

# CRYPTOCURRENCY ADOPTION IN E-PAYMENT: BARRIER OF ITS IMPLEMENTATION

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## ABSTRACT

Cryptocurrency is a type of cryptographic e-currency generated by the computational result of mathematical techniques throughout blockchain technology. It has bitcoin as the world's first decentralized anonymous digital currency which allows online transactions without relying on any third-party institutions or government. Though, its technology is considered as one of the secure online integrated payment systems in financial transactions for many different businesses, it is still struggling for its integration and people are reluctant to embrace its adoption. Therefore, to address this gap, we discussed several implications for theory within information system adoption in light with the study's objective. The research utilized a quantitative method survey built on theories of Technological Acceptance Model (TAM), Theory of Reasoned Action (TRA), DeLone and McLean Information System Success Model and Self-determination Theory Model (SDT) to examine the factors influencing its adoption in e-payment. We used a sample of 402 participants for the analysis where seven main variables and nine hypotheses got formulated and tested using PLS-SEM path modeling with SPSS. The result shows that the analysis of the data provided support for all the hypotheses and established a positive relation between variables and the findings obtained have both academic and practical worth in terms of Information Systems technology adoption for improving the understanding of factors influencing cryptocurrency adoption in e-transaction.

**Keywords:** *Cryptocurrency, E-currency, Blockchain, Bitcoin, E-payment*

## 1. INTRODUCTION

The cryptography concept was first conceived by [1], the anonymous cryptographic electronic money 'Ecash'. Later [2], the idea was implemented through Digicash which an early form of cryptographic electronic payments that required user software in order to withdraw notes from a bank and designate specific encrypted keys before it can be sent to a recipient. This allowed the digital currency to be untraceable by the issuing bank, the government, or any third party. In 2008, bitcoin was first invented, as indicated in [3] 'whitepaper', where the idea was to use a distributed system to manage one largescale electronic transaction every 10 minutes and permit the separated network to reach an agreement about the state of exchange. "Its new technique solved double-spending to avoid a single

currency unit spent twice, which was the weakness of other digital currencies and resolved by clearing all transactions through a central clearing house" [4]. The awareness of creating bitcoin by Nakamoto was to solve issues affecting the current banking system services. For instance, bank operation crashes are sometimes due to a technical issue, account hacked, daily transfer limits or high additional transfer charges, double spending or depression and fractional reserve banking, and so on.

The cryptocurrency bitcoin's network started operating in 2009 and later on developed by other programmers. Presently, bitcoin's achieved distributed computation has enlarged and currently surpassed the joined managing power of the sphere's two supercomputers with its massive integration in our daily use. It became the top of literature in

cryptography through several findings. It is considered as one of the most popular digital currencies and trustworthy in e-transaction by most results. Though it is regarded as one of the secure online integrated payment systems in financial transactions for many different businesses, it is still unclear if bitcoin adoption in e-payment might rely on people's decisions or the technology itself.

Many significant factors curb the adoption of bitcoin in e-payment. The research measured particular areas, specifically trust, risk, self-efficacy, and resource appropriateness. At first, the doubt about the e-currency and the problems of inflammation or exchange while using it might negatively affect the end user's trust. As mentioned by [5], "The greater the degree of confidence, the greater the level of fulfillment". Secondly, the fear of being at risk by losing confidentially or money also constitutes another reason why some people are reluctant to adopt bitcoin. Users likewise characterized risk as a payer's conviction about expected dubious negative results from the e-exchange [6]. Thirdly, the lack of self-efficacy might also negatively affect end-users' motivations, confidence, and belief in their knowledge or skills to use them effectively [52;53]. And lastly, the lack of appropriate resources to access the internet and obtain reliable bitcoin information for some undeveloped countries where Internet and computer devices access are still issues. Resource appropriateness is a physical or virtual part of limited accessibility within computer devices or board system data [7].

Furthermore, to inspect the impression of cryptocurrency, particular bitcoin adoption in e-transactions by the end-users, this study adopts a quantitative research methodology where TAM is the central theory of the research. This study proposes and validates a theoretical model for predicting user intention on bitcoin adoption by examining every variable's influences and mediating effects and their relations. Therefore, the study focused on developing an exploration structure by delineating the current writing in a data framework IS set and some past writing philosophy survey related to the research. This interdisciplinary strategy offers viewpoints from various examination teaches that can supplement each other in building up a synergistic structure to consider the user's goal to utilize bitcoin as installment's mode. A philosophy survey of past writing is the principal of any educational exploration as the audit uncovers the assemblage of information before starting the

investigation [8]. Similarly, as with all examinations, a scholastic audit's estimation relies upon the work done and found by previous research [9] and puts the final finding results obtained in both academic and practical worth usage in terms of Information Systems technology adoption for improving users understanding.

## 2. RESEARCH BACKGROUND

The technology behind cryptocurrency is blockchain, which continuously grows linked blocks using cryptography security [10;11;12]. Will Giberson [10] likewise said that blockchain is an assortment of data, connected, firmly impervious to change, and all-around secured utilizing cryptography, making programmers not have the option to adjust the information. He also said that every client has a duplicate of the record in the blockchain, and complex calculations scramble the information inside the squares. Blockchain worked from three innovations is a conveyed information base of changeless sequential request records called blocks. Its technology blocks all recent transactions and verified it every 10 minutes before a new one gets created and keeps growing accordingly [13]. As record of book that contains the subtleties of exchange information, it comprises four (4) essential subtleties: Hash of the past block, exchange information, estimations of the nonce, and Hash for the block itself. Block represents a record of information, esteem, known as a past hash and a worth, his Hash [13]. Hash resembles the unique mark of the block or some of the data. The previous Hash is the Hash of the block that came before. That means the block constitutes the data, Hash, and previous Hash. We call the first block in blockchain, genesis block; its Hash becomes before the second block, and the second block generates a new hash where that new Hash also becomes a previous hash of the third block, and so on. If anyone tries to modify a single data of any of the blocks, the Hash will change. The Hash is like the fingerprint of the block encrypted SHA256 algorithm. It cannot be modified or deleted in the chain. That is why they said blocks are cryptographically linked together, and the hash algorithm has to be one way, which means that you cannot go from Hash to documents, deterministic, fast computation, and mass effect [14]. If the input is modified somewhat, the output changes considerably and must withstand collisions. Each client in the blockchain network has two keys, for example, public and private. Public access is the location that everybody in the organization is aware of, and the private key is the unique location that

none of the clients knows. All transactions' records are monitored in blockchain technology, containing data on every operation's time, date, applicants, and expenses. Every node in the organization claims a complete duplicate of the blockchain.

