respondents in Study 2.

Demographic	Owners		Nonowners		Total	
	N	%	*N*	%	*N*	%
Age						
18–24	26	16.45	23	14.28	49	15.36
25–34	62	39.24	51	31.67	113	35.42
35–44	52	32.91	44	27.32	96	30.09
45–54	13	8.227	15	9.316	28	8.77
55+	5	3.164	28	17.39	33	10.34
Gender						
Man	111	70.25	57	35.40	168	52.66
Woman	46	29.11	103	63.97	149	46.70
Other	0	0	1	0.62	1	0.31
Prefer not to specify	1	0.632	0	0	1	0.31
Education level						
High school/diploma or below	5	3.16	13	8.07	18	5.64
Some university or college degree/ diploma	33	20.88	32	19.87	65	20.37
Bachelor's degree	97	61.39	80	49.68	177	55.48
Master's degree	20	12.65	29	18.01	49	15.36
PhD degree	2	1.26	6	3.72	8	2.50
Prefer not to specify	1	0.63	1	0.62	2	0.62
Cryptocurrency ownership						
Bitcoin	111	70.25				
Ethereum	94	59.49				
Dogecoin	32	20.25				
Solana	14	8.86				
Litecoin	13	8.23				
Shiba Inu	13	8.23				
Others	92	58.23				

variability in their opinions concerning the tradition barrier. Table 5 also reports the results from the measurement model assessment, confirming that the constructs have adequate reliability and validity.

We conduct a 2 × 2 × 2 between-subjects multivariate analysis of variance with consumer rejection along with functional and psychological barriers as dependent variables. The results given in Table 6 reveal that price volatility and the lack of structural assurances have positive influences on consumer rejection of crypto-payment, providing support for H1 and H4. The results also find a significant impact for price volatility on value barrier and image barrier (H2 and H3(b)). Concerning the lack of structural assurances, the experimental results indicate significant influences on security and privacy risk barrier, tradition barrier, and image barrier. These findings support H5 and H6. The results also show that cryptocurrency ownership status is a significant determinant of all functional and psychological barriers, with nonadopters demonstrating higher levels of usage, value, security and privacy risk, tradition, and image barriers toward crypto-payment.

Additionally, the results reveal two significant interaction effects. First, there is a significant interaction between price volatility and the lack of structural assurances. As illustrated in Figure 3a, where there is a high level of the lack of structural assurances, participants indicate almost the same level of crypto-payment rejection irrespective of the level of price volatility ($M_{High} = 6.14$; $M_{Low} = 6.05$). However, in situations with a low level of lack of structural assurances, those who perceive higher price volatility show a higher degree of crypto-payment rejection ($M_{High} = 5.31$; $M_{Low} = 4.53$). Second, there is a significant interaction between the lack of structural assurances and cryptocurrency ownership. The analysis indicates a higher level of discrepancy between owners and nonowners toward crypto-payment rejection where the lack of structural assurances is low. In this situation, cryptocurrency owners show a more significantly reduced level of rejection toward crypto-payment ($M_{Nonown} = 4.30$; $M_{Own} = 5.54$) (Figure 3b). The analysis of variance does not reveal any other significant interactions for consumer rejection or functional and psychological barriers.

TABLE 5 Mean, standard deviation, reliability, and validity results.

Construct	Mean	SD	Cronbach's α	CR	AVE	Construct correlations					
						COR	IMB	SRB	TRB	USB	VAB
COR	5.51	1.36	0.942	0.953	0.746	0.863[a]					
IMB	4.54	1.59	0.716	0.873	0.775	0.724	0.881				
SRB	4.98	1.65	0.904	0.940	0.839	0.440	0.574	0.916			
TRB	5.66	1.17	0.840	0.904	0.758	0.760	0.652	0.396	0.870		
USB	4.74	1.34	0.860	0.906	0.708	0.603	0.694	0.449	0.648	0.841	
VAB	5.33	1.23	0.877	0.911	0.672	0.773	0.682	0.352	0.719	0.581	0.820

Abbreviations: AVE, average variance extracted; COR, consumer rejection; CR, composite reliability; IMB, image barrier; SD, standard deviation; SRB, security and privacy risk barrier; TRB, tradition barrier; USB, usage barrier; VAB, value barrier.

