

Factors Affecting Consumer Acceptance of Digital Payments in E-Commerce Segment

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Abstract

Cryptocurrencies are decentralized digital assets based on blockchain technology and aim to be used for exchange. The integration of cryptocurrencies into e-commerce has gained substantial attention due to its potential to revolutionize traditional payment systems. This survey explores the components that impact the acceptance of cryptocurrencies to conduct transactions, receive services, and make purchases on e-commerce platforms. We aim to provide a comprehensive picture of factors, specifically perceived usefulness, perceived ease of use, and trust, that influence the acceptance of cryptocurrencies by utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM) using Partial Least Squares- Structural Equation Modelling (PLS-SEM). The collected results reveal the significant influence of perceived ease of use and perceived usefulness on behavioral intention and the correlation between them, as evidenced by this study on the acceptance of cryptocurrency in the e-commerce segment.

Keywords

Cryptocurrency, E-commerce, Online payment, Structural equation modeling, Technology acceptance model

1. Introduction

In the contemporary landscape, advancements in work and commerce have captured the interest of diverse enterprises and communities. With the rapid evolution of technology and the pervasive influence of digitalization, staying current, elevating customer satisfaction, and addressing contemporary needs following the prevailing conditions are deemed crucial factors in the success of commercial industries worldwide.

The e-commerce domain, presently constituting a significant portion of the business landscape, is advancing consistently. As online shopping is a voluntary decision using technology provided by an organization, required, so researchers and managers try to understand consumer behavior better because adopting e-commerce differs entirely from adopting a new technology in an organization (Fayad and Paper 2015). This increases people's satisfaction with online shopping, increases the number of visitors, and ultimately causes the growth of e-commerce. Identifying the reasons that attract customers to choose a technology and buy from it is a critical and absorbent topic. We will hear more about this topic in the future than today (Fedorko et al. 2018). It requires the analysis of its social, cultural, and economic environment (Valencia et al. 2019; Lu and Jin 2009). The modified version of the Technology Acceptance

Model, which is adapted from the theory of reasoned action, has been used for better analysis (Fedorko et al. 2018; Valencia et al. 2019; Fayad and Paper 2015; Johar and Awalluddin, 2011; Lu and Jin 2009; Venkatesh 2000; Guzzo et al. 2014; Koksalmis and Gozudok 2021) and investigates the factors affecting the user's acceptance of technology, as a result of which it is possible to provide better services and products to consumers by improving and upgrading the level of online shopping environments. Therefore, for better analysis, models should be designed and reviewed according to the characteristics of each region since the advancement of technology has a significant impact on people's lifestyles and habits (Cardona Valencia et al. 2019).

Cryptocurrencies are digital currencies based on cryptography for safety and work on decentralized networks implemented on blockchain technology (Koksalmis et al. 2022). With the growth of technology, the growth rate of digital currencies has also increased in recent years, so cryptocurrencies have risen to over 3750 available alternatives (Cordero et al. 2020; Greeff 2021). Cryptocurrencies have emerged as a solution as consumers demand faster, more flexible, convenient, and more efficient financial transactions (Oliva et al. 2019) (Greeff 2021; Koksalmis et al. 2022) (Oliva et al. 2019). Cryptocurrencies, unlike fiat currencies, are not subject to supply manipulation and possess essential currency features like stock value, being prepared as a unit of account, and serving as a scale of value. These features contribute to the motivation for adopting cryptocurrencies for investment purposes and for conducting transactions or transferring funds. This is why big companies, such as AT&T, Overstock, and Gyft, have recently accepted and implemented this payment method as an alternative method in their transactions. This can also raise concerns due to disintermediation in transactions, the absence of central rules and regulations (Mashatan et al. 2022), also illegal activities associated with cryptocurrencies, including tax evasion and money laundering, and the technology's complexity, making it a significant challenge for many users (Oliva et al. 2019).

In another way, the value of Cryptocurrencies is not dependent on other currencies, such as traditional ones like the dollar. Therefore, it is tough for businesses and customers to protect their capital against the ups and downs and manage financial risks (Yermack 2013). Blockchain, which has been around for over a decade, poses a challenge in predicting its adoption in the financial system. Known for securely recording transactions, the system uses technologies such as Destructive Ledger Technology (DLT) and smart contracts. It supports various platforms such as IBM Hyperledger and Ethereum (Grover et al. 2019). Despite legal and regulatory concerns from the users' point of view and concerns about accurate predictions, this technology can improve quality and service in various industries. While blockchain technology has gained attention in financial applications, customer usage remains lower than expected, and like traditional banking services, it still needs to be improved (Albayati et al. 2020). One of the studies concluded that although optimists and innovative individuals are more willing to adopt new technologies, discomfort and insecurity pose challenges in accepting complex technology-related products or services (Sohaib et al. 2020). Trust and security emerge as crucial factors scrutinized in research, significantly influencing consumer acceptance and the future implementation of blockchain as a currency.