SHA-256 Encryption, Public and Private key distributed public ledger, proof of work, and mining are the features that make blockchain the best technology of the time [10;15;16]. Cryptographic keys in a single transaction in the blockchain protect confidentiality and hash function to the blockchain immutable. The cryptographic key incorporates private and public access, and it utilizes hash work contains SHA-256, which represents the number of pieces it takes up in memory. Hash work takes information and returns an alphanumeric yield of 64 characters. The worth produced by a hash work is the hash value, and its value does not uncover the first message. A minor change in the information will result in an alternate hash value in the hash work. That is the unique feature of the hash function. SHA-256 is a one-way function when you give input passing through the hash function and get the output, but the reverse is not possible, which means, in simple terms, decrypting back to the original text is not possible using SHA-256 [15].

### 3. THEORETICAL FRAMEWORK

This study reviewed numerous literatures on technology acceptance to examine the critical usability factors of bitcoin adoption. In this study, the research identified 4-four prominent models and theories relating to understanding user perceptions of information technology (IT) and user acceptance of information systems (IS). The body of the research incorporates the Technological Acceptance Model [17], Theory of Reasoned Action [18], Self-determination Theory Model [19], and DeLone and McLean's data framework achievement model [20].

The technology Adoption Model generally estimates Data framework appropriation was first evolved by [17]. The framework models the dynamic cycle by which users might receive and execute another innovation. The exploration group created TAM dependent on the hypothesis that the function of a given invention depends on the apparent usability of the proposed researcher. Various systems apply TAM, which involves supporting experimental investigations in the IS. As it may, most scientists have dropped the image develop from the model of [17] for different reasons. For example, a few studies have found that attitude has a minor impact on conducting research goals

while trusts play a significant role within the apparent handiness attitude [21]. People may utilize the innovation regardless, even if they do not have an uplifting disposition towards it as long as it is valuable or gives a profitability upgrade [17]. The research uses the conceptualization of TAM like in other kinds of literature related to IS, where its first measurement contains three constructs: perceived usefulness, perceived ease of use, and intention to use [17].

[22], were the first to create the Theory of Reasoned Action model (TRA) as a sociological and mental examination feature. It has, from that point forward, become the establishment for researching IT use behavior. It has developed into a well-informed goal hypothesis, which assumes that specific conduct's mentalities are precise indicators of individual expectations. For example, [23;24;25] and [26] applied TRA to distinguish the trust and risk factors that influence Fintech's duration expectation. [27;28;29]'s fundamental exploration on purchaser acknowledgment of electronic business broadened the TAM by consolidating the ideas of perceived trust and perceived risk and subsequently adjusting Davis' unique model marginally. The variables perceived risk (PR) and perceived trust (PT) in this research study got conceptualized by TRA were [30;31] first presented perceived risk, and [32]. The perceived trust (PT) construct got investigated regarding its impact on user intention by [33;34;35] and several other kinds of literature.

Self-determination theory (SDT) recommends that people flourish, develop, accomplish objectives, and feel more prominent prosperity under conditions that help satisfy essential human needs [36]. As [19] characterized, self-determination is the nature of human working, including decision experience. It is the limit of pick, and those decisions turn into the determinants of one's activity. According to [37], the center components in SDT are extraneous and inherent inspiration. The theory suggests that the reception relies upon fulfilling three essential mental needs, and those needs are a need for relatedness, competence, and autonomy [38; 39]. In this investigation, we initially conceptualized the self-efficacy variable from the self-determination hypothesis. It alludes to the individuals' judgment of their abilities to compose or execute strategies needed to achieve assigned kinds of execution [37].

McLean's data framework achievement model [20] led a far-reaching audit of IS writing and

proposed an IS achievement model. This model is one of the most broadly referred to as IS achievement models [40;41]. It presented an orderly mix of individual measures from IS achievement classifications to make a complete estimation instrument and comprises six IS classifications measurements: Quality of the system, quality of knowledge, usage, user satisfaction, individual impact, and organizational impact. In this examination, Resource Appropriateness (RA) gets conceptualized from the [20] hypothesis. DeLone and McLean characterized RA as a legitimate source of flexibility, which creates advantages. It can extensively be ordered upon its accessibility as accurate, and potential based on the level of improvement and use. According to [42], RA is legitimate materials, energy, administrations, staff, information, or different resources that are changed to deliver advantage and might be burned-through or made inaccessible. From [43] and [44], RA is an asset that could be any physical or virtual segment of restricted accessibility inside a PC or data. It is a computer device.

#### 4. CONCEPTUALIZATION

The model branded seven variables with nine hypotheses through four main measurements. TAM's first measurement contains three constructs: perceived usefulness, perceived ease of use, and intention to use. The second measurement, which includes the self-efficacy variable, is adopted from self-determination theory (SDT). The third is by TRA to distinguish the trust and risk factors of bitcoin adoption in e-transaction. Perceived risk (PR) and perceived trust (PT) are considered external variables incorporated in TAM to raise the elucidatory power of the users in the adoption. The last measure includes resource appropriateness (RA) with the adoption of DeLone and McLean's theory. TAM is selected as part of the integrated multidimensional model for this study because the concept of perceived usefulness and perceived ease of use appeared to be more appropriate to examine the mediating effects between variables [17]. The chosen propose model here is commonly known and helpful in various domains that predict IT acceptance and adoption studies. The conceptualization of this study is directly associated with the research objective, which worked out step by step (refer to figure 1).

In this study, research objective one (1) justified the study's aim based on the conceptualization, as presented in figure 1. That happened by considering the previous research

investigating social commerce using cryptocurrency for an electronic transaction. The researchers tested the relationship between PR and two majors' variables (PU and IU) [45]. There, PR negatively affects PU and IU. [46] first introduced perceived risk (PR) and believed that the user's behavior would cause unpredictable consequences. The current research proposes to evaluate further the relationship between perceived risk (PR), and intention to use (IU) influences each other when users utilize bitcoin for e-transaction rather than on social commerce using general cryptocurrency for e-payments.

**H1.** Perceived risk positively affects the Intention to Use.

The study justified the research objective two (2) from the conceptualization of previous research work. There, the investigation was in social commerce using cryptocurrency for an e-transaction and objective one. The research examined PR and IU's liaison negatively correlated [45]. This current research proposes to evaluate further the relationship between perceived trust (PT) and intention to use (IU) using particular digital currency 'bitcoin' for e-payment rather than on social commerce using available cryptocurrency. Perceived trust also constitutes one of the significant factors in e-transaction with bitcoin. PT plays an essential role in user intention; if more users trust bitcoin, they will accept to transact without hesitating. Trust is less critical when users explore information online than in situations when they do transactions [47;48;49;50;51]. Here, the study examines the influence of Perceived Trust and Intention to Use on bitcoin adoption and compares its relationship with the previous finding [45].

