Identifying the Facilitating Factors for Web-based Trading: A Case Study of Blockchain & Cryptocurrency

Sang Hoon Lee[1], Hyun-Seok Hwang[2] and Su-Yeon Kim[1,*]

[1]*School of Computer and Information Engineering, Daegu University, Republic of Korea*
[2]*Dept. of Business Administration, Hallym University, Republic of Korea*
E-mail: proplee@prolee.net; hshwang@hallym.ac.kr; sykim@daegu.ac.kr
[*]*Corresponding Author*

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Abstract

Blockchain, which is spotlighted as one of the core technologies in the Web 3.0 era, is being used as a tool for high security and decentralization. In addition, blockchain has been positioned as a core technology for services such as cryptocurrency, NFT, De-Fi, and metaverse, and has already provided high-quality services. In particular, cryptocurrency has shown rapid growth and has been receiving worldwide attention. Cryptocurrency is a web technology and has the property that it can be an investment target, and it is expected to develop further in the future. In this research, we analyzed factors influencing the intention to use cryptocurrency and structural causalities among the factors. We considered personal characteristics, characteristics of cryptocurrency itself, and social characteristic, and a research model has been established for an empirical study. In addition, a multi-group analysis was performed to identify differences between users and non-users. As a result of the analysis, it was found that some of the personal characteristics and cryptocurrency characteristics affect the intention to use. And in the case of

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non-users, it was found that not only personal and cryptocurrency characteristics, but also social characteristic influence their intention to use. The results of this research are expected to provide implications for cryptocurrency service providers and users, as well as institutions that establish related policies.

Keywords: Web trading, blockchain, crytocurrency, technology acceptance.

1 Introduction

With the development of Web 2.0, people are using a new web ecosystem through platform-based services. However, as the problem that existing platform-based services are dependent on companies has emerged, the era of Web 3.0, which aims for decentralization, has arrived. In Web 3.0, decentralization means that the ownership of user-generated content is not subordinated to the company, but rather belongs to the content producer. The core technology that enables decentralization in Web 3.0 is blockchain, and through this, users' ownership can be guaranteed without corporate interference. Blockchain became known gradually with the success of Bitcoin, and it is being used as a channel for Web 3.0 services along with cryptocurrency, DeFi, and NFT. In particular, as blockchain-based coins began to appear in the market, people became able to trade, and in the same form as the existing stock market, they were used not only as a technical value but also as an investment destination. After the launch of the first cryptocurrency, Bitcoin, it became an incredibly popular investment target until 2021. Currently, various coins such as Ethernet, Ripple, and Clayton are actively traded in the market. Cryptocurrency has been adopted and used as a payment method in various services as well as investment means.

In this research, we intend to identify what factors affect users' purchasing or trading of cryptocurrencies and to reveal structural relationships among those factors. After choosing the factors affecting the intention to use cryptocurrency based on related works, we establish a research model for explaining causalities among factors.

2 Theoretical Background

2.1 Block Chain and Future Web Technologies

Blockchain is a system that records information in a way that makes it difficult or impossible to change, hack, or deceive the system. Blockchain is

essentially a digital ledger of transactions that are duplicated and distributed over the entire computer system network of the blockchain. Web 3.0 is a possible future version of the internet based on public blockchains, a record-keeping system best known for facilitating cryptocurrency transactions. Zhang et al., emphasized blockchain as an effective tool for protecting data on Internet enterprise platforms (Zhang et al., 2022). Cofta analyzed and reflected on the history of trust research, and examined the research used by blockchain as a tool to increase trust (Cofta, 2018). A blockchain-based alliance chain was proposed to build a distributed energy trading platform (He et al., 2021). Blockchain is the technology that enables the existence of cryptocurrency (among other things). Bitcoin is the name of the best-known cryptocurrency, the one for which blockchain technology was invented. Bitcoin is issued by users, traded directly through wallets between individuals and supervised, eliminating the need for intervention by financial institutions, and quickly established itself in the market due to these characteristics. The success of Bitcoin facilitates the development of various cryptocurrencies such as Ethereum and Ripple using block chain technology. In the early days of cryptocurrency, it had only value as a new investment asset, but now it provides a tool for offline payments as well as online NFT purchases and sales.

Martin et al. (2022) classified cryptocurrency users into four categories – Machiavellism, Narcissism, Psychopathy, and Sadism – and analyzed why they purchase cryptocurrency. Users with Machiavellism preferred conspiracy and distrusted the government, so they showed more willingness to purchase cryptocurrency aimed at decentralization. Psychopathy and Sadism users purchase cryptocurrencies based on FOMO (fear of missing out) and optimism. As most cryptocurrencies use computing resources for mining, it becomes an environmental problem, and many related studies are being conducted. Panah et al. (2022) discussed the tax issue on coins mined by tagging a specific tag on a cryptocurrency mined using hydrogen energy, and presented a solution to the problem of garbage disposal by using cryptocurrency or using the underlying technology, block chain. Cryptocurrency technologies that can be used in the energy management field are being studied (França et al., 2020; Andoni et al., 2019).

