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# A psychological approach to Bitcoin usage behavior in the era of COVID-19: Focusing on the role of attitudes toward money

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## ABSTRACT

During and after the COVID-19 pandemic, consumers are more likely to adapt and use Bitcoin for their daily transactions. Responding to this trend, this study examines the antecedents (i.e., perceived behavioral control, subjective norm, and financial self-efficacy) and consequence (i.e., behavioral intention to use Bitcoin) of general consumers' attitudes toward money (i.e., power-prestige, retention-time, distrust, quality, and anxiety) based on the theory of planned behavior. This study employed three waves of data collection from general consumers in the United States who were interested in Bitcoin. The findings revealed that perceived behavioral control had significant influences on power-prestige, retention-time, distrust, quality, and anxiety. The results also indicated that subjective norm had a significant impact on retention-time, distrust, and anxiety. The outcomes addressed that financial self-efficacy significantly affected power-prestige, retention-time, distrust, quality, and anxiety. Lastly, the results found that behavioral intention to use Bitcoin was significantly influenced by power-prestige, retention-time, and distrust. Based on the empirical findings, this research proposes theoretical and practical implications for the cryptocurrency context.

## 1. Introduction

Over the last half-century, payment methods have dramatically evolved from cash to digital tokens (i.e., from cash, paper checks, debit and credit cards, and mobile platforms such as Android Pay and Apple Pay, to cryptocurrency, such as Bitcoin). Consequently, a world of digital payments is already here so that many e-commerce and offline retailers are ready to adapt and facilitate digital payment systems. In addition, financial institutions have developed technologies and infrastructures to provide customers with secure digital transaction services. Compared to other payment systems, such as credit cards and mobile wallets, Bitcoin has been considered a highly expedited and secured process for digital transactions and interactions, creating an immutable database that is stored and managed by multiple independent networks to lower the likelihood of data breaches and hacking attacks (Kumar et al., 2020). As a result, users can possess and use their own Bitcoin in a thoroughly secure environment after the authentication process through complicated mathematical algorithms (Casey and Paul, 2018). Furthermore, from the perspective of the service providers, Bitcoin leads to improvements in efficiencies and effectiveness by reducing the time and procedures for a transaction as it enables them to secure the data and value transfer to customers (Kumar et al., 2020).

In addition to the technological benefits, consumers may prefer to use digital payment systems (i.e., untouchable) rather than traditional systems (i.e., touchable) during and after the COVID-19 pandemic in order to reduce the "physical touchpoint" (Mnif et al., 2020). While previous studies have been conducted to identify and explore the determinants of consumers' intention to use Bitcoin (Albayati et al., 2020; Arias-Oliva et al., 2019; Folkinshteyn and Lennon, 2016), they have focused primarily on the perceived technological aspects of Bitcoin based on the technology acceptance model (TAM), such as perceived usefulness, perceived ease of use, and perceived risk. However, a noticeable perception of cryptocurrency has developed among consumers, viewing Bitcoin not as a new technology any more, but as a new form of money (Albayati et al., 2020). Additionally, during and after the COVID-19 pandemic, consumers may need to immediately accept and use cryptocurrency as money for financial transactions at home to reduce physical interactions with others (Cheema et al., 2020). Therefore, consumers' intention to accept and use Bitcoin should be studied, focusing more on the psychological aspect of money rather than its perceived technological aspects.

The study of Yamauchi and Templer (1982) developed five dimensions of attitudes toward money based on individuals' psychological aspects of money (e.g., personality and motivation): Power Prestige,

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Retention Time, Distrust, Quality and Anxiety. The aspects of money attitudes have been employed to identify motivations and behaviors with money in psychology (Steinhart and Jiang, 2019) and consumer behavior (Ong et al., 2020). Although consumers already view Bitcoin as money, there is little empirical research that applies the money attitude concept to this context to investigate the relationship motivations and behaviors with Bitcoin among consumers. Furthermore, while some of prior studies emphasized the psychological aspect of Bitcoin among consumers based on the theory of planned behavior (TPB), they used a general attitude toward Bitcoin, rather than specific aspects of money attitudes, as a predictor of consumers' intention to use Bitcoin (Anser et al., 2020). According to the extant literature, the components of TPB, such as perceived behavioral control, subjective norm, self-efficacy, and attitudes, are interrelated and integrated to predict consumers' behavioral intention regarding expenditure (e.g., credit card use, Ayudya and Wibowo, 2018; online shopping, Londono et al., 2017; or monetary donation, Mittelman and Rojas-Méndez, 2018). Although prior research has used TPB as a powerful weapon for predicting consumers' expenditure-related behavior, the components of TPB tend to show a lower level of explanatory power when demonstrating why consumers use (or do not use) electronic money (i.e., Bitcoin in this study) (Trinugroho et al., 2017; Wulandari et al., 2016). One possible reason for the lower level of explanatory power is that the components of TPB are too general to embrace the monetary aspects of electronic money from a consumer's perspective (e.g., general self-efficacy for and general attitudes toward spending money). The approach of the current study to consumers' money attitudes enables scholars to predict consumers' behavioral intention from more specific aspects of the TPB components by extending the theory's boundaries to the less-cash society (or untact society) in the near future (Wulandari et al., 2016). In addition, if scholars and practitioners specifically recognize the psychological aspects of money attitudes among consumers, they will be able to formulate a new framework and marketing strategy for Bitcoin usage for their target consumers. The future of a new payment system, such as Bitcoin, lies in scholars' and practitioners' efforts to understand their consumers' attitudes toward money across services/products, platforms, situations, and devices (Kumar et al., 2020). Hence, it is essential to apply the money attitude concept to Bitcoin by examining the influence of its dimensions on consumers' intention to adapt and use it in order to understand the consumers' psychological framework that merits deeper exploration of this area.

This study is based on TPB as a fundamental framework of the research model because it focuses on the significant role of attitudes toward money in predicting consumers' intention to adapt and use Bitcoin. However, compared to the approach of prior research employing TPB, this study applies the five dimensions of money attitude developed by Yamauchi and Templer (1982) to the research model that expands the traditional model of TPB for the Bitcoin context in particular. Based on the empirical findings, this study provides meaningful implications for practitioners granting them particular capabilities and advantages for Bitcoin promotions during and after the COVID-19 pandemic. Also, the empirical findings of this study help scholars to formulate a new psychological framework of Bitcoin adaptation and usage among consumers beyond the technological aspects in the era of COVID-19. In other words, this study will provide a direction for future research in the new payment system of cryptocurrency.

## 2. Literature review

### 2.1. Theory of planned behavior (TPB)

In the study of consumer behavior, the theory of planned behavior (TPB) has been studied as the most influential psychological framework for understanding consumers' various decision-making processes (Ajzen, 2002). The assumption of TPB is that three kinds of considerations guide all types of human behavior: behavioral beliefs (i.e., beliefs

in a behavior's attributes or consequences, such as self-efficacy); normative beliefs (i.e., beliefs in other people's normative expectations); and control beliefs (i.e., beliefs in the presence of variables that hinder a behavior's performance) (Anser et al., 2020). More specifically, first, behavioral beliefs lead to an individual's unfavorable or favorable attitude toward a particular behavior. Second, normative beliefs produce an individual's perceived subjective norm or social pressure. Third, control beliefs result in an individual's perceived behavioral control that refers to the perceived difficulty or ease of taking a particular action (Ajzen, 2002).