**H2.** Perceived trust has a positive effect on the Intention to Use.

Research objective three (3) aims to justify the conceptualization by considering previous research work. It investigates an empirical study of blockchain innovation. The research examined SE and PEOU and found a positive relationship between these two variables [53]. Building on their research, this current research proposes to evaluate the relationship between SE and PEOU further but using 'bitcoin' adoption for e-payment rather than on blockchain innovation. The self-efficacy variable relies on the lack of individuals' motivations, confidence, and belief of their knowledge and skill to use them effectively [54;55]. According to [37], it might be either or not concerned with the skills one possesses but rather with the judgment of what one can do or not. The objective here of this study aims

to examine the influence of SE and IU and the mediating effect of PEOU on the relationship between SE and IU on bitcoin adoption in e-payment.

**H3.** Self-Efficacy (SE) positively affects the Intention to Use.

**H5.** Self-Efficacy (SE) positively affects Perceived Usefulness.

**H8.** Self-Efficacy (SE) positively affects Perceived Ease of Use.

The fourth (4) research objective justified the study examination from the conceptualization verified by previous findings [52]. The research tested the relationship between Resource Appropriateness (RA) and Perceived Usefulness and found it to be positively correlated. The current study proposes evaluating the relationship between RA and PU applying the cryptocurrency survey 'bitcoin' on e-payment rather than multimedia instruction resources. The innovation of bitcoin technology requires access to the internet and obtain reliable bitcoin information through computer devices. According to a reliable literature source, a good teaching system should provide good resources that support the syllabus [52]. Although Chun Mao's study [52] was not on bitcoin transactions or financial scenarios, variables that measure one aspect of an information system can measure any

other. The third objective of this study is to examine the influence of RA and IU and the mediating effect of PU on the relationship between RA and IU on e-payment adoption with bitcoin in e-commerce.

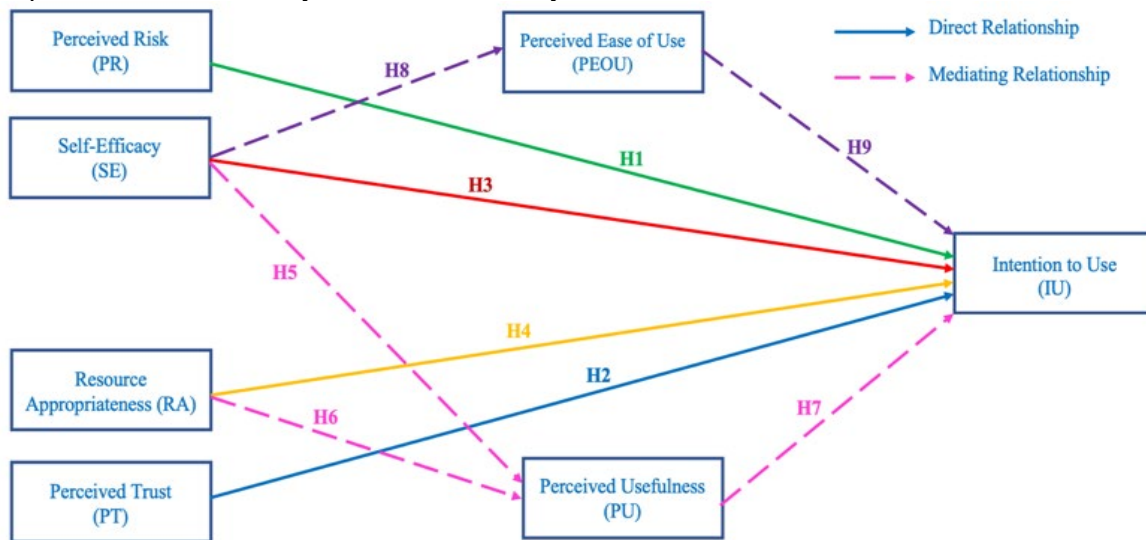
**H4.** Resource Appropriateness (RA) affects IU positively.

**H6.** Resource Appropriateness (RA) affects PU positively.

The fifth and the last research objective from the conceptualization aims to measure the influence of PEOU and PU on IU. [17;51] justified the research objective in bitcoin technology acceptance. The findings found that PEOU and PU have a positive effect on IU. PU is the degree to which a person agrees that utilizing a particular invention can improve the execution of their jobs. He likewise characterized PEOU as the degree to which an individual thinks using a specific framework would be easy [17]. The study's objective is to examine the mediating effect of PU on the relationship between SE, RA, and IU and the mediating effect of PU on the relationship between SE and IU on bitcoin adoption in e-payment.

**H7.** Perceived usefulness has a positive effect on the Intention to Use (IU).

**H9.** Perceived Ease of Use positively affects the Intention to Use (IU).



## 5. METHODOLOGY

This segment examines the significant parts of the examination plan and strategy in the investigation through several fundamental aspects.

### 5.1 Research Design

Research design originally grew as a particular area of study, set apart from the beginning by meeting on a design technique [56]. It can be classified as qualitative, quantitative, or mixed

method [57;58;59;60;61;62]. A concept, a definition, metaphors, symbols, and a description of objects are all characteristics of qualitative research [63]. Data is obtained in natural environments using observation, interviews, field notes, and other equipment. The information gathered can provide a detailed description of the study's participants [64]. However, qualitative study results are static and cannot be generalized [65], making them unsuitable for predicting user intention to use bitcoin in e-transactions. In the collecting and analysis of data, quantitative research stresses quantification [66]. Its strategy is to use statistical data as a tool for describing and analyzing research with far less time and resources [67;68;69;70]. Quantitative research allows for generalization through data collection and analysis [71; 72]. Aside from that, quantitative research bases on hypothesis testing, which defines criteria and objectives to follow readily. Consequently, it can be done anywhere at any time with the same results [72]. Hypotheses are evaluated in this study by looking into cause-and-effect correlations to predict whether or not someone will utilize bitcoin in an e-transaction.

## 5.2 Population and Sampling

This study considers the population as the theoretically specified aggregation of the study elements [73] and a complete set of people with a unique set of characteristics [74]. And the entire group of people or interests that the study wants to investigate through the research's objectives [75]. The examination unit is the initial phase in exploring the information, and it is the individual or article from which the business analyst gathers information [76;77;78;79]). Since this examination's essential role is worried about the end-user's impression on bitcoin's adoption in e-transaction, this investigation considered bitcoin users as the inquiry unit. The population of this study refers to all undergraduate and postgraduate university students, employed, self-employed, and pensioners who use e-commerce within Malaysia and outside. Generally, all Bitcoin users or non-users over the world are targeted and involved in this study.