1.1. Objectives

This study tries to expand a model delineating the constructs that impact the acceptance of cryptocurrencies within the e-commerce sector. This will be achieved by employing an appropriate technology acceptance model encompassing the factors influencing e-commerce and cryptocurrencies. The assessment will be conducted using partial least squares structural equation modeling. The global financial crisis 2008, resulting in a substantial loss of approximately 2% of the worldwide GDP, has likely diminished trust in banks and regulatory institutions. The publication of "Bitcoin - A Peer-to-Peer Electronic Cash System" occurred during this period, a development not considered arbitrary (Michael et al. 2022). In addition, the use of digital currencies as an investment tool is still visible. Some researchers envision cryptocurrencies as a potential alternative to traditional payment providers, especially in online transactions, subject to managing extreme volatility. Digital currencies are believed to have significant advantages over conventional payment methods, especially in cross-border transactions (Michael et al. 2022). In this paper, we want to investigate the intention of using this technology as an alternative in e-commerce by examining the opinions of consumers and analyzing them. We will determine the level of interest and willingness to accept a new technology by analyzing some of the answers. As discussed in an article on this issue from an enterprise point of view, Comparative analysis with traditional payment systems reveals that factors influencing integration include the enterprise's field and the development of information technology. For e-commerce companies specializing in consumer goods, hybrid cryptocurrency payments prove cost-effective compared to traditional systems and decrease their costs. The study delves into trends in electronic payment systems, emphasizing inclusive access, information security, and digitalization. Cryptocurrencies are considered alternatives, showcasing unique characteristics of payment systems and highlighting inclusive access, information security, and digitalization (Suslenko et al. 2022).

The remainder of this study is presented in the following order: The following section presents hypotheses and debates about the technology acceptance model and methodology. At last, results, conclusions, and further research are presented.

2. Research Model and Hypotheses Development

The fundamental object of this research is to analyze the elements that affect the acceptance of cryptocurrencies as an alternative to traditional payment methods in the e-commerce segment. We used Fred Davis' 1989 Technology Acceptance Model (Davis 1989) (TAM) and Venkatesh's 2003 Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) in our research. The Technology Acceptance Model (TAM) has earned significant popularity and is now frequently employed. Information systems use the advanced technology acceptance model (TAM) to forecast consumers' technology adoption and use. This model helps understand user decision-making and their attitude toward new technology. Technology acceptance and rejection are predicted by the TAM model (Koksalmis and Gozudok 2021). Our model consists of four components: Behavioral Intention, Perceived usefulness, Perceived ease of use, and Trust, as depicted in Figure 1.

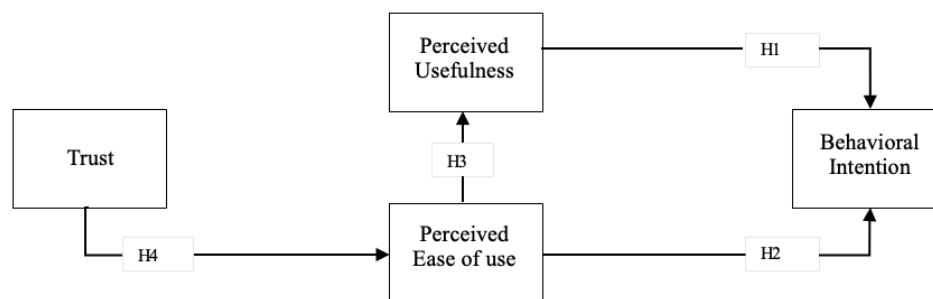


Figure 1. Research Model

2.1. Behavioral Intention

Behavioral intention refers to an individual's intentional decision to execute a proposed activity. Behavioral intention means the user's perceived probability of doing a specific activity, such as accepting the new technology (Albayati et al. 2020; Koksalmis and Gozudok 2021).

2.2. Perceived usefulness

Perceived usefulness is the belief that using a specific approach would enhance an individual's job performance (Johar and Awalluddin 2011).