The integration of self-efficacy, perceived behavioral control, subjective norm, and attitude toward a particular behavior results in the formation of an individual's behavioral intention, which in turn leads to actual behavior (Ajzen, 2002; Hamilton et al., 2020). However, this study proposes that TPB within the context of financial behavior may be influenced by external situations, such as the economic condition or the COVID-19 pandemic. This is because each individual's beliefs, judgments, and social influence may vary depending on final actual behavior (e.g., finance-related vs. health-related behavior) as well as internal and external actual control (e.g., internal situation vs. external situation) (Anser et al., 2020; Hamilton et al., 2020; Yoo et al., 2020). Thus, this study applies TPB to general consumers' finance-related behavior toward Bitcoin along with the ongoing situation of the COVID-19 pandemic by focusing on perceived behavioral control, subjective norm, and financial self-efficacy.

### 2.2. Perceived behavioral control

TPB is based on the notion that human behavior tends to be under volitional control, referring to how individuals deal with a particular situation through a behavior with perceived volitional control (Ajzen, 2002). Hence, perceived behavioral control is defined as individuals' confidence in their ability to correctly take an action in question (Ajzen, 2002). Simply, perceived behavioral control refers to consumers' perception of a level of difficulty or ease in taking a certain action (Fishbein and Ajzen, 2010). This means that perceived behavior control could be shaping a particular behavior in order to improve skills and overcome environmental constraints (Martinez and Lewis, 2016). According to Fishbein and Ajzen (2010), individuals tend to possess stronger behavioral intentions: (1) when there is a lack of the presence of environmental barriers; and (2) when the behavior requires lower levels of essential skills. Therefore, in order to fully explain consumers' particular behavior (Bitcoin adaption and usage behavior in this study), facilitators, skills, environmental barriers, and abilities should be considered at the same time (Martinez and Lewis, 2016). This is because Bitcoin is a relatively new payment system compared to others, and consumers who are interested in Bitcoin should possess high levels of perceived controls in external environmental conditions (e.g., availability of technologies or resources necessary for using Bitcoin for their daily transactions) and internal conditions (e.g., knowledge, experiences, and ability) (Hau and Kang, 2016). Based on that notion, this study proposes that general consumers' perceived behavioral control, such as skills, environmental factors, and abilities, serves as an important role in predicting their behavioral intention to use Bitcoin for daily transactions.

### 2.3. Subjective norm

The definition of subjective norm is a person's perception that people around a person consider that a particular action should or should not be taken (Ajzen, 2002). According to the assumption of TPB, subjective norm is formed by two components, subjective descriptive norm (i.e., a behavior that is addressed by an essential referent in a particular social or cultural environment) and subjective injunctive norm (i.e., a behavior that is commonly disapproved or approved) (Wang et al., 2016). The two components imply that individuals tend to comply with significant

others' expectations and behaviors regarding whether their behaviors are socially, culturally, and/or psychologically approved or disapproved (Blok et al., 2015). Therefore, other people's expectations and behaviors could serve as a motivational factor of an individual's behavior, such as a socially influential factor (i.e., subjective norm in this study) (Blok et al., 2015). In other words, when other people's expectations and perceptions about an individual's behavior are strong, the individual is more likely to engage in a particular behavior based on those expectations and perceptions (Wang et al., 2016). This assumption can be applied to Bitcoin adaptation and usage behavior. If a consumer realizes that others (e.g., family members, friends, neighborhoods, and even celebrities and experts) think that the consumer should adapt and use Bitcoin for daily transactions, or if others adapt and use Bitcoin for their daily transactions, the consumer is more likely to perceive social pressures and intend to use Bitcoin.

#### 2.4. Financial self-efficacy

One of the critical components in TPB, self-efficacy is defined as individuals' beliefs in their abilities to succeed in a particular task (Bandura, 1997). As a confidence level of perceived ability to accomplish a certain task, self-efficacy leads individuals to accept a difficult task or challenge to produce a desired outcome (Bandura, 1997). Hence, self-efficacy is also defined as individuals' optimistic beliefs in their abilities to succeed in a certain task. This belief leads consumers to attempt, persist, and succeed at particular tasks and activities by formulating a strong sense of self-efficacy (Lown, 2011). The concept of self-efficacy could be applied to the context of financial behaviors, such as Bitcoin adaptation and usage for daily transactions.

Kinard and Webster (2010) found that the significance of self-efficacy was weaker when using a concept of general self-efficacy rather than a context-specific concept, such as financial self-efficacy in the finance-related behavior context. In addition, the study of Engelberg (2007) suggested that economic self-efficacy, referring to consumers' beliefs in coping with a rapidly changing economy, significantly relates to money attitudes. Hence, consumers with a high level of financial self-efficacy are more likely to attempt to accomplish financial difficulties by perceiving them as challenges rather than as threats to success (Farrell et al., 2016). Because the concept of financial self-efficacy is based on the econometric applicability of financial behavior, the financial self-efficacy construct leads consumers to accomplish financial challenges and produce favorable financial outcomes during and after the COVID-19 pandemic (Farrell et al., 2016).

#### 2.5. Money attitudes

In society, money has become a tangible signal that represents personal achievement, recognition, power, and respect among individuals (Khare, 2014; McClelland and Winters, 1971). Also, money results in individuals' psychological states of superiority and security (Adler, 1964). Based on the general perceptions and attitudes toward money among individuals as well as prior empirical research, Yamauchi and Templer (1982) developed a scale for measuring money attitudes by considering love, power, freedom, security, and feeling defensive and anxious (Goldberg and Lewis, 1978; Khare, 2014). For example, their study proposed "retention-time" as one of the subdimensions of money attitudes based on irrational money attitudes in the study of Goldberg and Lewis (1978, p. 100) (e.g., "you automatically say, 'I can't afford it,' whether you can or not").

The subdimensions of money attitude developed by Yamauchi and Templer (1982) are power-prestige (i.e., acquisition, importance, superiority, and security), retention (i.e., obsessive personality traits, hoarding, and parsimony), security (i.e., dissatisfaction, pessimism, and reverse), and concern (i.e., comfort, confidence, and optimism). The subdimensions were conceptually and empirically evaluated for specific assessment of consumers' attitudes toward money, such as

power-prestige, retention-time, distrust, quality, and anxiety, to predict their money-related behaviors (Hayhoe et al., 2012). More specifically, power-prestige addresses individuals' attitudes for indicating the importance of acquisition, competition, status seeking, and external recognition through money. Retention-time indicates individuals' attitudes for embracing preparedness behavior or clear planning via money. Distrust demonstrates individuals' cautious attitudes toward money in terms of their financial practice. Quality refers to individuals' tendency to spend money and value of higher quality when paying for a product/service. Anxiety is based on the amount of individuals' perceived anxiety related to financial or monetary situations (Ng et al., 2011; Yamauchi and Templer, 1982). In particular, the approach of Yamauchi and Templer (1982) is of interest to the current research context (i.e., Bitcoin as a new format of money) since it is based on specific attitudes for current spending and future acquisition of money under the nature of the financial situations (Ng et al., 2011).

#### 2.6. Behavioral intention

Behavioral intention refers to an antecedent of individuals' planned or anticipated behaviors (Fishbein and Ajzen, 2010). Also, behavioral intention has been operationalized as a possibility for taking an action among consumers and their expectancies about the action in a particular situation (Ajzen, 2002). Thus, in TPB, behavioral intention to behave in a particular way has been considered as an immediate driver of an actual behavior (Fishbein and Ajzen, 2010). Therefore, this study defines behavioral intention as general consumers' anticipation of adapting and using Bitcoin for their daily transactions during and after the COVID-19 pandemic.