As discussed above, research on the use of cryptocurrency, laws, and social impact is being actively conducted, but behavioral research on the reasons why users want to purchase cryptocurrency is relatively lacking. In this research, we intend to construct and present a model that can analyze users' motivation to use cryptocurrency.

2.2 Technology Acceptance Model

Technology acceptance model (TAM) is proposed by Davis (1986) and is widely used in research on acceptance of new technologies. User's technology acceptance is explained based on perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness is the expectation of how useful a new technology is to users. Perceived ease of use means that when a new technology is perceived as easy to use, the willingness to use the related technology increases. Davis found in his paper that perceived usefulness and perceived ease of use affect intention.

The technology acceptance model has already been studied in various fields. Cigdem et al. (2016) conducted a technology acceptance study on the web-based evaluation system in the EFL course. In the study, the analysis was carried out by applying the technology acceptance model along with the factors necessary for EFL web-based evaluation, and it was found that both perceived usefulness and ease of use affect the intention to use. Etriegana et al. (2019) also conducted a technology acceptance study for a web-based virtual laboratory and integrated online learning environment. The study also showed that perceived usefulness and ease of use affect users' intention to use technology. Among recent research, Oyman et al. (2022) on how augmented reality affects consumers was performed with TAM. In the study, it was found that augmented reality had a positive effect on all perceived usefulness, enjoyment, and ease of use, and ultimately also affects the intention to use. Munoz-Leiva et al. (2017) analyzed users' intention to use mobile banking apps and found that perceived usefulness and ease of use affect intentions of use through attitudes. In addition, the same results can be confirmed in many studies such as the acceptance model for machine translation (Yang and Wang, 2019), E-Learning (Abdullah and Ward, 2016), and M-Learning (Al-Emarn et al., 2018).

3 Research Model

A research model was established as shown in Figure 1 to investigate users' intention to use cryptocurrency. In order to identify factors expected to influence usage intentions, 10 users with experience in using cryptocurrency and 10 users without experience were pre-interviewed. As a result, characteristics such as Innovativeness, Self-Efficacy, Profitability, Reliability, and Social Norm were derived as external variables, and a research model was established by classifying them into personal characteristics, cryptocurrency characteristics, and social characteristic.

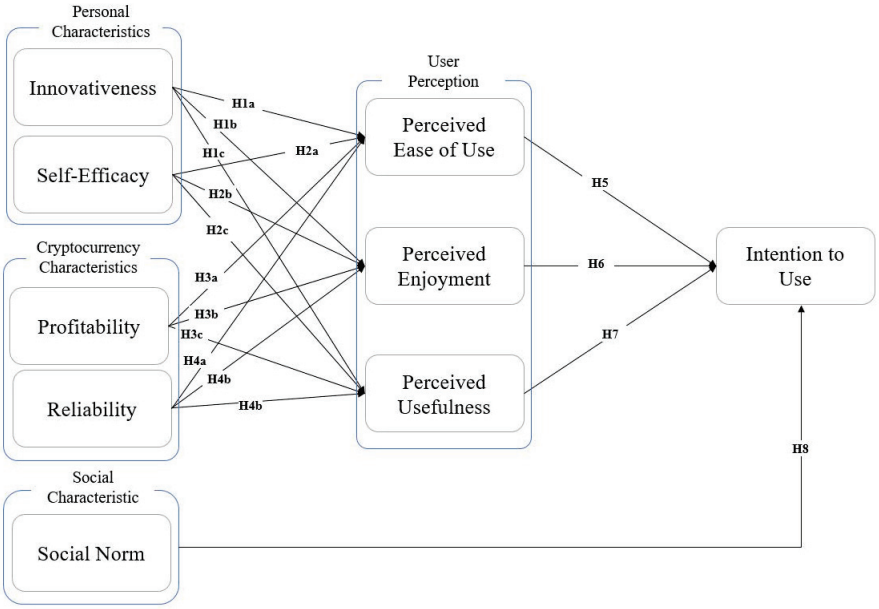

Figure 1 Research model.

3.1 Personal Characteristics

Personal characteristics are one of the factors frequently used in the general new technology acceptance model. When a particular technology is used, the intention to use may be affected due to the characteristics of each individual. In this study, innovativeness and self-efficacy were set as personal characteristics.