H1: "Perceived usefulness affected the behavioral intention in a positive way for Internet transactions by cryptocurrency on e-commerce platforms."

2.3. Perceived ease of use

Perceived ease of use is the breadth with which people assume that using the new technology is effortless (Albayati et al. 2020).

H2: "Perceived ease of use on the usage of cryptocurrency on the basis of blockchain technology as an alternative payment method in e-commerce significantly affects consumers' behavioral intention."

H3: "Perceived ease of use on the usage of cryptocurrency on the basis of blockchain technology as an alternative payment method in e-commerce significantly affects perceived usefulness."

2.4. Trust

Trust includes the degree of ease, assurance, and protection people experience while using technology (Albayati et al. 2020).

H4: "Trust strongly affects the perceived ease of use into cryptocurrency transactions on e-commerce platforms that utilize blockchain technology."

3. Research Methodology

The data was collected through an online survey published among people living in Turkey. Although there are no restrictions on answering the questions, the responses indicate that most individuals are at least 18 years old and have the literacy skills to understand this subject. There are three parts to the questionnaire: first the letter of introduction and informed satisfaction form, second the questions about the general information of the respondents so that none of the questions does not specify a respondent’s identification, including gender, age, education level, income (monthly), occupation and the last part questions about each construct in a model. We collected 270 questionnaires, all of them were suitable for analysis. Table 1 demonstrates general information about the respondents; according to the result, 57.8% of respondents were women, and nearly 71.1% of respondents were in the range of 25-34; almost all the people have at least an undergraduate degree, and more than half of the people have salaries less than twice MW in a month. Since our study is explanatory based, Partial Least Squares-Structural Equation Modelling (PLS-SEM), with the help of the PLS 4.1.0.0 software program, is a suitable approach for our statistical analysis.

Table 1. Demographics

Variables of the sample		Percentage (%)
Gender	Man	40
	Woman	57.8
	Prefer not to answer	2.2
Age	Less than 25	15.6
	25-34	71.1
	35-44	8.9
	45-54	2.2
	More than 54	2.2
Education	Elementary or junior high school	0
	High school	0
	Undergraduate	28.9
	Master’s or PhD degree	71.1
Income (Monthly)	Not employed	26.7
	Under MW	11.1
	MW	17.8
	2*MW	20
	3*MW	11.1
	4*MW	0
	Above 4*MW	13.3

As we use a model base on literature review, and the items allied to each construct are collected from the existing studies. Behavioral Intention was evaluated using the seven items (e.g., BI1, BI2, BI3, BI4, BI5, BI6, BI7) from (Cordero et al. 2020; Greeff 2021; Sohaib et al. 2020; Mashatan et al. 2022). Perceived usefulness items (e.g., PU1, PU2, PU3, PU4, PU5, PU6) were collected by (Albayati et al. 2020). Perceived ease of use items (e.g., PEOU1, PEOU2, PEOU3, PEOU4) were taken from (Albayati et al. 2020; Greeff 2021; Koksalmis and Gozudok 2021). The seven items related to trust (e.g., TR1, TR2, TR3, TR4, TR5, TR6, TR7) were adapted from (Albayati et al. 2020; Cordero et al. 2020; Mashatan et al. 2022).

4. Results

Prior to examining the presented hypotheses, the assessment items and constructs were evaluated for their reliability and validity using multiple tests (Ketchen 2013). To assess the reliability and effectiveness of concepts, it's crucial to calculate both convergent and discriminant validity. Convergent validity is measured by metrics like Cronbach’s

Alpha, composite reliability, and Average Variance Extracted (AVE). Confirmatory factor analysis, a specialized form of factor analysis, is used to ensure control over outer loadings. For adequate convergent validity, items related to a construct should ideally have outer loadings exceeding 0.7 (Koksalimis and Gozudok 2021). Continuing with this explanation, according to the results obtained, three of the 24 items evaluated (PEOU4, PU 4, PU5) had factor loading levels below the threshold. Initially, we removed these components from the model and run again to resolve the issue. Thus, all factor loadings exceeded 0.7, which is visible in Table 2. A minimum Cronbach's alpha and composite reliability criterion of 0.7 is recommended to ensure construct reliability and validity. Table 2 also shows that all structures match these criteria. Testing convergent validity with Average Variance Extracted (AVE) results followed. An appropriate AVE threshold is 0.5. Table 2 shows that all components have AVE ratings above 0.5, demonstrating convergent validity (Damar and Koksalimis 2023).