#### 2.7. Research hypotheses development

As an accessible control belief, perceived behavioral control serves as a facilitation or impediment of performance of individuals' particular behavior (Ajzen, 2020). Hence, required abilities and skills for the behavior should be included as control factors, including money, time, and tangible and intangible resources. Perceived behavioral control refers to consumers' subjective probability of inhibiting or facilitating their evaluations of a control factor (i.e., money in this study) in a situation (Ajzen, 2020). In addition, perceived behavioral control is based on consumers' perceptions of price, technology, and knowledge to adapt and use a new payment system (i.e., Bitcoin in this study) and the ability to evaluate it (Wang et al., 2016). If consumers perceive that they can control the factors related to the particular situation, they are more likely to evaluate a product/service more positively (Wang et al., 2016). More specifically, when perceiving that using Bitcoin would be entirely within their control for financial transactions, consumers are more likely to use Bitcoin as a symbol of success to influence and impress others by getting the best (power-prestige and quality), to closely monitor their financial status by planning their financial future (retention-time), to become more suspicious in terms of any money-related situation by making the most efficient purchase decision (distrust), and to use Bitcoin as a source of protection from money-related anxiety (anxiety) (Durvasula and Lysonski, 2010). Therefore, this study proposes the following hypotheses:

**H1.** Perceived behavioral control is positively associated with power-prestige (H1-1), retention-time (H1-2), distrust (H1-3), quality (H1-4), and anxiety (H1-5).

In TPB, subjective norm is speculated to influence individuals' opinions about a particular attitude toward a behavior in question (Ajzen, 2002). In other words, a consumer's subjective norm tends to be formed by a perception of what others who are considered important think about the consumer's attitudes and behaviors (Safa and Von Solms, 2016). Hence, as a social pressure factor, subjective norm leads consumers to formulate positive or negative evaluations of something in

order to meet others' expectations and behaviors (Hamilton et al., 2020). This social pressure may come from family members, friends, neighborhoods, and even other consumers, who perceive Bitcoin as an efficient and effective format of money that enables consumers to evaluate money positively or negatively. Hence, when perceiving that others consider Bitcoin as an efficient and effective form of financial transactions, consumers are more likely to emphasize Bitcoin as a monetary symbol of success and more positively evaluate its value by viewing it as a symbol of personal achievement (power-prestige and quality), to promote money management for the future (retention-time), and to become more secure with their financial decisions to protect themselves from a lack of money-related confidence (distrust and anxiety) (Nga and Yeoh, 2015). Accordingly, this study establishes the following hypotheses:

**H2.** Subjective norm is positively associated with power-prestige (H2-1), retention-time (H2-2), distrust (H2-3), quality (H2-4), and anxiety (H2-5).

Financial self-efficacy refers to perceived control over individuals' spending or financial behavior (i.e., Bitcoin usage in this study), which in turn leads to a better financial outcome (Farrell et al., 2016). As a new type of monetary product, Bitcoin is perceived by consumers as an enhancement to their financial outcomes during and after the COVID-19 pandemic, having greater capacities to manage their financial status and financial plans for the future (Conlon and McGee, 2020). This is because financial self-efficacy refers to consumers' feelings of being able to deal effectively with an unstable economic condition such as during and after the COVID-19 pandemic (Lim et al., 2014). Accordingly, consumers with a high level of financial self-efficacy are more likely to attempt to acquire investments in insurance, savings, and property (i.e., Bitcoin in this study) (Farrell et al., 2016). For example, because consumers perceive that adapting and using Bitcoin would offer financial outcomes under their control, this high level of perceived financial self-efficacy leads them to use Bitcoin more for their daily transactions as a symbol of success and power as well as to pay for quality, carefully spend money with a sense of security and control, and reduce money-related anxiety distress and distrust particularly during and after the COVID-19 pandemic (Engelberg, 2007). Based on the above notion, this study proposes that financial self-efficacy leads consumers to engage more in monetary products, perceptions, and attitudes:

**H3.** Financial self-efficacy is positively associated with power-prestige (H3-1), retention-time (H3-2), distrust (H3-3), quality (H3-4), and anxiety (H3-5).

Money brings a special meaning of power to many people as it can be used to buy control, domination, and social status, as well as to purchase food, housing, cars, and cloth (Goldberg and Lewis, 1978). Hence, consumers have displayed their social power by spending money for high-quality products and services (Roberts and Jones, 2001). In other words, consumers possess and display tangible and intangible materials to attempt to signal their social power (Furnham, 2019). This study assumes that consumers use Bitcoin as a new format of money, making them perceive Bitcoin as a means of comparison and as a solution to problems (Stroukal, 2018). Accordingly, to reflect social status and power, consumers may be more likely to adapt and use Bitcoin (Stroukal, 2018). Consumers could attempt to feel socially powerful and increase their ability to match their perceptions of socially required (or desirable) appearances via the acquisition of Bitcoin (Maurer et al., 2013).

Since the COVID-19 pandemic has negatively influenced the global economic condition, there is a lack of faith among consumers in their capabilities to make effective and efficient purchase decisions. Hence, the distrust dimension compels consumers to continue comparing the values of Bitcoin as well as the prices of each product (Sharif and Yeoh, 2018). Accordingly, consumers are more likely to be sensitive to prices paid for products/services during and after the COVID-19 pandemic

(Conlon and McGee, 2020). Thus, consumers have become more price conscious and may perceive Bitcoin as "gold price returns" to prepare for future financial transactions (Jareño et al., 2020). This is because individuals tend to invest more in higher-return items regardless of the level of risk during unstable economic conditions (Conlon and McGee, 2020; Jareño et al., 2020). Furthermore, individuals are more likely to perceive and use Bitcoin as a source of protection from feelings of anxiety during the COVID-19 pandemic (Jareño et al., 2020). In other words, consumers may adapt and use Bitcoin to protect themselves from a level of anxiety during stressful periods, such as the unstable economic conditions and the COVID-19 pandemic in particular. This means that consumers' desire to escape from money-related anxiety serves as the main motivation of their intention to use Bitcoin (Sharif and Yeoh, 2018). The above notions propose the significant association between money attitudes and behavioral intention to use Bitcoin. Thus, the following hypotheses are established:

**H4.** Behavioral intention to use Bitcoin is positively influenced by power-prestige (H4-1), retention-time (H4-2), distrust (H4-3), quality (H4-4), and anxiety (H4-5).

TPB proposes perceived behavioral control, subjective norm, and attitudes as conceptually independent antecedents of behavioral intention (Ajzen, 2002; De Cannièrè, De Pelsmacker and Geuens, 2009). The conceptual framework of TPB speculates that behavioral intention is the immediate driver of actual behavior and attitudes serve as a full mediator between behavioral control/subjective norm and behavioral intention (Ajzen, 2002; De Cannièrè, De Pelsmacker and Geuens, 2009). In other words, the degree to which consumers have an unfavorable or favorable appraisal or evaluation of money in question is influenced by the perceived social pressure of using money (i.e., subjective norm) and by the perceived difficulty or ease of using money, which make consumers display a stronger behavioral intention to use money (i.e., Bitcoin in this study) (De Cannièrè et al., 2019). As the overall evaluation of orientation of an object or performance of a behavior (emphasizing specific monetary format, Bitcoin in this study), attitudes toward money (i.e., power-prestige, retention-time, distrust, quality, and anxiety) are formed by the way consumers apply their general perceptions of money, such as perceived behavioral control, subjective norm, and financial self-efficacy according to the fundamental notion of TPB (Ajzen and Fishbein, 2005). Accordingly, this study proposes that consumers' finance-related behavior is the manifestation of consumers' general perceptions of money and is influenced by money attitudes. Thus, the following hypothesis is formulated (see Fig. 1):

**H5.** Money attitudes mediate the relationship between perceived behavioral control/subjective norm/financial self-efficacy and behavioral intention to use Bitcoin.