According to Rogers (2003)'s Diffusion of Innovations, individual innovation refers to the user's reaction to new things. Users react differently to new technologies, and based on this, Agrwal and Prasad (1998) suggested the criterion of personal innovation in the information and communication field. Since then, numerous studies have shown that personal innovativeness influences user intention (Hong et al., 2021; Hwang et al., 2014; Mohammadi, 2015; Jung et al., 2015; Ding, 2019; Hwang, 2019; Peregrina et al., 2014). Since cryptocurrency belongs to a relatively new technology, a hypotheses were established by judging that the innovativeness of individual users will affect the intention to use.

Self-efficacy refers to the confidence that one can use new skills on one's own. Users with high self-efficacy have positive behavioral changes to solve

problems, which in turn influences acceptance intentions (Bandura, 1982; Compeau and Higgins, 1995). A number of studies have already shown that self-efficacy affects service use intention, and hypotheses were established including self-efficacy in the model of this study (Chen et al., 2011; Hsu and Chiu, 2004; Abdullah and Ward, 2016; Luarn and Lin, 2005; Al-Ammary et al., 2014; Alenezi et al., 2010).

Hypothesis 1. Innovativeness will have a positive effect on User Perception.
Hypothesis 1a. Innovativeness will have a positive effect on Perceived Ease of Use (H1a).
Hypothesis 1b. Innovativeness will have a positive effect on Perceived Enjoyment (H1b).
Hypothesis 1c. Innovativeness will have a positive effect on Perceived Usefulness (H1c).
Hypothesis 2. Self-Efficacy will have a positive effect on User Perception.
Hypothesis 2a. Self-Efficacy will have a positive effect on Perceived Ease of Use (H2a).
Hypothesis 2b. Self-Efficacy will have a positive effect on Perceived Enjoyment (H2b).
Hypothesis 2c. Self-Efficacy will have a positive effect on Perceived Usefulness (H2c).

3.2 Cryptocurrency Characteristics

Cryptocurrency characteristics are factors for the characteristics of cryptocurrency itself. Through preliminary analysis, the characteristics of cryptocurrency were set as profitability and reliability.

Profitability refers to the degree to which users generate revenue through services. Profitability is widely used for acceptance research in the field of new information technologies related to economic fields, and it has been shown to affect usage intentions (Chong et al., 2021; Lee et al., 2019; Abbas Borhani et al., 2021). In addition, as revealed in several studies analyzing cryptocurrency, profitability in cryptocurrency is judged to be a very important factor, so we included profitability in the research model (Davidson and Diamond, 2020; De Angelis et al., 2021; Ahmad et al., 2021; Islam et al., 2022).

Reliability refers to whether a particular service or technology provides information accurately and consistently. In many previous studies, reliability

was found to be an important characteristic of cryptocurrencies (Lee, 2018; Agustina, 2019; Yeong, 2019; Sciarelli et al., 2021). Due to the nature of cryptocurrencies, monetary transactions are made, so reliability, like existing financial services, is judged to have a great influence on users' intentions to use, so it was added as a characteristic of cryptocurrency in the research model (Wang et al., 2022; Jang and Park, 2020; Park, 2019; Fadare et al., 2011).

Hypothesis 3. Profitability will have a positive effect on User Perception.
Hypothesis 3a. Profitability will have a positive effect on Perceived Ease of Use (H3a).
Hypothesis 3b. Profitability will have a positive effect on Perceived Enjoyment (H3b).
Hypothesis 3c. Profitability will have a positive effect on Perceived Usefulness (H3c).
Hypothesis 4. Reliability will have a positive effect on User Perception.
Hypothesis 4a. Reliability will have a positive effect on Perceived Ease of Use (H4a).
Hypothesis 4b. Reliability will have a positive effect on Perceived Enjoyment (H4b).
Hypothesis 4c. Reliability will have a positive effect on Perceived Usefulness (H4c).

3.3 User Perception

Perceived ease of use (PEOU) refers to how easy it is to use a particular technology or service (Liu and Tao, 2022; Wang et al., 2021; Chou et al., 2022; Shin et al., 2022; Xu et al., 2021). If cryptocurrency trading is complicated or difficult, it will not be easy to transact. As a large number of users prefer cryptocurrencies that are easy to use when transmitting or transacting, it was judged that the ease of use of cryptocurrencies will have a very large impact on the intention to use them, so they were included in the factors and hypothesized.

Hypothesis 5. Perceived Ease of Use will have a positive effect on Intention to Use (H5).