[a]Diagonal elements represent the square root of average variance extracted.

TABLE 6 Results of the multivariate analysis of variance.

Source	DV		Mean	MS	*F*	Sig.
PRV	COR		High: 5.72	14.95	12.47	0.000
			Low: 5.29			
	VAB		High: 5.51	11.04	8.76	0.003
			Low: 5.14			
	TRB		High: 5.63	2.37	2.24	0.135
			Low: 5.46			
	IMB		High: 4.80	23.19	13.15	0.000
			Low: 4.26			
LSA	COR		High: 6.09	109.95	91.71	0.000
			Low: 4.92			
	SRB		High: 5.29	48.27	25.49	0.000
			Low: 4.51			
	TRB		High: 5.86	31.68	29.96	0.000
			Low: 5.23			
	IMB		High: 5.21	146.49	83.07	0.000
			Low: 3.85			
OWN	COR		Nonowner: 5.97	69.14	57.67	0.000
			Owner: 5.04			
	USB		Nonowner: 5.03	29.22	20.89	0.000
			Owner: 4.43			
	VAB		Nonowner: 5.57	18.72	14.86	0.000
			Owner: 5.08			
	SRB		Nonowner: 5.28	46.43	24.52	0.000
			Owner: 4.52			
	TRB		Nonowner: 5.88	35.83	33.88	0.000
			Owner: 5.21			
	IMB		Nonowner: 5.01	74.35	42.16	0.000
			Owner: 4.05			
PRV × LSA	COR	High PRV	High LSA: 6.14	9.56	7.97	0.005
			Low LSA: 5.31			
		Low PRV	High LSA: 6.05			
			Low LSA: 4.53			
OWN × PRV	COR	Nonowner	High PRV: 6.25	1.15	0.96	0.329
			Low PRV: 5.70			
		Owner	High PRV: 5.20			
			Low PRV: 4.88			
OWN × LSA	COR	Nonowner	High LSA: 6.40	7.86	6.56	0.011
			Low LSA: 5.54			
		Owner	High LSA: 5.78			
			Low LSA: 4.30			

TABLE 6 (Continued)

Source	DV			Mean	MS	*F*	Sig.
OWN × PRV × LSA	COR	Nonowner	High PRV	High LSA: 6.62	4.51	3.77	0.053
				Low LSA: 5.87			
			Low PRV	High LSA: 6.18			
				Low LSA: 5.21			
		Owner	High PRV	High LSA: 5.65			
				Low LSA: 4.74			
			Low PRV	High LSA: 5.92			
				Low LSA: 3.84			

Abbreviations: COR, consumer rejection; DV, dependent variable; IMB, image barrier; LSA, lack of structural assurances; MS, mean square; OWN, ownership; PRV, price volatility; SRB, security and privacy risk barrier; TRB, tradition barrier; USB, usage barrier; VAB, value barrier.