### 3. Method

#### 3.1. Data collection

In this study, the unit of analysis was general consumers in the United States who are interested in Bitcoin. During the COVID-19 pandemic, three waves of data collection were conducted to avoid potential bias regarding sample selection and to increase the generalizability of the empirical findings. More specifically, survey-based research in consumer behavior has been criticized because it is based on a cross-sectional study design via one wave of data collection. This approach may not enable survey-based research to appropriately examine the dynamic and complex circumstances of a current market since one-time data collection reflects the current market situation's limited aspects (Davis et al., 2011). Accordingly, the use of three waves of data collection from target consumers can help researchers in consumer behavior to reduce potential method and sampling biases and to produce more robust findings that reflect the dynamic and complex

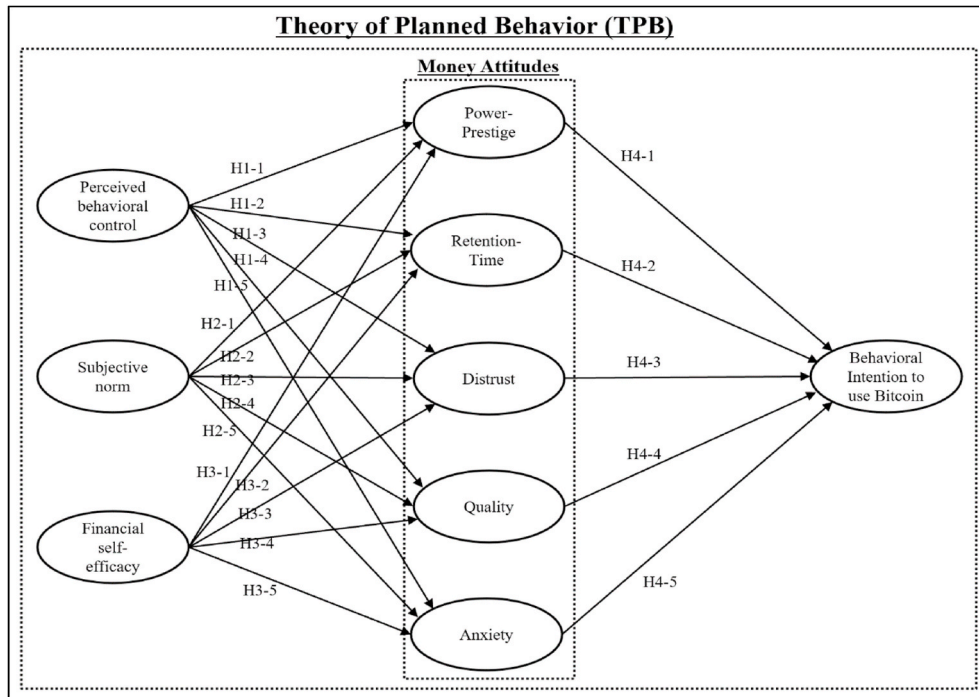


Fig. 1. A research model.

situations of a current market (Stewart, 2009).

As a snowball sampling approach, the author conducted the first wave of data collection during the month of May 2020 by reaching out to 10 online Bitcoin community members and asking them to send the survey link to other members in the community. For the second wave of data collection, during the month of June 2020, a random sampling approach was used by sharing the survey link on Amazon’s Mechanical Turk. The third wave of data collection was conducted during the month of July 2020 by a marketing research company that collects data from its online panels. The first page of the questionnaire had a screening question to make sure that the participants were interested in Bitcoin: “Please indicate whether you plan to use Bitcoin for any current or future transactions.” The participants were then able to move forward to the next page of the survey where they had to click the “Yes” button.

As a result of the three waves of data collection, 395 samples were used for structural equation modeling along with reliability analysis, correlation analysis, and confirmatory factor analysis to test the hypothesized association among variables in this study. The author checked whether the sample size was acceptable for data analyses via “A-priori Sample Size Calculator for Structural Equation Models” developed by Dr. Daniel Soper (n.d.). Using the software, the author set the desired statistical power level at 0.80 (should be greater than or equal to 0.80), anticipated effect size at 0.3 (considered as medium), number of observed variables at 49, number of latent variables at 9, and probability level at 0.50 (Fritz and MacKinnon, 2007; Sagan, 2019). The results indicated that the minimum sample size to detect effect was 184, minimum sample size for model structure was 133, and recommended minimum sample size was 184. By considering model-specifications, such as desired statistical power, anticipated effect size, number of observed variables, number of latent variables, and probability level, this software helps researchers decrease the risk of Type I and II errors compared to traditional rules-of-thumb (e.g., a minimum sample size of 200 or 10 samples per latent variable) (Wolf et al., 2013).

Lastly, before conducting further empirical analyses, this study conducted a one-way analysis of variance (ANOVA) by comparing all mean values of 20% of responses among randomly selected participants from three waves of data collection, respectively (i.e., from snowball samples vs. random samples vs. online panel samples) to make sure that

the data collection approach influences the main empirical findings. The results of the ANOVA revealed no significant differences among the snowball sample, random sample, and online panel sample groups. Consequently, the author decided to proceed with further empirical analyses based on the results of the ANOVA, signifying no serious sampling bias among the variables (Goodman and Blum, 1996). Table 1 indicates the demographic characteristics of the participants.

3.2. Measures

Multiple items from previous studies were adapted and revised by the author for this research’s particular context, Bitcoin. The author selected the measures based on how well they were conceptually

Table 1 Demographic analysis of participants.

Variables (N = 395)	Characteristics	Frequency (%)
Gender	Male	202 (51.1%)
	Female	193 (48.9%)
Age	18–29	45 (11.4%)
	30–39	111 (28.1%)
	40–49	92 (23.3%)
	50 or above	147 (37.2%)
	2-year or 4-year college	274 (69.4%)
Education	High school	75 (19.0%)
	Graduate school	46 (11.6%)
Monthly household income	Less than \$2,000	28 (7.1%)
	\$2,000 - \$2,999	45 (11.4%)
	\$3,000 - \$4,999	163 (41.3%)
	\$5,000 - \$6,999	102 (25.8%)
	Over \$7,000	57 (14.4%)
Marriage	Single	102 (25.8%)
	Married	293 (74.2%)
Occupation	Sales	11 (2.8%)
	Office	193 (48.9%)
	Self-employed	33 (8.4%)
	Housewife	74 (18.7%)
	Professional	39 (9.9%)
	Public official	10 (2.5%)
	Student	18 (4.6%)
	Etc.	17 (4.3%)

developed and how rigorously they were empirically tested and validated in prior research. Three professionals in the Bitcoin industry and consumer behavior fields reviewed the revised items before the questionnaire was finalized. Thirty general consumers who were interested in Bitcoin were then invited to participate in a pilot study for minor changes in the flow and content of the questionnaire. To control common method bias, lastly, the survey items were randomly ordered in the finalized questionnaire as a procedural remedy (Podsakoff et al., 2012). This approach enabled participants to reduce perceived similarity and redundancy of the survey items, which reduces common method bias while responding to the items. All items for measuring each construct were measured on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). Table 2 indicates where each item was from and how each construct was operationalized in this study.