## 5.3 Sample Size

Sampling size alludes to the number of chose subjects [80;81]. The number of respondents picked as an example to speak to the populace qualities, choosing the sample size will rely upon specific attributes. These qualities are the inconstancy in the populace, exactness or precision required, wanted certainty level, and kind of

sampling plan [82;83]. The population's variability determines how efficiently the study accepts the sample size [80]. And suggests Various rules to choose the minimum sample size for regression analyses [84;85]. The data collected is considered very good when the size is between 400-500, and a broadly acknowledged proportion of test size to assessed boundaries is  $N: p = 5:1$  [86]. Therefore, a guideline for the base example size of basic condition models got proposed for the study. We distributed a set of questionnaires in the google form and face-to-face approach, and we obtained 402 participants, which seems very good.

## 5.4 Instrumentation for Data Collection

The overview instrument's point is to interpret the scientist's data needs into a structure that will extricate respondents' information [87]. Therefore, we created a questionnaire as an examination instrument to gather information from the respondents. A questionnaire is a record containing questions and different sorts of things intended to acquire data proper for examination [88;89;90;91;92]. The respondents get instructed regarding what we are going to do with the data given through the questionnaire. And in the questionnaire, we provided an affirmation of privacy, the significance of reaction referenced, and time assessment. The questionnaire comprised of several parts: section A covers the demographic data, section B the data on self-efficacy (SE), section C the perceived ease of use (PEOU), section D represents information on perceived usefulness (PU); section E captured information on perceived trust (PT); section F obtain the data on perceived risk (PR), section G data on resource appropriateness (RA), and finally section H gives information on the intention to use (IU).

## 5.5 Measurement of Constructs

To rigorously test the exploration system's speculations, we operationally characterize and estimate all the structure required factors and use a questionnaire as a powerful instrument in our investigation. As suggested by previous researchers, we used five Likert-scale to respond to every construct. Previous findings declare that for a more significant report ( $N > 100$ ), a five Likert-scale is best for better information dissemination [93;94; 95; 96;97; 98]. The study built the main question items on seven identified constructs (PR, PT, SE, RA, PEOU, PU, and IU) of the proposed theoretical model. The scale comprises five things estimated on a five-point Likert scale from strongly Disagree,

Disagree, Neutral, Agree, and Strongly Agree, scaled from 0 to 4, respectively.

The construct self-efficacy (SE), perceived ease of use (PEOU), perceived usefulness (PU), intention to use (IU), perceived trust (PT), Perceived risk (PR), and resource appropriateness (RA) scale gets adjusted from some previous findings [61; 17; 100; 101; 45; 102; 103; 104; 105; 106; 107; 108; 109; 110; 45; 111]. In light of the input and suggestions, we altered the questionnaire likewise. We choose to eliminate few words for straightforwardness without losing their significance in light of the extensive and excess remarks. Similarly, in light of the proposals, hardly any things that have comparable implications were disposed of. Certain words are additionally subbed with different terms to improve sentence clearness.

### 5.6 Instrument Validation

To guarantee respondent's comprehension of the questions asked in the questionnaire, we conducted a validation of the questionnaire to check the instrument's validity. The questionnaire validation is essential to identify genuine mistakes, oversights, or issues that would have become a problem if they are not recognized, corrected before going into the field [113]. Therefore, we validated the questionnaire with several experts, including the supervisor we are working with and two academics from the KICT department at the International Islamic University of Malaysia. Two Ph.D. applicants also completed it at the Faculty of Information and Communication Technology at IIUM. These experts evaluated, remarked, and analyzed the questionnaire in terms of content accuracy, clarification, duration, simplicity, and, in general, introduction. All pre-testing exercises were listed—The principal goal of this activity was to lessen favoritisms and equivocalness. Notwithstanding, preceding the assessment, all members got informed on the exploration targets and the examination setting.

### 5.7 Pilot Study and Statistical Analysis Techniques

While pre-testing views significantly guarantee the questionnaire's nature, a pilot study is a significant cycle. It is confirmed from previous findings that utilizing a questionnaire for considerable exploration. It is fundamental to get data by pilot testing the questionnaire with the sample population [114]. A pilot study aims to decide the respondents' translation of the inquiries,

quantify the ideal opportunity for research undertaking and information assortment, and practice the accurate information assortment measure [115]. A sum of 42 questionnaires was randomly dispersed uniformly among 500 individuals, including students, employees, self-employed, and pensioners.

A total of 402 respondents, 181 (45.0%) male and 211 (55.0%) females, answered the questionnaire. As the research objective is prediction and theory development, we then utilize PLS-SEM (partial least square-structural equation modeling) method to examine the measurement and structural model. We also examined the Statistical Package for Social Science (SPSS) version 21 to test the instrument's dependability. We favored Smart PLS software to analyze the data for this research compared to AMOS because PLS is the software used for Partial Least Square SEM (PLS-SEM), which is suitable for multiple regression analysis and prediction and theoretical development. At the same time, AMOS is the software used for Covariance based SEM (CB-SEM [117].

### 5.8 Data Collection

There are few different methods of collecting questionnaire data. The technique varies from self-managed methods, phone study, individual meetings, and an online survey. The self-managed plans imply a printed self-regulated survey sent or conveyed to respondents and grant them to react voluntarily and return the study through the mail; A phone overview includes calling respondents utilizing the phone. Though its review can deliver a quick reaction, people rarely distribute it to the community. And when it comes to individual meeting demand, it includes a face-to-face individual [119]. A personal meeting can yield a fast reaction. It also portrays a technique that urges respondents to offer socially satisfactory responses [120]; The online survey includes posting a site study with respondents typically answering from a singular computer or mobile device distantly. It permits fast reactions and gives ease accordingly [120; 121]. During the investigation, we adopted individual meetings and an online web-based survey.

## 6. RESULT

### 6.1 Demographic analysis

We isolated the data examination into two phases to distinguish and examine the variables that influence the adoption of bitcoin in e-transaction.

First, we performed a data examination using SPSS version 24 to get the overall image of the respondent's demographic data. Secondly, we used an organized model utilizing SEM procedure with SmartPLS version 3.2.8 to analyze an interrelationship between numerous autonomous and ward factors and test them. According to [122;123], a response rate of at least 50 percent is typically deemed acceptable for analysis and reporting. A response rate of at least 60 percent is fine. A response rate of 70 percent is excellent. After the investigation, we received 402 responses who completed the questionnaire, which yields an 80,4 % (402/500x100) response rate based on 500 distributed questionnaires. Table 1 shows the demographic details of respondents. Of the 402 respondents, 181 (45.0%) were males and 211 (55.0%) were females. The respondents' average age was between 15 and 54 years old. The majority of the respondents were between 25-34 years old (62.7%), followed by 15-24-year-old (17.4%), 35-44-year-old (15.7%), and 45-54-year-old (4.2%). Some of the respondents were highly appointed as employees (52.2%), followed by students (31.8%), self-employed (14.2 %), and retired (1.7 %). The response rate obtained in this study is greater than 70%. Therefore, it can be considered excellent. Our response rate is considered high by looking at the previous works' results compared to other literature works involving cryptocurrency and bitcoin adoption [124;125].