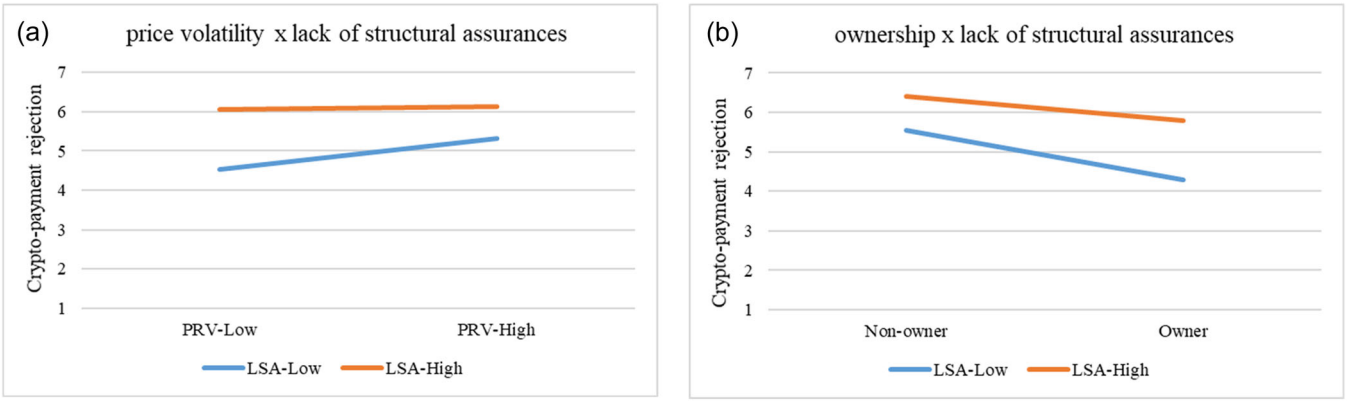

FIGURE 3 Interaction effects. (a) price volatility x lack of structural assurances. (b) ownership x lack of structural assurances.

6 | DISCUSSION AND CONCLUSION

In line with the stimulus-organism-response paradigm, the results show that high levels of volatility and inadequate institutional structures in the cryptocurrency landscape function as strong stimuli that provoke negative consumers' evaluation and behavior toward cryptocurrency payment. The results from both studies confirm that the uncertainties stemming from the radical changes in the cryptocurrency market lead to a value barrier by driving consumers to view crypto-payment as not economical or financially advantageous compared to traditional money. This aligns with individuals' decision making under uncertainty, fostering loss aversion, as postulated by the prospect theory. Concerning cryptocurrency owners, while they perceive a lower value barrier, it remains a significant issue because the majority of owners adopt cryptocurrencies for reasons other than relational exchanges, such as the potential for high returns, risk reduction in investment portfolios, or fear of missing out. The high level of price volatility creates a dichotomy between holding and spending cryptocurrency for the owners, accompanied by the belief that cryptocurrency is mainly an investment tool or a store of value rather than a form of money. Consequently, they demonstrate negative perceptions about the value of crypto-payment. Related to this, the results reveal a significant influence of cryptocurrency ownership status on crypto-payment rejection, with owners indicating a lower degree of resistance. Considering the fact that making payments does not rank among the primary reasons for cryptocurrency adoption by owners (Ontario Securities Commission, 2022), this finding suggests a two-step rejection process for crypto-payment. First, there is a cryptocurrency rejection pertaining to nonowners. Then, there is a rejection from cryptocurrency owners, which can be attributed to the individuals' primary reason for holding cryptocurrencies, among other contributing factors. This two-step rejection process aligns with a two-step process for crypto-payment adoption. Investment-related cryptocurrency use-cases do not necessarily follow such a staged process.

From the perspective of the innovation resistance theory, the findings reveal that the value barrier is highly relevant to crypto-payment, given its significant impact compared to other hypothesized functional barriers. It suggests that financial incentives can motivate crypto-payment usage; however, such proposals must consider retailer interests and motives to encourage consumers. At a broader level, these results imply that the high price volatility motivates cryptocurrency rejection in use-cases other than investment or value

storage, particularly where other reliable options are available. This is particularly relevant to traditional cryptocurrencies characterized by higher volatility in value, in contrast to stablecoins.

As proposed by the prospect theory, the findings from both studies confirm that the high volatility of cryptocurrencies significantly contributes to the development of psychological barriers toward crypto-payment. The findings from the student sample imply that higher levels of volatility prompts consumers to place more value to payment using traditional money; however, their image of crypto-payment remains relatively unaffected. On the other hand, experimental results imply that the general population tends to form more negative impressions about using cryptocurrencies for daily purchases when faced with higher price volatility. Nonetheless, this increased volatility does not significantly alter their preference for conducting payment transactions using traditional money. This aligns with observed differences in passive consumer resistance and attachment to the status quo among young individuals and the broader population (Alam et al., 2020).