## 4. Result

### 4.1. Measurement model

The two-step approach suggested by Anderson and Gerbing (1992) was performed to test all indicators' reliability and validity before investigating the hypothesized associations among the research model's variables via structural equation modeling. As the first step, all constructs' reliabilities were checked by Cronbach's alpha coefficients through SPSS 27.0. According to Hair et al. (2010), in the social science field, the coefficient must be more than 0.70 for confirming reliability of each construct. As indicated in Table 2, the coefficients of all constructs exceeded the minimum value (i.e., perceived behavioral control = 0.940; subjective norm = 0.831; financial self-efficacy = 0.938; power-prestige = 0.949; retention-time = 0.940; distrust = 0.929; quality = 0.796; anxiety = 0.878; and behavioral intention to use Bitcoin = 0.937).

As the second step, all constructs' validities were tested by confirmatory factor analysis (CFA) that specified pattern, number, association, and meaning of free parameters. During this stage, five items were removed due to a lower acceptable level of convergent validity (less than 0.50) (Hair et al., 2010). As a result of the data purification procedure, the fit indices of the measurement model were signified:  $\chi^2 = 3,491.713$ , degree of freedom = 866,  $p < 0.001$ , Root Mean Square Error of Approximation (RMSEA) = 0.088, Normed Fit Index (NFI) = 0.910, Comparative Fit Index (CFI) = 0.949, and Tucker-Lewis Index (TLI) = 0.935. In addition, the standardized factor loadings of all indicators were more than 0.50, their critical ratios were all statistically significant ( $p < 0.001$ ) (see Table 2), and their composite construct reliability (CCR) was over 0.80 (Fornell and Larcker, 1981), satisfying convergent validity (see Table 3).

Based on the outputs of CFA, the author assessed the proportion of average variance extracted (AVE) for each construct and performed a correlation analysis to compare the AVE values with the squared correlation coefficients to test discriminant validity (Fornell and Larcker, 1981; Hair et al., 2010). Table 3 indicates the results of comparisons, signifying discriminant validity of all constructs (e.g., perceived behavioral control [AVE = 0.841]:  $0.020 \leq \Phi^2 \leq 0.523$ ; financial self-efficacy [AVE = 0.722]:  $0.120 \leq \Phi^2 \leq 0.545$ ).

Lastly, the author conducted Harman's one-factor test as a statistical remedy suggested by Podsakoff et al. (2012) to check whether the procedural remedy worked to control common method bias. The  $\chi^2$  values and degree of freedom of the measurement model were 3,491.713 and 866, respectively, while those of the one-factor model were 10,126.351 and 902, respectively. Because the empirical findings revealed that  $\chi^2$  values and degree of freedom of the measurement model were significantly better than those of the one-factor model, it was concluded that the procedural remedy successfully controlled the possibility of common method bias in this study.

### 4.2. Testing of the hypothesized structural model

Structural equation modeling was conducted with AMOS 27.0 to empirically examine the hypothesized associations among variables in this research. Fig. 2 illustrates maximum likelihood estimates for each parameter of the associations in the proposed research model. The fit indices of the research model were acceptable to interpret the empirical findings (i.e.,  $\chi^2 = 3,507.064$ , degree of freedom = 868,  $p < 0.001$ , RMSEA = 0.088, NFI = 0.908, CFI = 0.948, TLI = 0.935) (Hair et al., 2010).

First, the empirical findings revealed that perceived behavioral control had significant influence on power-prestige (coefficient = 0.431, critical ratio = 9.678,  $p < 0.01$ ), retention-time (coefficient = 0.249, critical ratio = 4.002,  $p < 0.01$ ), distrust (coefficient = 0.249, critical ratio = 3.806,  $p < 0.01$ ), quality (coefficient = 0.327, critical ratio = 4.577,  $p < 0.01$ ), and anxiety (coefficient = 0.384, critical ratio = 7.153,  $p < 0.01$ ), supporting H1-1, H1-2, H1-3, H1-4, and H1-5. Second, the empirical results indicated that subjective norm had significant impact on retention-time (coefficient = 0.211, critical ratio = 4.470,  $p < 0.01$ ), distrust (coefficient = 0.201, critical ratio = 4.044,  $p < 0.01$ ), and anxiety (coefficient = 0.083, critical ratio = 2.209,  $p < 0.05$ ), whereas the impact on power-prestige (coefficient = 0.003, critical ratio = 0.095,  $p > 0.05$ ) and quality (coefficient = -0.060, critical ratio = -1.173,  $p > 0.05$ ) was not significant, supporting H2-2, H2-3, and H2-5 only. Third, the empirical outcomes addressed that financial self-efficacy significantly affected power-prestige (coefficient = 0.499, critical ratio = 10.669,  $p < 0.01$ ), retention-time (coefficient = 0.264, critical ratio = 4.245,  $p < 0.01$ ), distrust (coefficient = 0.191, critical ratio = 2.938,  $p < 0.01$ ), quality (coefficient = 0.194, critical ratio = 2.789,  $p < 0.01$ ), and anxiety (coefficient = 0.474, critical ratio = 8.411,  $p < 0.01$ ), supporting H3-1, H3-2, H3-3, H3-4, and H3-5. Lastly, the empirical results found that behavioral intention to use Bitcoin was significantly influenced by power-prestige (coefficient = 0.315, critical ratio = 3.510,  $p < 0.01$ ), retention-time (coefficient = 0.347, critical ratio = 5.880,  $p < 0.01$ ), and distrust (coefficient = 0.132, critical ratio = 2.290,  $p < 0.05$ ), while it was not significantly impacted by quality (coefficient = 0.046, critical ratio = 0.897,  $p > 0.05$ ) and anxiety (coefficient = -0.105, critical ratio = -0.987,  $p > 0.05$ ), supporting H4-1, H4-2, and H4-3 only (see Table 4).

To estimate the indirect impact of perceived behavioral control, subjective norm, and financial self-efficacy on behavioral intention to use Bitcoin through money attitudes, the author employed the Monte Carlo and bias-corrected bootstrapping methods suggested by Preacher and Hayes (2008) and Tofighi and MacKinnon (2016). This mixed approach enables scholars to examine the significant roles of more than two mediators in the relationship between independent variables and dependent variables. Table 4 demonstrates that perceived behavioral control (indirect effect: 0.230,  $p < 0.01$ ; 95% bootstrap confidence interval [CI] = 0.166lower level [LL], 0.303upper level [UL]), subjective norm (indirect effect: 0.089,  $p < 0.01$ ; 95% bootstrap CI = 0.024LL, 0.141UL), and financial self-efficacy (indirect effect: 0.233,  $p < 0.01$ ; 95% bootstrap CI = 0.157LL, 0.298UL) had a significant indirect influence on behavioral intention to use Bitcoin through money attitudes, partially supporting H5.