Table 2: Demographic Respondents

Statistics				
		Gender	Age	Occupation
N	Valid	402	402	402
	Missing	0	0	0
Mean		1.549	2.067	1.858

## 6.2 Exploratory Factor analysis (EFA)

The researchers performed the EFA using principal component analysis (PCA) as an extraction method together with orthogonal Varimax as a rotation method to analyze the structure of the measurement elements corresponding to the constructs of the proposed research model. The investigation carried out the EFA using version 24 of the SPSS software kit. Second, the sphericity measures of Kaiser-Meyer-Olkin (KMO) and Bartlett are determined to measure the adequacy of the sampling for the outcomes of sufficient factor analysis. According to [126], if the value of KMO is more relevant than 0.6,

the relationship between the elements is statistically significant, ideal for carrying out EFA and providing a sparse collection of variables. Likewise, [127;128] argued that if Bartlett's sphericity test is essential, the correlation between the measurement elements is ideal for EFA. Table 2 indicates that the value of Kaiser-Meyer-Olkin (KMO) is 0.923, which is more significant than 0.6, whereas the sphericity tests of Bartlett are also substantial ( $p < 0.005$ ) [129; 130]. Therefore, the two preconditions for achieving EFA met.

Table 2: KMO and Bartlett of sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.923
Bartlett's Test of Sphericity	Approx. Chi-Square	3699.436
	df	435
	Sig.	.000

In addition, the values of the expected points explained by each factor got also tested to demonstrate the total variance of an original variable shared with other variables. If the information less than 0.5 (50 percent) but greater than 0.3, the similarity value can be viewed as weak elements. The common factors with more than 0.5 values suggest that these elements are vital and correspond well to the other components, and the elements' values between 0.3 and 0.5 are considered acceptable [85]. Table 3 presents the Outer loading results between the items and their latent constructs. All the loads found above the recommended limit of 0.50 [131; 132] except PR3. As PR3 is a weak element, we removed it (see figure 2 and 3, p).



Table 3: Outer loading result

Variables	IU	PEOU	PR	PT	PU	RA	SE
IU1	0.659						
IU2	0.648						
IU3	0.563						
IU4	0.737						
PEOU1		0.854					
PEOU2		0.764					
PEOU3		0.723					
PEOU4		0.611					
PR1			0.785				
PR2			0.614				
PR3			0.297				
PR4			0.578				
PT1				0.685			
PT2				0.696			
PT3				0.577			
PT4				0.608			
PT5				0.69			
PU1					0.749		
PU2					0.615		
PU3					0.561		
PU4					0.611		
PU5					0.592		
PU6					0.608		
RA1						0.509	
RA2						0.522	
RA3						0.645	
RA4						0.664	
SE1							0.876
SE2							0.840
SE3							0.838

### 6.3 Confirmatory Factor Analyses (CFA)

According to [85], it is recommended to test the validity of the measurement model in two stages: the GOF (Goodness-of-fit) indices and the reliability and composite validity. The proposed research model gets evaluated with the CFA for the GOF indices, the evaluation of reliability (Cronbach's alpha and composite reliability), and

validity (convergent and discriminant) using SmartPLS version 3.2.8. The measurement model contains seven factors which were measured using 30-thirty items derived from EFA. To examine this study's hypotheses, critical ratios, standardized assessments, a p-value is adopted. It assumes that a relationship is statistically significant as a p-value less than 0.05 (with CR or t-value is found higher

than  $\pm 1.96$  [85,131]. Hair examined all occasional trajectories in the model based on the trajectory estimates and the CR (t-value). The results demonstrated that all the t-values estimated causal pathways were above 1.96 (critical value) after a bootstrapping (refer to figure 2 and 3 p 17-18) and significant at  $p < 0.05$  except three (PR-IU (1.375); SE-IU (1.886); PT-IU (0.995)). Therefore, we can conclude that all the hypotheses are positively correlating between each variable.

The reliability assessment also gets tested using the reliability coefficients of Cronbach's alpha. To measure each construct's overall reliability and internal consistency in the model, we used Cronbach's alpha reliability coefficients (refer to table 4 p18). Results indicated that all constructs' reliability values fall above the recommended limit  $\geq 0.7$  [85] except PR construct (0.391) and RA (0.366) construct. The construct reliabilities' values are ranging from 0.677 (RA) to 0.887 (SE). These results indicated high internal consistency and strong reliability among all constructs of the measurement model.

To calculate each construct's convergent validity in the proposed model, we used the AVE, the normalized factor loading estimates, and composite reliability (CR) estimation [131]. We found all the factors to be within the acceptable requirement for factor loading  $\geq 0.50$  and  $0.70$ . That is an indication of good convergent validity. The values of AVE for all constructs ranged from 0.347 to 0.724. Simultaneously, the CR constructs' values were well above the recommended level, which ran from 0.677 to 0.887, suggesting that all the constructs had an excellent internal consistency.

#### 6.4 Hypotheses Testing

Following the CFA validation, the next step in the study is to use a structural model to evaluate the causal hypotheses raised in the proposed research model and the relationships' strengths. To test the hypothetical structural model, the researchers used GOF indices and looked at other parameter estimates. We used the hypotheses to raise the causal path, which evaluates the latent constructs' relationships (refer to table 5 p19). We divided the proposed theoretical model's latent constructions into several constructs.

Another essential part of the structural model evaluation is the estimation of the parameters of the coefficients. By evaluating each relationship's

course, we checked the research hypotheses and adopted the parameter estimates to produce the population covariance matrix calculated for the structural model. We also used the critical percentages, structured tests, and the p-value to investigate the study's hypotheses. When the required rate (CR or t-value) is more significant than 1.96, it is assumed that a relationship is statistically significant at the 0.05 stage [85]. Based on the trajectory projections and the CR, Hair looked at all of the model's occasional trajectories (t-value). Except for three, all of the approximate causal pathways' t-values were greater than 1.96 (critical value) and significant at  $p < 0.05$  except for two. The nine hypothetical paths between the variables were all found to be necessary, according to the findings provided in table 5. The theoretical relationship between self-efficacy (SE) and perceived ease of use (PEOU), for example, was statistically significant with a CR value of 26.581 ( $> + 1.96$ ) ( $p 0.001$ ). Likewise, perceived risk PR and intention to use IU; perceived confidence PT and intention to use IU; self-efficacy SE and intention to use IU; resource appropriateness RA and intention to use IU; resource appropriateness RA and perceived usefulness PU; self-efficacy SE and perceived usefulness PU; perceived ease of use PEOU and intention to use IU; perceived usefulness PU and intention to use IU; perceived usefulness PU and intention to use IU; perceived usefulness. The study shows that all suggested hypotheses (H1, H2, H3, H4, H5, H6, H7, H8, and H9) were positively relevant.