Both empirical and experimental results indicate that the development of institutional structures, particularly in legal and regulatory aspects, is imperative to reduce consumer resistance to crypto-payment. Consumers perceive high levels of risk exposure with cryptocurrency transactions from inadequate structural assurances in this space. The uncertainties with cryptocurrency standards and regulations motivate loss aversion behaviors and stimulate psychological barriers to crypto-payment. This is evident both in an increasing inclination to stick to traditional money use and in an overall image of cryptocurrencies as immature or inappropriate for retail purchases. These results imply that until proper cryptocurrency regulations and standards are in place, the mainstream use of cryptocurrency for payment purposes remains limited.

The significant interaction between the lack of structural assurances and price volatility further highlights how current characteristics of the cryptocurrency landscape can shape consumer behavior toward the specific cryptocurrency use-cases. From a loss aversion perspective, when there is a high level of uncertainty with the structural assurances, the potential loss is already high and further loss due to price volatility does not significantly impact consumer decision making. Therefore, consumers indicate almost the same level of crypto-payment rejection irrespective of the level of price volatility. On the other hand, when consumers share confidence in the structural assurances surrounding cryptocurrencies, they become more sensitive to volatility in value and feel the resulting potential loss more strongly. Therefore, perceived uncertainties associated with high volatility can lead to a stronger inclination to reject crypto-payment. This underlines the importance of establishing robust regulatory frameworks, effective consumer protection measures, and technological safeguards as a precursor to cryptocurrency use in payment transactions. Furthermore, this finding highlights the potential for stablecoins to be more readily accepted and utilized for crypto-payment.

With regard to the significant interaction between the lack of structural assurances and cryptocurrency ownership status, both owners and nonowners express a rather similar level of crypto-payment rejection in the absence of adequate structural assurances. From a loss aversion perspective, they demonstrate a consistent behavior due to high uncertainties in this situation. However, where such uncertainties are less of a major issue, cryptocurrency owners tend to form less negative perceptions toward crypto-payment. Theoretical considerations suggest that owners exhibit a higher level of self-efficacy stemming from their prior knowledge and experience in using cryptocurrencies. Additionally, they already adapt to and live with trust-related issues with cryptocurrencies. This is reflected in significant influences of the cryptocurrency ownership status on all psychological and functional barriers, as well as on crypto-payment rejection. It further supports the notion of a two-step process for consumer rejection of crypto-payment. The findings on these interaction effects highlight the dominant role that inadequate structural assurances play in driving consumer resistance toward cryptocurrency payment.

In terms of the functional barriers proposed by innovation resistance theory, empirical results indicate that while consumers admit the existence of issues pertaining to crypto-payment usage and risks, those issues do not significantly influence their rejection behavior. This is a surprising finding, particularly for the risk barrier as the literature establishes that consumers are more reluctant to cryptocurrencies and other innovations and technologies when they perceive higher levels of risk (e.g., Ermakova et al., 2017; Kaur et al., 2020; Leong et al., 2020). In Study 1, we can attribute this to the characteristics of survey participants. In general, university students, particularly young undergraduates, are digital natives and more comfortable with new technologies (Alam et al., 2020), and hence they perceive less difficulty in working with new digital tools even if they do not have prior information. Moreover, due to being more involved in the digital world and cyber technologies, they express confidence in their own self-efficacy to deal with risks (Yan et al., 2018). The insignificant impact of the risk barrier can also be attributed to general familiarity with using digital payment methods. This empirical finding aligns with a few previous works suggesting that consumer perception of security risks is not an inhibitor of cryptocurrency use (Mashatan et al., 2022; Walton & Johnston, 2018). Overall, the results suggest that value, image, and tradition considerations are much more important than usage and risk issues in influencing consumer decision making about cryptocurrency payment.

From the theoretical standpoint, this research provides novel insights into the complex mechanisms that drive consumer resistance in the cryptocurrency domain. In addition to the sequential mechanisms proposed by the stimulus-organism-response framework, the results support a direct effect of the lack of structural assurances as an environmental stimulus on consumer behavior. More generally, the research findings provide evidence on the causal relationships among psychological and functional barriers to innovation resistance. The findings also contribute to the existing literature on innovation resistance theory through providing insights into the antecedents of different innovation barriers. The findings indicate

how the main attributes of a digital innovation shape consumers' psychological responses and cognitive evaluations that lead to consumer resistance behavior toward specific use-cases of that innovation. The research also advances our understanding of how uncertainties foster passive consumer resistance and attachment to the status quo, while bolstering active resistance.