## 5. Discussion and conclusion

### 5.1. Theoretical implications

Based on a psychological framework of TPB, this study emphasized the roles of general consumers' attitudes toward money in predicting behavioral intention to use Bitcoin for daily transactions. From a theoretical perspective, first, this study attempts to expand the TPB model by considering various aspects of money attitudes in the context of Bitcoin instead of focusing on the technological aspects of Bitcoin, such as perceived usefulness, perceived ease of use, and perceived risk

**Table 2**  
Measurement model from CFA.

Constructs	Items	Factor Loading	Standardized Error	Critical Ratio
Perceived behavioral control ( $\alpha = 0.940$ ) from Walton and Johnston (2018)	I think that I would be able to use Bitcoin well for financial transactions during and/or after the COVID-19 pandemic.	0.898	Fixed	Fixed
	I think that using Bitcoin would be entirely within my control during and/or after the COVID-19 pandemic.	0.962	0.033	32.272
	I think that I have the resources, knowledge, and ability to use Bitcoin during and/or after the COVID-19 pandemic.	0.890	0.036	27.074
Subjective norm ( $\alpha = 0.831$ ) from Walton and Johnston (2018)	People whose opinions are valued to me would think that I should use Bitcoin.	0.722	Fixed	Fixed
	People who influenced me would think that I should use Bitcoin.	0.986	0.113	11.298
Financial self-efficacy ( $\alpha = 0.938$ ) from Low (2011)	It is not hard to stick to my spending plan when unexpected expenses arise during the COVID-19 pandemic.	0.838	Fixed	Fixed
	It is not challenging to make progress toward my financial goals during the COVID-19 pandemic.	0.875	0.046	22.433
	When unexpected expenses occur, I tend not to use credit during the COVID-19 pandemic.	0.907	0.044	23.925
	When faced with a financial challenge during the COVID-19 pandemic, I do not have a hard time figuring out a solution.	0.873	0.046	22.371
	I have confidence in my ability to manage my finances during the COVID-19 pandemic.	0.874	0.046	22.396
	I am not worried about running out of money in retirement.	0.717	0.051	16.458
	I use money to influence other people to do things for me.	0.850	Fixed	Fixed
Power-Prestige ( $\alpha = 0.949$ ) from Yamauchi and Templer (1982)	I must admit that I purchase things because I know they will impress others.	–	–	–
	In all honesty, I own nice things in order to impress others.	0.881	0.041	23.682
	I behave as if money were the ultimate symbol of success.	0.903	0.041	24.848
	I must admit that I sometimes boast about how much money I make.	0.843	0.042	21.844
	People I know tell me that I place too much emphasis on the amount of money a person has as a sign of his success.	0.900	0.041	24.697
	I seem to find that I show more respect to people with money than I have.	0.894	0.042	24.402
	Although I should judge the success of people by their deeds, I am more influenced by the amount of money they have.	0.854	0.043	22.371
	I often try to find out if other people make more money than I do.	0.575	0.048	12.549
Retention-Time ( $\alpha = 0.940$ ) from Yamauchi and Templer (1982)	I do financial planning for the future.	0.863	Fixed	Fixed
	I put money aside on a regular basis for the future.	0.920	0.037	26.332
	I save now to prepare for my old age.	0.900	0.037	25.177
	I keep track of my money.	0.858	0.037	22.931
	I follow a careful financial budget.	0.785	0.043	19.577
	I am very prudent with money.	–	–	–
	I have money available in the event of another economic depression.	0.782	0.045	19.455
Constructs	Items	Factor Loading	Standardized Error	Critical Ratio
Distrust ( $\alpha = 0.929$ ) from Yamauchi and Templer (1982)	I argue or complain about the cost of things I buy.	0.758	Fixed	Fixed
	It bothers me when I discover I could have gotten something for less elsewhere.	–	–	–
	After buying something, I wonder if I could have gotten the same for less elsewhere.	0.773	0.062	16.083
	I automatically say, "I can't afford it," whether I can or not.	0.867	0.063	18.425
	When I buy something, I complain about the price I paid.	0.824	0.069	17.334
	I hesitate to spend money, even on necessities.	0.873	0.066	18.580
	When I make a major purchase, I have the suspicion that I have been taken advantage of.	0.872	0.065	18.559
Quality ( $\alpha = 0.796$ ) from Yamauchi and Templer (1982)	I buy top-of-the-line products.	0.684	Fixed	Fixed
	I spend more to get the very best.	0.843	0.097	13.633
	I pay more for something because I know I have to in order to get the best.	0.791	0.096	13.230
	I buy the most expensive items available.	–	–	–
Anxiety ( $\alpha = 0.878$ ) from Yamauchi and Templer (1982)	I buy name brand products.	0.526	0.093	9.300
	It's hard for me to pass up a bargain.	–	–	–
	I am bothered when I have to pass up a sale.	0.731	Fixed	Fixed
	I spend money to make myself feel better.	0.803	0.070	15.807
	I show signs of nervousness when I don't have enough money.	0.847	0.069	16.699
	I show worrisome behavior when it comes to money.	0.830	0.068	16.366
Behavioral intention to use Bitcoin ( $\alpha = 0.937$ ) from Abramova and Böhme (2016)	I worry that I will not be financially secure.	0.635	0.072	12.360
	I am willing to use Bitcoin to buy physical goods, such as electronics, household appliances, clothes during and/or after the COVID-19 pandemic.	0.852	Fixed	Fixed
	I am willing to use Bitcoin to buy computer software, other digital goods or pay for hosting or cloud computing services during and/or after the COVID-19 pandemic.	0.912	0.045	25.103
	I am willing to use Bitcoin to make cross-border money transfers during and/or after the COVID-19 pandemic.	0.943	0.046	26.710
	I am willing to use Bitcoin to make donations, buy gift cards or give away as presents during and/or after the COVID-19 pandemic.	0.855	0.053	22.257

$\chi^2 = 3,491.713$ , degree of freedom = 866,  $p < 0.001$ , RMSEA = 0.088, NFI = 0.910, CFI = 0.949, TLI = 0.935.

All items were measured on "a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree)."

$\chi^2 = 3,491.713$ , degree of freedom = 866,  $p < 0.001$ , RMSEA = 0.088, NFI = 0.910, CFI = 0.949, TLI = 0.935.

All items were measured on "a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree)."



**Table 3**  
Construct intercorrelations ( $\Phi$ ), mean, and standard deviation (SD).

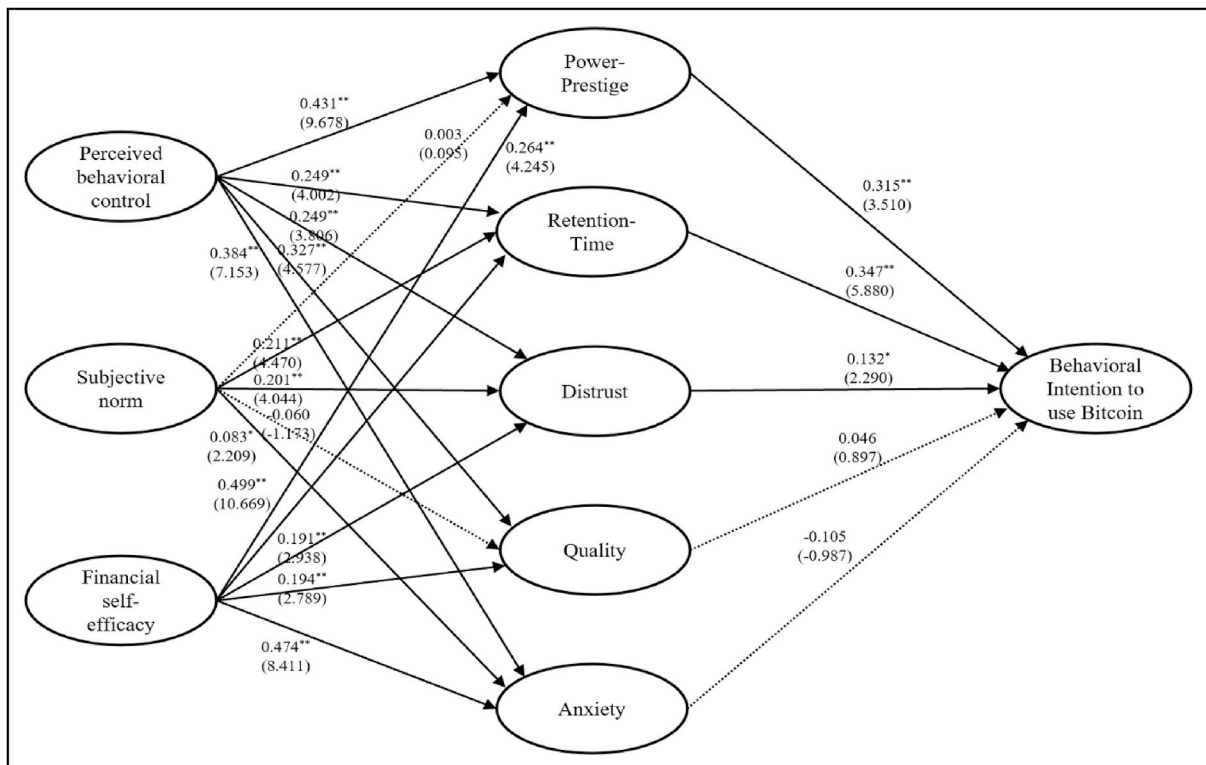
Construct	1	2	3	4	5	6	7	8	9
1. Perceived behavioral control	1								
2. Subjective norm	0.142**	1							
3. Financial self-efficacy	0.614**	0.155**	1						
4. Power-Prestige	0.723**	0.128*	0.738**	1					
5. Retention-Time	0.412**	0.288**	0.426**	0.419**	1				
6. Distrust	0.368**	0.221**	0.352**	0.441**	0.679**	1			
7. Quality	0.390**	0.058	0.347**	0.365**	0.268**	0.260**	1		
8. Anxiety	0.659**	0.198**	0.674**	0.694**	0.467**	0.448**	0.474**	1	
9. Behavioral intention to use Bitcoin	0.363**	0.482**	0.454**	0.445**	0.607**	0.548**	0.200**	0.422**	1
Mean	4.376	4.753	4.125	4.089	4.231	4.335	4.089	4.291	4.258
SD	1.306	1.154	1.241	1.307	1.122	1.102	1.076	0.105	1.141
CCR <sup>a</sup>	0.941	0.852	0.939	0.951	0.941	0.929	0.808	0.880	0.939
AVE <sup>b</sup>	0.841	0.747	0.722	0.712	0.728	0.688	0.520	0.598	0.794