Figure 2 and 3 in page 17 and 18 illustrate the structural model showing various estimates (CR/ t values, beta coefficients) explained in the variables. After bootstrapping, the structural model's result shows that the critical ratio and standardized regression weight for the direction between PR and IU are  $-0.047/1.333$ , which is essential since the T-statistic is nearly closed to 1.9.

**H1.** Perceived Risk (PR) positively affects the Intention to Use (IU) of bitcoin adoption in e-payment.

The critical ratio and standardized regression weight for the direction between PT and IU were found to be  $0.049/0.909$ , respectively, as shown in figure 2 and 3, indicating that hypothesis H2 is statistically relevant at  $p=0.001$ . These findings show that PT has a significant positive impact on IU's willingness to accept bitcoin as a payment mode on the e-commerce platform. As a result, we believe that as users gain trust in a bitcoin transaction, their consideration of its usability will

steadily improve. In conclusion, by IU, PT is an essential factor in bitcoin's absolute acceptance and success.

**H2.** Perceived trust (PT) positively affects the Intention to Use (IU) of bitcoin adoption in e-payment.

The critical ratio and standardized regression weight for the path between SE to IU, SE to PU, and SE to PEOU were 0.083/1.854, 0.485/11.675, and 0.732/26.263 shows that hypothesis H3, H5, and H8 statistically significant at  $p=0.001$ . These results also demonstrate a robust positive effect between SE-IU, SE-PU, and SE-PEOU toward bitcoin adoption on the e-commerce platform as a mode of payment. Therefore, it infers that the role of Self-efficacy has a strong significant effect on Intention to Use. PU and PEOU also play an important mediating role between SE and IU. In summary, SE is an essential factor in bitcoin's actual adoption and success, both directly and indirectly through PU and PEOU.

**H3.** Self-Efficacy (SE) positively affects Perceived Ease of Use (PEOU) of bitcoin adoption in e-payment.

**H5.** Self-Efficacy (SE) positively affects Perceived Usefulness (PU) of bitcoin adoption in e-payment.

**H8.** Self-Efficacy (SE) positively affects Perceived Ease of Use (PEOU) of bitcoin adoption in e-payment.

The structural model's result indicates that the critical ratio and uniform regression weight for the paths between RA and IU and RA and PU are 0.241/5.461 and 0.339/7.6, respectively, as shown in figure 2 and 3 page 17 and 18. The approach between these structures is statistically meaningful ( $p=0.001$ ), according to these findings. As a result, these findings support hypotheses H4 and H6. These findings also show a substantial significant impact of RA on IU and RA on PU regarding bitcoin adoption as a mode of payment on the e-commerce platform. Therefore, it assumes that when the users use the proper computer devices with the internet, they can easily interact with bitcoin in e-transaction. Their consideration of its usefulness will gradually increase. In summary, RA is an essential factor in bitcoin's actual adoption and success, both directly and indirectly through PU.

**H4.** Resource appropriateness (RA) positively affects Self-Efficacy (SE) of bitcoin adoption in e-payment.

**H6.** Resource appropriateness (RA) positively affects Perceived Usefulness (PU) of bitcoin adoption in e-payment.

The critical ratio and standardized regression weight for the path between PU and IU found to be 0.383/7.106, respectively, indicating that hypothesis H7 is statistically relevant at  $p=0.001$ . Therefore, it demonstrates a strong positive effect on IU's PU on bitcoin adoption on the e-commerce platform as a payment mode. It assumes that when the users perceive the bitcoin option as easy to use in the transaction, their consideration toward its usefulness will increase gradually. In summary, PU gets found to be an essential factor in bitcoin's actual adoption and success, directly to IU.

**H7.** Perceived Usefulness (PU) has a positive effect on the Intention to Use (IU) of bitcoin adoption in e-payment.

The critical ratio and standardized regression weight for the path between PEOU on the intention to use to be 0.172/3.066, respectively, shows that hypothesis H9 statistically significant at  $p=0.001$ . These findings also show that PEOU has a clear positive impact on IU's willingness to accept bitcoin as a payment method on the e-commerce platform. Therefore, it assumes that when users discover the ease of using the e-currency, they will definitively vote for bitcoin options in their daily transactions. Their consideration of its usefulness will also gradually increase. In summary, PEOU is an essential factor in bitcoin's actual adoption and success, directly on IU.

**H9.** Perceived Ease of Use (PEOU) positively affects the Intention to Use (IU) of bitcoin adoption in e-payment.

## 7. DISCUSSION

The impact of perceived risk (PR) on the intention to use (IU) (H1) characterizes expected dubious negative results on a client's conviction [133]. Because of shoppers' perceived risk hypothesis, customers see risk as they face vulnerability and bothersome outcomes because of bad choices. In this examination, PR accepts an immediate position impact on bitcoin's natural selection and utilization in e-installment utilizing the H1 hypotheses. The results demonstrated that the t-values estimated causal pathways were closed 1.96 (critical value) and significant at  $p < 0.05$ . These outcomes exhibit a beneficial PR effect on IU toward bitcoin appropriation on the web-based business stage as an installment method. Accordingly, it predicts that their value will increment step by step

when the clients see the bitcoin exchange risk. PR is a significant factor in bitcoin's actual reception and achievement in the synopsis, straightforwardly to IU.

Perceived trust characterizes the degree of confidence that an individual has in another substance to perform anticipated exercises without exploiting. In this investigation, PT expects to immediately impact the actual appropriation and utilization of bitcoin in e-installment through the H2 hypotheses. We found that the estimation of critical ratio and standardized regression weight for PT and IU to be 0.049 and 0.955. The results demonstrated that all the t-values estimated causal pathways were below 1.96 (critical value) and nearly significant at  $p < 0.05$ . These outcomes uncovered that the path between these develops factually huge at  $p = 0.001$ . Hence, hypotheses H2 whenever discovered to be upheld by these outcomes. These discoveries further show a substantial critical impact of PT on IU toward bitcoin selection on the online business stage as an installment method. This way, it tends to be accepted that when the clients see the trust in utilizing bitcoin in e-exchange, their consideration toward its handiness will increment step by step. PT is a significant factor in bitcoin's actual reception and achievement in the synopsis, straightforwardly to IU.