In terms of limitations, this research develops insights from a vignette-based experimental setup (Study 2) where there is a potential for experimenter demand effects. Our experimental design adheres to the recommended best practices for minimizing such effects. Additionally, results from Study 2 are consistent with those of Study 1 in which no manipulation exists. Aside from these, recent evidence suggests that demand effects in typical vignette-based experiments are likely low, and participants' ability to align their subsequent behavior with manipulation expectations is limited (Eckerd et al., 2021; Mummolo & Peterson, 2019). Therefore, demand effect does not seem to be a major issue in our experimental setup. Nonetheless, we cannot rule out the potential presence of such an effect. Further research can help enhance the robustness of the findings from our vignette-based study.

This study examines consumer resistance to crypto-payment in terms of their rejection behavior. Investigating other forms of resistance remains the subject of future studies. Adoption postponement behavior is particularly relevant considering that the crypto-currency domain and their use-cases are evolving rapidly. Little is also known about how social influences and norms, exposure to information about cryptocurrencies, and the individuals' level of knowledge or understanding of the concept of cryptocurrency shape consumer attitudes toward crypto-payment. Moreover, in general, price inflation and fluctuation can influence consumer spending and saving behaviors, contingent on different factors such as inflation expectations, financial and other characteristics of consumers, and the types of goods or services. Therefore, there is a need for future research to delve into the influences of these factors on consumer resistance behavior toward crypto-payment to provide a more nuanced understanding of the dynamics at play. Further research is also required to investigate the problem from the perspective of retailers and business-to-consumer firms, particularly those who offer crypto-payment services along with other payment options.

ACKNOWLEDGMENTS

Toronto Metropolitan University (formerly Ryerson University) is in the "Dish with One Spoon Territory." The Dish with One Spoon is a treaty between the Anishinaabe, Mississaugas, and Haudenosaunee that bound them to share the territory and protect the land. Subsequent Indigenous Nations and peoples, Europeans, and all newcomers have been invited into this treaty in the spirit of peace, friendship, and respect. We thank them for allowing us to conduct research on their land. This work was supported by the Social Sciences and Humanities Research Council (SSHRC) and the Natural Sciences and Engineering Research Council (NSERC) of Canada, as well as by Ripple Inc. through University Blockchain Research Initiative (UBRI).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Mohamad Sadegh Sangari https://orcid.org/0000-0002-1769-4278

Atefeh Mashatan http://orcid.org/0000-0001-9448-9123

REFERENCES

Abramova, S., & Böhme, R. (2016). Perceived benefit and risk as multidimensional determinants of bitcoin use: A quantitative exploratory study. In *37th International Conference on Information Systems*.

Aguinis, H., & Bradley, K. J. (2014). Best practice recommendations for designing and implementing experimental vignette methodology studies. *Organizational Research Methods*, *17*(4), 351–371.

Akyildirim, E., Corbet, S., Cumming, D., Lucey, B., & Sensoy, A. (2020). Riding the wave of crypto-exuberance: The potential misusage of corporate blockchain announcements. *Technological Forecasting and Social Change*, *159*, 120191.

Alam, M. Z., Hu, W., Kaium, M. A., Hoque, M. R., & Alam, M. M. D. (2020). Understanding the determinants of mHealth apps adoption in Bangladesh: A SEM-Neural network approach. *Technology in Society*, *61*, 101255.

Albrecht, C., Duffin, K. M., Hawkins, S., & Morales Rocha, V. M. (2019). The use of cryptocurrencies in the money laundering process. *Journal of Money Laundering Control*, *22*(2), 210–216.

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, *14*(3), 396–402.

Ayedh, A., Echchabi, A., Battour, M., & Omar, M. (2021). Malaysian Muslim investors' behaviour towards the blockchain-based Bitcoin crypto-currency market. *Journal of Islamic Marketing*, *12*(4), 690–704.