\*\* $p < 0.01$ .

\* $p < 0.05$ .

<sup>a</sup> Composite construct reliability.

<sup>b</sup> Average variance extracted.



Note. \*\* $p < 0.01$ , \* $p < 0.05$ , standardized coefficient (critical ratio), solid line: significant path, dotted line: insignificant path

**Fig. 2.** Estimates of structural equation modeling.

Note. \*\* $p < 0.01$ , \* $p < 0.05$ , standardized coefficient (critical ratio), solid line: significant path, dotted line: insignificant path.

(Arias-Oliva et al., 2019). This research suggests that general consumers are more likely to perceive Bitcoin as money rather than a new technology during and after the COVID-19 pandemic through using it to reduce physical interaction (Mnif et al., 2020). In other words, the assumption of this study's approach is that money attitudes can be a significant predictor of general consumers' behavioral intention to use Bitcoin from a psychological perspective. More specifically, based on the fundamental framework of TPB, this research proposed five dimensions of money attitudes, including power-prestige, retention-time, distrust, quality, and anxiety, and found their different impact on behavioral intention to use Bitcoin. However, prior research in the Bitcoin context emphasized consumers' general attitudes toward Bitcoin (Anser et al., 2020), considering Bitcoin as one of the objects. In addition, prior

research employing TPB revealed a lower level of explanatory power when predicting consumers' behavioral intention to use (or not to use) electronic money (Trinugroho et al., 2017; Wulandari et al., 2016). This approach neglects the monetary characteristics of Bitcoin, which are different from those of general objects and/or even a new technology. For example, prior research's approach to Bitcoin is based on how to "get" or "accept" the object (i.e., Bitcoin); however, this study proposes that attitude toward Bitcoin should be based on how to "spend" and "use" it as money for daily transactions. The proposition of our study was supported by the empirical results that found the distinct influence of five dimensions of money attitudes on behavioral intention to use Bitcoin among general consumers. Our research suggests a different angle of TPB in the Bitcoin context to understand Bitcoin as money

**Table 4**  
Standardized structural estimates.

Path	Standardized estimates	Standardized error	Critical ratio
H1- 1 Perceived behavioral control → Power-Prestige	0.431	0.049	9.678**
H1- 2 Perceived behavioral control → Retention-Time	0.249	0.059	4.002**
H1- 3 Perceived behavioral control → Distrust	0.249	0.049	3.806**
H1- 4 Perceived behavioral control → Quality	0.327	0.050	4.577**
H1- 5 Perceived behavioral control → Anxiety	0.384	0.042	7.153**
H2- 1 Subjective norm → Power-Prestige	0.003	0.045	0.095
H2- 2 Subjective norm → Retention-Time	0.211	0.060	4.470**
H2- 3 Subjective norm → Distrust	0.201	0.050	4.044**
H2- 4 Subjective norm → Quality	-0.060	0.048	-1.173
H2- 5 Subjective norm → Anxiety	0.083	0.038	2.209*
H3- 1 Financial self-efficacy → Power-Prestige	0.499	0.053	10.669**
H3- 2 Financial self-efficacy → Retention-Time	0.264	0.061	4.245**
H3- 3 Financial self-efficacy → Distrust	0.191	0.051	2.938**
H3- 4 Financial self-efficacy → Quality	0.194	0.050	2.789**
H3- 5 Financial self-efficacy → Anxiety	0.474	0.046	8.411**
H4- 1 Power-Prestige → Behavioral intention to use Bitcoin	0.315	0.064	3.510**
H4- 2 Retention-Time → Behavioral intention to use Bitcoin	0.347	0.048	5.880**
H4- 3 Distrust → Behavioral intention to use Bitcoin	0.132	0.060	2.290*
H4- 4 Quality → Behavioral intention to use Bitcoin	0.046	0.057	0.897
H4- 5 Anxiety → Behavioral intention to use Bitcoin	-0.105	0.105	-0.987
Indirect path	Standardized estimates	95% bootstrapping confidence intervals	p-value
Perceived behavioral control → Behavioral intention to use Bitcoin	0.230	0.166–0.303	0.001
Subjective norm → Behavioral intention to use Bitcoin	0.089	0.024–0.141	0.008
Financial self-efficacy → Behavioral intention to use Bitcoin	0.233	0.157–0.298	0.005
Endogenous variables	Squared Multiple Correlations (R <sup>2</sup> )		
Power-Prestige	0.709 (70.9%)		
Retention-Time	0.283 (28.3%)		
Distrust	0.219 (21.9%)		

**Table 4 (continued)**

Path	Standardized estimates	Standardized error	Critical ratio
Quality	0.221 (22.1%)		
Anxiety	0.625 (62.5%)		
Behavioral intention to use Bitcoin	0.428 (42.8%)		

$\chi^2 = 3,507.064$ , degree of freedom = 868,  $p < 0.001$ , RMSEA = 0.088, NFI = 0.908, CFI = 0.948, TLI = 0.935.  
\*\* $p < 0.01$ , \* $p < 0.05$ .

rather than a general object or technology among general consumers during the COVID-19 pandemic, confirming that the boundaries of TPB can be extended to the “untact” society in the near future. Thus, this study provides scholars with a new avenue for broadening the TPB framework that focuses more on specific attitudes than on general attitudes, depending on the specific research contexts.