Self-efficacy in the IS setting can be characterized as a client's view of their capacity and inspiration to utilize PCs to achieve an undertaking [134]. In this examination, the results of critical ratio and standardized regression weight for the way among SE and IU are 0.083 and 1.866 individually, demonstrating that hypotheses H3 measurably huge at  $p = 0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . These outcomes also show a reliable constructive effect on SE on IU toward bitcoin appropriation on the internet business stage as an installment method. Consequently, it tends to get expected that when clients find the significance of self-efficacy in bitcoin alternatives in exchange, their consideration toward its handiness will increment progressively. In outline, SE is a significant factor in bitcoin's actual reception and achievement, both straightforwardly and roundabout way to IU.

Miller can characterize resource appropriateness in IS settings as materials, energy, administrations, staff, information, or different resources changed to deliver advantage and might be

burned-through or made inaccessible [135]. In this examination, RA expects to have an immediate impact on the genuine appropriation and utilization of bitcoin in e-installment utilizing the H4 hypotheses (refer to table 5 p19). As appeared in Figures 2-3 page 17-18, the consequences of critical ratio and standardized regression weight for the way among RA and IU are 0.241 and 5.219 separately, demonstrating that theory H4 measurably huge at  $p = 0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . Likewise, these outcomes show RA's constructive effect on IU toward bitcoin reception on the online business stage as an installment method. Accordingly, the analysis result may gather that resource appropriateness has a substantial huge impact on IU. In outline, RA is a significant factor in bitcoin's real reception and achievement, both legitimately and by implication through PU.

As previously mentioned, self-efficacy in the IS setting can be characterized as a client's view of their capacity and inspiration to utilize PCs to achieve an undertaking [136]. In this examination, the results of critical ratio and standardized regression weight for the way among SE and PU are 0.485 and 12.485 individuals, demonstrating that hypotheses H5 measurably huge at  $p = 0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . These outcomes also show SE's reliable constructive effect toward bitcoin appropriation on the internet business stage as an installment method. Consequently, it tends to get expected that when clients find the significance of self-efficacy in bitcoin alternatives in exchange, their consideration toward its handiness will increment progressively. In outline, SE is a significant factor in bitcoin's real reception and achievement, both straightforwardly and roundabout way to IU thought PU.

Resource appropriateness in IS setting as materials, energy, administrations, staff, information, or different resources changed to deliver advantage and might be burned-through or made inaccessible [137]. In this examination, RA expects to have a mediate position impact on the genuine appropriation and utilization of bitcoin adoption in e-installment through H6 hypotheses (refer to table 5 p19). the consequences of critical ratio and standardized regression weight for the way among RA and PU discovered to be 0.339 and 7.869 separately, demonstrating that theory H6 (as

proposed in the speculated model in section three) measurably huge at  $p=0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . Likewise, these outcomes show RA's constructive effect on PU toward bitcoin reception on the online business stage as an installment method. Accordingly, the analysis result may gather that resource appropriateness has a substantial huge impact on PU. In outline, RA is a significant factor in bitcoin's real reception and achievement, both legitimately and by implication through PU to IU.

PU is alluded to as the client's observation of a particular development (framework, administration, innovation) to improve their exhibition [138]. In this examination, the results of critical ratio and standardized regression weight for the way among PU and IU discovered are 0.383 and 6.906 individually, demonstrating that hypotheses H7 (as proposed in the guessed model in section three) factually huge at  $p=0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . Likewise, these outcomes exhibit a reliable constructive result on PU to IU toward bitcoin selection on the web-based business stage as an installment method. Like this, it very well may be expected that when the clients see the bitcoin alternative as simple to use in exchange, their consideration toward its value will increment progressively. PU is a significant factor in bitcoin's genuine appropriation and achievement in a rundown, both straightforwardly and by implication to IU.

As mentioned above, self-efficacy in the IS setting can be characterized as a client's view of their capacity and inspiration to utilize PCs to achieve an undertaking [139]. In this examination, the results of critical ratio and standardized regression weight for the way among SE and PEOU are 0.172 and 3.246 individual, demonstrating that hypotheses H8 measurably huge at  $p=0.001$ . The results indicated that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . These outcomes also show a reliable constructive effect on SE to PEOU toward bitcoin appropriation on the internet business stage as an installment method. Consequently, it tends to get expected that when clients find the significance of self-efficacy in bitcoin alternatives in exchange, their consideration toward its handiness will increment progressively. In outline, SE is a significant factor in bitcoin's real

reception and achievement, both straightforwardly and roundabout way to IU through PEOU.

PEOU mirrors the client's desire concerning the exertion needed to utilize IT advancements. In this investigation, PEOU gets expected to have an immediate beneficial outcome on bitcoin's open reception and utilization in e-installment using the H9 hypotheses. The conjectured connection between PEOU and IU tried through theories H9 (for example, PEOU-PU) was critical. Uncover that the essential estimation of ratio and standardized regression weight for the way among PEOU and IU discovered to be 0.172 and 3.246 separately, demonstrating that hypotheses H9 (as proposed in the speculated model in part three) measurably huge at  $p=0.001$ . The results showed that all the t-values estimated causal pathways were above 1.96 (critical value) and significant at  $p < 0.05$ . In this manner, it very well may be exhibited that there is a reliable constructive outcome on PEOU to IU toward bitcoin appropriation on the internet business stage as a method of installment. It can likewise get accepted that when the clients see bitcoin choice as simple to use in exchange, their consideration toward its helpfulness will increment step by step. In outline, PEOU is a significant factor in bitcoin's real reception and achievement, both legitimately and in a roundabout way to PU.

## 8. CONCLUSION

The investigation utilized prior and secondary information references to fortify the essential data acquired. Preliminary and secondary information got from interviews, publications, journals, and books. The study utilized a review survey to assemble the necessary information for this exploration. Therefore, this investigation used a cross-sectional procedure that depends on data gathered at one point in time with an average premium in depicting connections among factors for a steady populace. And create a self-detailing, paper-based survey questionnaire as the information assortment instrument. The investigation solicits all participants to show their level of understanding or conflict with different proclamations in the overview survey with a 5-point Likert-type scale as an estimation. The study instrument was created by adjusting things from past exploration to acknowledgment in IS/IT acknowledgment area. We performed with SPSS for missing worth investigation, anomaly's assessment, spellbinding examination, and EFA to make this analysis successful. For the model investigation, an SEM device was used to test the proposed speculations to

figure way dissects with the assistance of SmartPLS. Segment profiles of the example information and things level, the research adopts measurable testing in the transparent investigation. Be that as it may, the study extricated static variables (constructs) during EFA. Finally, the analysis comprised SEM of two stages and performed CFA and necessary model testing on EFA's information.