BitInfoCharts. (2023). *Ethereum transactions historical chart*. https://bitinfocharts.com/comparison/ethereum-transactions.html

Blockchain Capital. (2020). *Bitcoin is (still) a demographic mega-trend: data update*. https://blockchain.capital/bitcoin-is-still-a-demographic-mega-trend-data-update/

Cai, R., Leung, X. Y., & Chi, C. G. Q. (2022). Ghost kitchens on the rise: Effects of knowledge and perceived benefit-risk on customers' behavioral intentions. *International Journal of Hospitality Management*, *101*, 103110.

Chen, X., Miraz, M. H., Gazi, M. A. I., Rahaman, M. A., Habib, M. M., & Hossain, A. I. (2022). Factors affecting cryptocurrency adoption in digital business transactions: The mediating role of customer satisfaction. *Technology in Society*, *70*, 102059.

Churchill Jr., G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, *16*(1), 64–73.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic Press.

CoinMarketCap. (2023). *Bitcoin to USD chart*. https://coinmarketcap.com/currencies/bitcoin/

Dabbous, A., Merhej Sayegh, M., & Aoun Barakat, K. (2022). Understanding the adoption of cryptocurrencies for financial transactions within a high-risk context. *The Journal of Risk Finance*, *23*(4), 349–367.

Dabholkar, P. A. (1994). Incorporating choice into an attitudinal framework: Analyzing models of mental comparison processes. *Journal of Consumer Research*, *21*(1), 100–118.

Dehghani, M., William Kennedy, R., Mashatan, A., Rese, A., & Karavidas, D. (2022). High interest, low adoption. A mixed-method investigation into the factors influencing organisational adoption of blockchain technology. *Journal of Business Research*, *149*, 393–411.

Eckerd, S., DuHadway, S., Bendoly, E., Carter, C. R., & Kaufmann, L. (2021). On making experimental design choices: Discussions on the use and challenges of demand effects, incentives, deception, samples, and vignettes. *Journal of Operations Management*, *67*(2), 261–275.

Ermakova, T., Fabian, B., Baumann, A., Izmailov, M., & Krasnova, H. (2017). Bitcoin: Drivers and impediments. *SSRN Electronic Journal*. https://dx.doi.org/10.2139/ssrn.3017190

Falk, T., Schepers, J., Hammerschmidt, M., & Bauer, H. H. (2007). Identifying cross-channel dissynergies for multichannel service providers. *Journal of Service Research*, *10*(2), 143–160.

Featherman, M. S., Valacich, J. S., & Wells, J. D. (2006). Is that authentic or artificial? Understanding consumer perceptions of risk in e-service encounters. *Information Systems Journal*, *16*(2), 107–134.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50.

Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, *58*(2), 1–19.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152.

He, H., & Mukherjee, A. (2007). I am, ergo I shop: Does store image congruity explain shopping behaviour of Chinese consumers? *Journal of Marketing Management*, *23*(5–6), 443–460.

Heidenreich, S., & Handrich, M. (2015). What about passive innovation resistance? Investigating adoption-related behavior from a resistance perspective. *Journal of Product Innovation Management*, *32*(6), 878–903.

Henry, C. S., Engert, W., Sutton-Lalani, A., Hernandez, S., McVanel, D., & Huynh, K. (2023). Unmet payment needs and a central bank digital currency. *Bank of Canada Staff Discussion Paper*, *15*. https://doi.org/10.34989/sdp-2023-15

Henry, C. S., Huynh, K. P., & Nicholls, G. (2018). Bitcoin awareness and usage in Canada. *Journal of Digital Banking*, *2*(4), 311–337.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, *20*, 277–320.

Hernandez-Ortega, B., & Ferreira, I. (2021). How smart experiences build service loyalty: The importance of consumer love for smart voice assistants. *Psychology & Marketing*, *38*(7), 1122–1139.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, *3*(4), 424–453.

International Organization for Standardization. (2020). *ISO 22739:2020(en): Blockchain and distributed ledger technologies—Vocabulary*. https://www.iso.org/obp/ui/#iso:std:iso:22739:ed-1:v1:en

Jacoby, J. (2002). Stimulus-organism-response reconsidered: An evolutionary step in modeling (consumer) behavior. *Journal of Consumer Psychology*, *12*(1), 51–57.