Table 2. Reliability and validity

Construct	Items	Factor Loadings	AVE	Composite reliability	Cronbach's alpha
Behavioral intention	BI1	0.834	0.749	0.95	0.944
	BI2	0.829			
	BI3	0.89			
	BI4	0.823			
	BI5	0.845			
	BI6	0.905			
	BI7	0.925			
Perceived usefulness	PU1	0.881	0.755	0.939	0.895
	PU2	0.898			
	PU3	0.834			
	PU6	0.862			
Perceived ease of use	PEOU1	0.868	0.685	0.827	0.776
	PEOU2	0.874			
	PEOU3	0.734			
Trust	TR1	0.811	0.659	0.947	0.916
	TR2	0.828			
	TR3	0.794			
	TR4	0.764			
	TR5	0.84			
	TR6	0.832			
	TR7	0.809			

After assessing construct reliability and validity, discriminant validity was assessed. Discriminant validity is evaluated by comparing construct correlations to the square root of the AVE for each construct. The diagonal values (square roots of AVE) must exceed the off-diagonal values to establish discriminant validity. The Heterotrait Monotrait Ratio-HTMT test proves that all HTMT values are below 0.85, validating Fornell and Larcker's criterion that Table 3 and Table 4 show the result of these tests. The discriminant validity was also checked using cross-loadings. Cross-loading is reviewed to ensure that an item does not load significantly on various structures, and low cross-loadings indicate strong discriminant validity, the outcome can be observed in Table 5. (Damar and Koksalimis 2023; Henseler et al. 2015).

Table 3. Discriminant validity – Heterotrait Monotrait Ratio (HTMT)

	Behavioral intention	Perceived ease of use	Perceived usefulness	Trust
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Behavioral intention				
Perceived ease of use	0.099			
Perceived usefulness	0.211	0.636		
Trust	0.135	0.329	0.091	

Table 4. Discriminant validity – Fornell and Larcker

	Behavioral intention	Perceived ease of use	Perceived usefulness	Trust
Behavioral intention	0.865			
Perceived ease of use	0.083	0.828		
Perceived usefulness	0.205	0.58	0.869	
Trust	0.126	-0.321	-0.077	0.812

Table 5. Discriminant validity – Cross-Loadings

	Behavioral intention	Perceived ease of use	Perceived usefulness	Trust
BI1	0.834	0.023	0.162	0.025
BI2	0.829	0.096	0.17	0.055
BI3	0.89	0.066	0.144	0.118
BI4	0.823	0.073	0.168	0.158
BI5	0.845	0.043	0.183	0.17
BI6	0.905	0.097	0.186	0.137
BI7	0.925	0.104	0.215	0.098
PEOU1	0.096	0.868	0.552	-0.373
PEOU2	0.051	0.874	0.506	-0.225
PEOU3	0.052	0.734	0.34	-0.147
PU1	0.216	0.653	0.881	-0.162
PU2	0.192	0.496	0.898	-0.07
PU3	0.131	0.337	0.834	0.035
PU6	0.145	0.432	0.862	-0.001
T1	0.104	-0.377	-0.132	0.811
T2	0.065	-0.288	-0.072	0.828
T3	0.098	-0.176	-0.025	0.794
T4	0.07	-0.203	-0.044	0.764
T5	0.213	-0.255	-0.023	0.84
T6	0.065	-0.198	-0.017	0.832
T7	0.09	-0.21	-0.066	0.809

Table 6 shows each hypothesis's summary path coefficients and respective p-values. According to the analysis below, the hypothesis with a p-value < 0.05 is accepted. PU (Path coefficient = 0.236, p-value < 0.05) significantly predicted BI, PEOU (Path coefficient = 0.58, p-value < 0.05) also predicts the PU. we can conclude that H1, H3 are supported. Although the p-value is less than 0.05 and it is expected that H4 hypothesis is accepted, the negative correlation between trust and perceived ease of use, shown according to their path coefficient, leads to the rejection of this hypothesis, and the result cannot be ignored. The output of the proposed model is illustrated in Figure 2.