Compared to previous studies in the financial behavior context, this study proposed the antecedents of general consumers’ attitudes toward money in an empirical way based on the fundamental framework of TPB. For instance, prior research has focused primarily on identifying the association between the demographic characteristics of general consumers and money attitudes or considered money attitudes as an independent variable to predict buying behavior or financial well-being (Ong et al., 2020; Sabri et al., 2020; Sharif and Yeoh, 2018). However, according to the fundamental assumption of TPB, an individual’s attitude tends to be formed by perceived behavioral control, subjective norm, and self-efficacy rather than by itself without antecedents. Hence, a general consumers’ attitude toward money needs to be conceptually and empirically studied along with its antecedents as a mediator instead of an independent variable to understand its role in predicting financial behaviors. To do so, this study proposed financial self-efficacy for the money-related research context, such as Bitcoin, as a new predictor of general consumers’ attitudes toward money. Therefore, our study provides a new standpoint of TPB by suggesting a new finance-related driver of money attitudes to predict general consumers’ financial behaviors in comparison to prior research employing general variables, such as self-efficacy (Arias-Oliva et al., 2019).

Lastly, although studying general consumers’ adaptation and usage of cryptocurrency or Bitcoin for their daily transactions may be in the early stages, many scholars and practitioners in the finance and consumer behavior fields are already interested in this topic (Folkinshteyn and Lennon, 2016). This is because Bitcoin provides general consumers not only with technological benefits (e.g., security), but also with social and environmental benefits (e.g., generating more jobs and reducing the use of natural resources for producing physical payment systems). This study focuses primarily on the monetary aspects of Bitcoin; however, other perspectives on Bitcoin, such as its technological and regulatory aspects, should also be considered to holistically understand general consumers’ perceptions, emotions, attitudes, and behaviors toward Bitcoin that completely replaces all physical payment systems in the near future (Yoo et al., 2020). From this standpoint, the extended TPB model of this study provides a new avenue for this evolving payment system.

### 5.2. Managerial implications

First, perceived behavioral control served as a significant antecedent of general consumers’ attitudes toward money in this study. This empirical finding meant that Bitcoin marketers should lead consumers to perceive Bitcoin as easy to use for their daily transactions. However, the formulation of perceived behavioral control among consumers may be dependent on how they are motivated and goal-directed through a desirable action (i.e., Bitcoin usage behavior in this study). Thus, Bitcoin marketers should use consumers’ motivations for engaging in Bitcoin

usage behaviors for daily financial transactions that aim to enhancing their levels of perceived knowledge and ability to control and use Bitcoin. In other words, instead of simply emphasizing how easily consumers can use Bitcoin, companies should focus on consumers' ability and knowledge to have behavioral control when adapting and using Bitcoin for their daily transactions. To do so, Bitcoin marketers may conduct training and implement personal counseling services that focus on enhancing consumers' understanding of Bitcoin benefits and favorable outcomes.

Second, this study examines the significant role of subjective norm in directly forming general consumers' attitudes toward money and indirectly motivating their intention to use Bitcoin for daily transactions. From a managerial perspective, Bitcoin marketing companies need to position Bitcoin usage behavior as a social trend, by showing the popularity of the Bitcoin payment system. For example, according to [Ru et al. \(2018\)](#), consumers tend to consider a celebrity and/or expert with high popularity as a significant source of social influence. Hence, suggestions and recommendations as well as actual behaviors of celebrities and experts can convince consumers to adapt and use Bitcoin for daily transactions. This is because of the basic principle of social influence, implying that individuals tend to act desirably. This means that consumers who are sensitive to social influence are more likely to save money (i.e., retention-time), spend less money (i.e., distrust), and earn more money (i.e., anxiety), leading them to use Bitcoin for daily transactions, in order to follow the social trend. Also, the self-categorization theory assumes that consumers tend to categorize themselves in certain groups and follow most group members' behaviors in order not to be psychologically isolated and to attain psychological group identification ([Ru et al., 2018](#)). Thus, a message about the popularity of Bitcoin usage behaviors in a particular consumer group (e.g., consumers of Bank of America/Chase or consumers in a certain city) via frequency or percentage may be used as one of the most effective marketing tools for Bitcoin. Instead of focusing on general consumer groups, Bitcoin marketers should sub-divide and study the different consumer groups based on demographic, psychological, or social factors.

Third, financial self-efficacy was found to be a significant driver of general consumers' attitudes toward money, leading them to adapt and use Bitcoin for daily transactions. This empirical finding implies that Bitcoin marketers should provide consumers with appropriate information that increases their understanding about the pros and cons of Bitcoin usage. This effort enables Bitcoin marketers to understand consumers' financial self-efficacy so that consumers may be more likely to adapt and use Bitcoin to achieve their financial goals and resolve any financial issues. This is because consumers tend to avoid financial distress and try not to face a negative finance-related shock, such as job loss, when possessing a high level of financial self-efficacy. In this case, they are more likely to set aside emergency savings and plan for the future by purchasing insurance and cryptocurrency. Hence, Bitcoin marketers need to highlight that using Bitcoin for daily transactions improves the financial welfare of consumers by instilling consumers' beliefs about financial self-efficacy. However, Bitcoin marketers should also recognize that too much optimistic information about Bitcoin may lead consumers to overestimate their financial self-efficacy, which would make consumers refuse Bitcoin usage in the future.

Lastly, power-prestige, retention-time, and distrust were significant determinants of consumers' behavioral intention to use Bitcoin for daily transactions. It could be interpreted that general consumers may be likely to adapt and use Bitcoin as money to influence others and show off success (i.e., power-prestige). Also, consumers tend to be retentive about Bitcoin as money, indicating that they are concerned about their current financial situation during and after the COVID-19 pandemic (i.e., retention-time). Furthermore, consumers may be more sensitive to their spending, which leads them to adapt and use Bitcoin for their daily transactions (i.e., distrust). The empirical findings meant that general consumers would adapt and use Bitcoin as a monetary tool for affecting others and planning for the future during and after the COVID-19

pandemic. From a practical perspective, Bitcoin marketers should focus on shaping consumers' attitudes toward money, making decisions regarding Bitcoin usage for their daily transactions. For example, marketers may highlight Bitcoin's benefits for future financial investment and long-term goals to secure their financial status during and after the COVID-19 pandemic. This effort makes consumers plan and prepare for the future through Bitcoin adaptation and usage for their daily transactions. In other words, the marketing message aims to promote consumer education and encourage general consumers to establish a long-term financial plan with Bitcoin during and after the COVID-19 pandemic. In addition, Bitcoin marketers should emphasize "status consumption of Bitcoin" by helping consumers to formulate social power, such as consideration, respect, and envy from others, by making them perceive Bitcoin as a symbol or signal of social power during and after the COVID-19 pandemic.

### 5.3. Limitations and directions for future research

This study provides some direction for future studies in the Bitcoin context according to its three limitations of methodological approaches. First, the author considered monthly household income as a significant moderator in the hypothesized associations between variables and conducted ANOVAs to reveal its impact. However, there were no significant differences in the income groups among the participants. Although this research did not find a significant impact, the difference levels of household income and the different occupations should be considered in future research. For example, the degree of money attitudes might vary depending on each participant's disposable income or time for spending money. Second, this study collected data from general consumers who were interested in Bitcoin usage in the United States. However, American consumers' attitudes toward money may be different from those of consumers in other cultures, such as Asia and Europe. Hence, future research should collect data from multiple cultures to investigate this study's research model to increase generalizability. Third, this study relied heavily on the subdimensions of money attitudes identified by the study of [Yamauchi and Templer \(1982\)](#). Thus, future studies should be conducted using conduct mixed-method approaches (i.e., qualitative and quantitative) that identify any potential subdimensions of money attitudes to extend the model of TPB in the Bitcoin context.

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