Johnson, V. L., Woolridge, R. W., & Bell, J. R. (2021). The impact of consumer confusion on mobile self-checkout adoption. *Journal of Computer Information Systems*, *61*(1), 76–86.

Jonker, N. (2019). What drives the adoption of crypto-payments by online retailers? *Electronic Commerce Research and Applications*, *35*, 100848.

Joo, M. H., Nishikawa, Y., & Dandapani, K. (2020). Cryptocurrency, a successful application of blockchain technology. *Managerial Finance*, *46*(6), 715–733.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–292.

Kamboj, S., Sarmah, B., Gupta, S., & Dwivedi, Y. (2018). Examining branding co-creation in brand communities on social media: Applying the paradigm of stimulus-organism-response. *International Journal of Information Management*, *39*, 169–185.

Katsiampa, P. (2019). An empirical investigation of volatility dynamics in the cryptocurrency market. *Research in International Business and Finance*, *50*, 322–335.

Kaur, P., Dhir, A., Singh, N., Sahu, G., & Almotairi, M. (2020). An innovation resistance theory perspective on mobile payment solutions. *Journal of Retailing and Consumer Services*, *55*, 102059.

Kim, H. W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *MIS Quarterly*, *33*(3), 567–582.

Koroma, J., Rongting, Z., Muhideen, S., Akintunde, T. Y., Amosun, T. S., Dauda, S. J., & Sawaneh, I. A. (2022). Assessing citizens' behavior towards blockchain cryptocurrency adoption in the Mano River Union states: Mediation, moderation role of trust and ethical issues. *Technology in society*, *68*, 101885.

Laukkanen, T., Sinkkonen, S., Kivijärvi, M., & Laukkanen, P. (2007). Innovation resistance among mature consumers. *Journal of Consumer Marketing*, *24*(7), 419–427.

Leong, L. Y., Hew, T. S., Ooi, K. B., & Wei, J. (2020). Predicting mobile wallet resistance: A two-staged structural equation modeling-artificial neural network approach. *International Journal of Information Management*, *51*, 102047.

Liébana-Cabanillas, F., Marinkovic, V., Ramos de Luna, I., & Kalinic, Z. (2018). Predicting the determinants of mobile payment acceptance: A hybrid SEM-neural network approach. *Technological Forecasting and Social Change*, *129*, 117–130.

Mashatan, A., Sangari, M. S., & Dehghani, M. (2022). How perceptions of information privacy and security impact consumer trust in crypto-payment: An empirical study. *IEEE Access*, *10*, 69441–69454.

Matanda, M. J., & Freeman, S. (2009). Effect of perceived environmental uncertainty on exporter–importer inter-organisational relationships and export performance improvement. *International Business Review*, *18*(1), 89–107.

Mathieson, K., & Keil, M. (1998). Beyond the interface: Ease of use and task/technology fit. *Information & Management*, *34*(4), 221–230.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research*, *13*(3), 334–359.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. The MIT Press.

Miraz, M. H., Hasan, M. T., Rekabder, M. S., & Akhter, R. (2022). Trust, transaction transparency, volatility, facilitating condition, performance expectancy towards cryptocurrency adoption through intention to use. *Journal of Management Information and Decision Sciences*, *25*, 1–20.

Montoya-Weiss, M. M., Voss, G. B., & Grewal, D. (2003). Determinants of online channel use and overall satisfaction with a relational, multichannel service provider. *Journal of the Academy of Marketing Science*, *31*(4), 448–458.

Morewedge, C. K., & Giblin, C. E. (2015). Explanations of the endowment effect: An integrative review. *Trends in Cognitive Sciences*, *19*(6), 339–348.

Mummolo, J., & Peterson, E. (2019). Demand effects in survey experiments: An empirical assessment. *American Political Science Review*, *113*(2), 517–529.