Table 6. Hypothesis outcomes

Hypothesis	Path	Standard deviation	T-statistics	Path coefficient	P-values	Supported
H1	PU → BI	0.084	2.814	0.236	0.005	Yes
H2	PEOU → BI	0.09	0.594	-0.054	0.553	No
H3	PEOU → PU	0.033	17.776	0.58	0.000	Yes
H4	TR → PEOU	0.053	6.037	-0.321	0.000	No

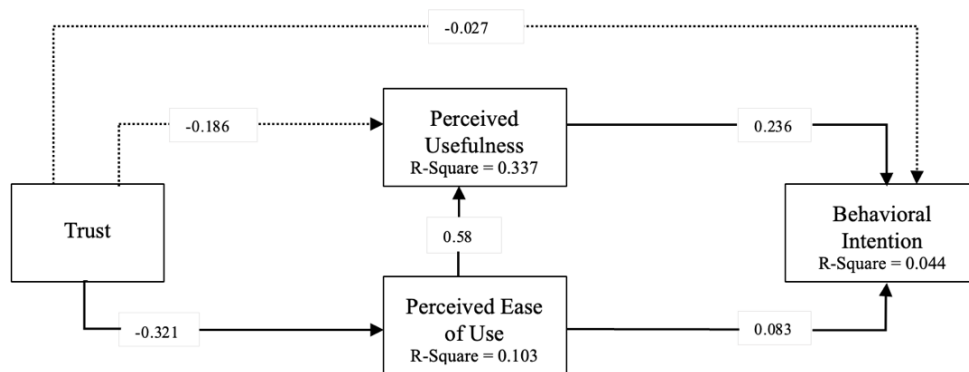


Figure 2. Research model with results (---: indirect effects)

The coefficient of determination, R Square, measures the extent to which the constructs effectively explain the dependent constructs that are listed in Table 7. The variables of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as a group represent only 4.4% of behavioral intention. PEOU alone explains just 33.7% of PU, whereas Trust can account for 10.3% of PEOU.

Table 7. R-square values

Latent variable	R-Square
BI	0.044
PU	0.337
PEOU	0.103

5. Conclusion and Future Research

In this study, we gathered 270 valid responses from a representative sample of society, 270 individuals, in order to demonstrate the existence of business growth in the e-commerce sector, with a particular focus on Turkey. It is self-evident that restrictions on electronic businesses are no longer appropriate, given the impending digitization of everything and the expanding and rising popularity of digital currency among people around the world. Using cryptocurrencies as an alternative payment method is expected to gain significant traction in the near future, as evidenced by its implementation by several renowned corporations across the globe. The main goal of our research is to investigate the variables that influence the assumption of digital currencies as an alternative to traditional payment techniques in the field of e-commerce; hence, we prepared a model based on the existing literature and the calculated items of the constructs that are already obtained. We try to find these constructs in the form of TAM and use smart PLS as a method of our analysis.

The outcomes of our research show that the perceived usefulness has strongly affected behavioral intention in a positive way, as we expected at first, according to its p-value and the path coefficient results. According to other research, we expected that perceived ease of use has positively affected behavioral intention, but the result shows that although this hypothesis is not supported according to the result of its p-value, as we see the path coefficient result, the obtained number is negligible; It is crystal clear that finding the cause of this answer makes it easy to change this result, which may be a misunderstanding of the respondents to the questions about this construct can be one of the reasons of this result, which can be solved in subsequent research. We predicted that trust, as one of the important components of our model and financial issues, has significant effects on PEOU and certainly the adoption of the latest technologies. The evidence indicates that the hypothesis on the impact of trust on PEOU has been rejected. This result contradicts our initial hypothesis regarding the significant impact of trust on PEOU. Finally, we would like to point out the impact of perceiving the ease of using technology on perceiving its usefulness, according to the obtained results, with the p-value less than 0.5 and the positive correlation between these constructs according to their path coefficient; this hypothesis is strongly supported.

Regarding the r-square results, it is evident that a low value indicates insufficient constructs that influence BI. To solve this, incorporating additional constructs, including an increase in the number of items, is necessary to obtain more valid responses. That might be effective for further research. Effective questionnaire design and valuable responses from participants are crucial in research that relies on data obtained from people's answers, as various factors can influence how people respond. Different responses from participants may yield useful insights to validate results and facilitate the implementation of e-commerce technology.

While this work has made multiple contributions, it is important to note that there are limits that can guide future research. Initially, our research was exclusively carried out in Turkey. Hence, the analysis may vary if the suggested model is examined in a different nation with distinct cultural norms and for diverse age groups. Furthermore, our model accounts for approximately 4.4% of the variance in behavioral intention to use. Hence, future research can explore supplementary frameworks pertaining to the utilization of cryptocurrency in electronic commerce. Ultimately, this study incorporated demographic variables as elements into the model. Hence, the forthcoming research can incorporate variables such as gender, age, and education level into the proposed model.

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