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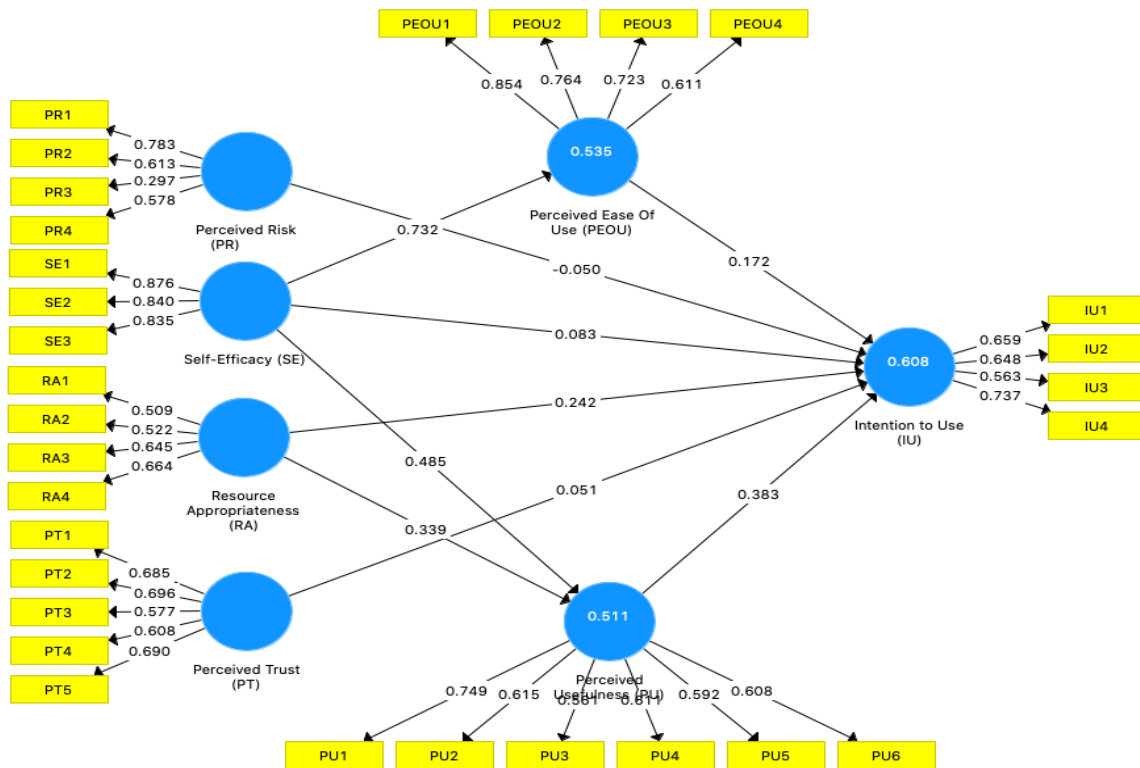


Figure 2: Confirmatory Factor Analyses (CFA)

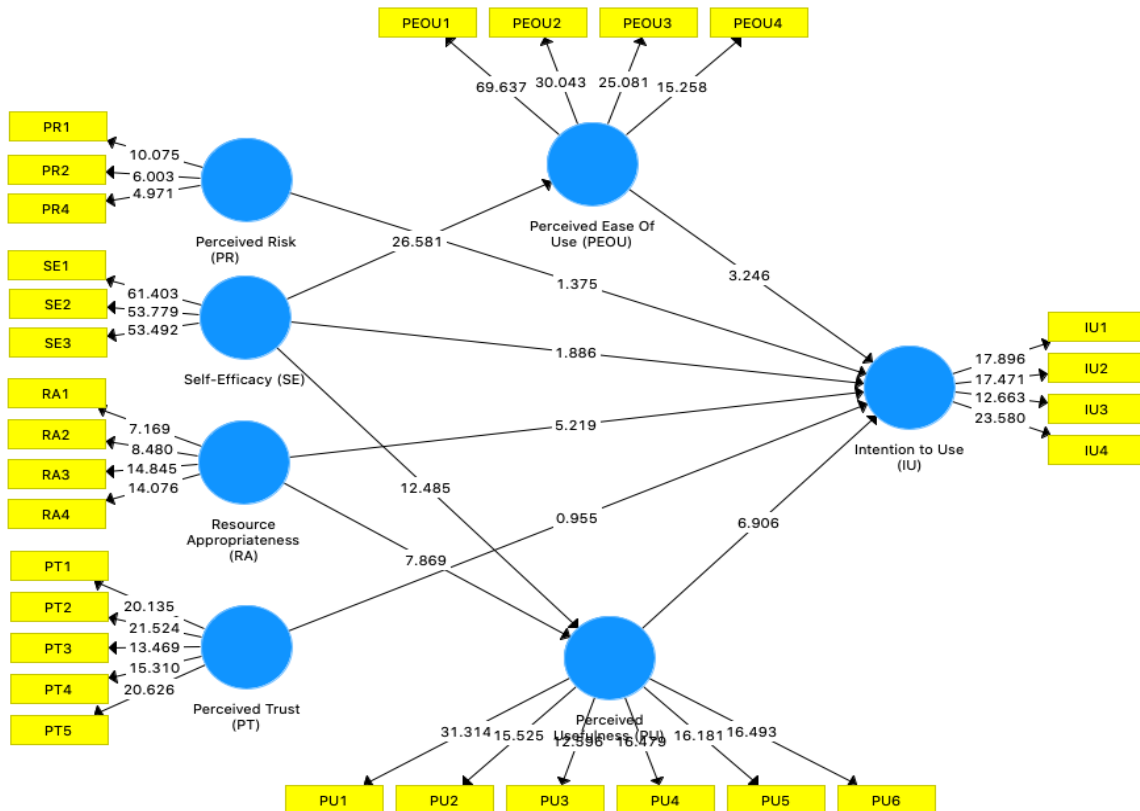


Figure 3: Bootstrapping Measurement Model

Table 4: Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
IU	0.55	0.558	0.748	0.428
PEOU	0.723	0.745	0.829	0.552
PR	0.391	0.407	0.7	0.442
PT	0.66	0.661	0.787	0.426
PU	0.686	0.698	0.792	0.391
RA	0.366	0.374	0.677	0.347
SE	0.809	0.809	0.887	0.724

Table 5: Hypotheses Test Results

Hypotheses Relationship	Hypotheses	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
PEOU -> IU	H9	0.172	0.174	0.056	3.066	0.002
PR -> IU	H1	-0.047	-0.038	0.035	1.333	0.183
PT -> IU	H2	0.049	0.052	0.054	0.909	0.364
PU -> IU	H7	0.383	0.383	0.054	7.106	0
RA -> IU	H4	0.241	0.24	0.044	5.461	0
RA -> PU	H6	0.339	0.343	0.045	7.6	0
SE -> IU	H3	0.083	0.077	0.045	1.854	0.064
SE -> PEOU	H8	0.732	0.733	0.028	26.263	0
SE -> PU	H5	0.485	0.484	0.042	11.675	0