Nel, J., & Boshoff, C. (2021). "I just don't like digital-only banks, and you should not use them either": Traditional-bank customers' opposition to using digital-only banks. *Journal of Retailing and Consumer Services*, *59*, 102368.

Ontario Securities Commission. (2022). *Crypto asset survey*. https://www.osc.ca/sites/default/files/2022-10/inv_research_20220928_crypto-asset-survey_EN.pdf

Pal, D., Zhang, X., & Siyal, S. (2021). Prohibitive factors to the acceptance of Internet of Things (IoT) technology in society: A smart-home context using a resistive modelling approach. *Technology in Society*, *66*, 101683.

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*, *70*, 153–163.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, *12*(4), 531–544.

Presthus, W., & O'Malley, N. O. (2017). Motivations and barriers for end-user adoption of bitcoin as digital currency. *Procedia Computer Science*, *121*, 89–97.

PYMNTS. (2022). *Paying with cryptocurrency: What consumers and merchants expect from digital currencies*. https://www.pymnts.com/study/paying-with-cryptocurrency-shopping-consumer-finance-digital-wallets/

de Quidt, J., Vesterlund, L., & Wilson, A. J. (2019). Experimenter demand effects. In A. Schram & A. Ule (Eds.), *Handbook of research methods and applications in experimental economics* (pp. 384–400). Edward Elgar Publishing.

Ram, S. (1987). A model of innovation resistance. *Advances in Consumer Research*, *14*, 208–212.

Ram, S., & Sheth, J. N. (1989). Consumer resistance to innovations: The marketing problem and its solutions. *Journal of Consumer Marketing*, *6*(2), 5–14.

Rungtusanatham, M., Wallin, C., & Eckerd, S. (2011). The vignette in a scenario-based role-playing experiment. *Journal of Supply Chain Management*, *47*(3), 9–16.

Sohaib, O., Hussain, W., Asif, M., Ahmad, M., & Mazzara, M. (2020). A PLS-SEM neural network approach for understanding cryptocurrency adoption. *IEEE Access*, *8*, 13138–13150.

Tandon, A., Jabeen, F., Talwar, S., Sakashita, M., & Dhir, A. (2021). Facilitators and inhibitors of organic food buying behavior. *Food Quality and Preference*, *88*, 104077.

US Federal Reserve. (2023). *Economic well-being of U.S. households in 2022*. https://www.federalreserve.gov/publications/files/2022-report-economic-well-being-us-households-202305.pdf

Walton, A., & Johnston, K. (2018). Exploring perceptions of Bitcoin adoption: The South African virtual community perspective. *Interdisciplinary Journal of Information, Knowledge & Management*, *13*, 165–182.

Wang, Z., Guan, Z., Hou, F., Li, B., & Zhou, W. (2019). What determines customers' continuance intention of FinTech? Evidence from YuEbao. *Industrial Management & Data Systems*, *119*(8), 1625–1637.

Wu, K., Vassileva, J., Noorian, Z., & Zhao, Y. (2015). How do you feel when you see a list of prices? The interplay among price dispersion, perceived risk and initial trust in Chinese C2C market. *Journal of Retailing and Consumer Services*, *25*, 36–46.

Yan, Z., Robertson, T., Yan, R., Park, S. Y., Bordoff, S., Chen, Q., & Sprissler, E. (2018). Finding the weakest links in the weakest link: How well do undergraduate students make cybersecurity judgment? *Computers in Human Behavior*, *84*, 375–382.

Yeong, Y. C., Kalid, K. S., Savita, K. S., Ahmad, M. N., & Zaffar, M. (2022). Sustainable cryptocurrency adoption assessment among IT enthusiasts and cryptocurrency social communities. *Sustainable Energy Technologies and Assessments*, *52*, 102085.

Yin, T., & Paswan, A. K. (2007). Antecedents to consumer reference price orientation: An exploratory investigation. *Journal of Product & Brand Management*, *16*(4), 269–279.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Sangari, M. S., Mashatan, A. (2024). What is driving consumer resistance to crypto-payment? A multianalytical investigation. *Psychology & Marketing*, *41*, 575–591. https://doi.org/10.1002/mar.21935