Perceived enjoyment means that the user feels pleasure when using a particular technology. In general, people who are interested in games or new technologies are known to find it fun (Xu et al., 2021; Oyman et al., 2022; Al-Ammary et al., 2014; Alenezi and Karim, 2010). In the pre-interview,

it was judged that young people have fun in trading cryptocurrency and have tendencies to think of it as a kind of game. To confirm this, perceived enjoyment was set as a hypothetical variable within the research model.

> Hypothesis 6. Perceived Enjoyment will have a positive effect on Intention to Use (H6).

Perceived usefulness (PU) is how users feel that a particular skill will be useful(Liu and Tao, 2022; Wang et al., 2021; Chou et al., 2022; Shin et al., 2022; Mutambara and Bayaga, 2021; Al-gahtami, 2014). In general, when a new technology is useful to you, you are more likely to use or purchase it. Therefore perceived usefulness was used to judge that users perceive cryptocurrency to be useful.

> Hypothesis 7. Perceived Usefulness will have a positive effect on Intention to Use (H7).

3.4 Social Characteristic

Many researchers have considered the factor 'social norm' to reflect the social impact in expanded TAM (Al-gahtami, 2014; Bravo et al., 2022; Fox et al., 2021; Mutambara and Bayaga, 2021; Raffaghelli et al., 2022; Scovell, 2022; Wang et al., 2021; Xu et al., 2021; Yang and Zhou, 2011). In addition, social norm was set as a factor that directly affects 'Intention to Use' without going through 'Perceived Ease of Use' and 'Use', which are the main mediating factors of TAM (Dickinger et al., 2008; Nasri and Charfeddine, 2012; Wang et al., 2021; Yoon, 2018). If a large number of users are using it or someone close to me is using a specific service and technology, it can be said that it has a great influence on intention to use. Even during the pre-interview, there were many responses that they tried it because many users were using it, so it was included in the model of this study and the following hypothesis was established.

> Hypothesis 8. Social Norm will have a positive effect on Intention to Use (H8).

4 Empirical Research

4.1 Data Collection and Respondent Characteristics

An empirical analysis was conducted to verify the research model and hypotheses. The questionnaire was collected both online and offline from June to July 2021. A total of 210 responses were collected, and 201 responses

Table 1 Respondent characteristics

Characteristic	Category	Frequency	Ratio
Gender	Male	145	72.1%
	Female	56	27.9%
Age	20's	103	51.2%
	30's	27	13.4%
	40's	62	30.9%
	50's	9	4.5%
User experience	Yes	106	52.7%
	No	95	47.3%

were used for analysis, excluding 9 responses with missing value and low credibility. The demographic characteristics are shown in Table 1. Since this study is related to cryptocurrency, it was judged that it is reasonable that the people in their 20s, who are relatively quick to adopt technology, and those in their 40s, who are interested in investment, occupy a high proportion, so this sample was used for analysis. By occupation, university (graduate) students accounted for the most with 82, followed by office workers with 65, self-employed with 17, and civil servants with 11, and others with 26. Among the total respondents, 106 users had experience with cryptocurrency, and 95 respondents did not. Among users with experience, 63% were within 6 months, 20% within 3 years, 8% within 1 year, and 7% within 3 years. Similar to the current cryptocurrency market flow, it seems to properly represent the distribution of users who entered early and held for a long time and users who have recently entered.

4.2 Identification of Latent Variables using Factor Analysis

(1) Factor Analysis

In this study, two factor analyses, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), was performed to identify latent variables. We can identify the latent variables from respondents' responses using EFA and verify whether the responses are properly grouped using CFA. Factors Analyses are summarized in Table 2.

(2) Reliability Test

Cronbach's α is the most widely used to verify the reliability of EFA. As a result of reliability verification, all factors were 0.7 or higher, indicating appropriate reliability. Another way of confirming the reliability of measurement variables is verifying that Average Variance Extracted (AVE) and

Table 2 Results of factor analysis and reliability test

Factor (Latent Var.)	Questionnaire (Observed Var.)	Cronbach's α	AVE	Construct Reliability
Innovativeness	Innovativeness1	0.805	0.644	0.780
	Innovativeness2			
Self-Efficacy	Self-Efficacy1	0.862	0.662	0.794
	Self-Efficacy2			
Profitability	Profitability1	0.850	0.614	0.761
	Profitability2			
Reliability	Reliability1	0.748	0.527	0.690
	Reliability2			
Perceived Ease of Use	PEOU1	0.926	0.782	0.877
	PEOU2			
Perceived Enjoyment	Enjoyment1	0.945	0.832	0.909
	Enjoyment2			
Perceived Usefulness	Usefulness1	0.894	0.735	0.847
	Usefulness2			
Social Norm	Social Norm1	0.815	0.624	0.768
	Social Norm2			
Intention	Intention1	0.948	0.763	0.906
	Intention2			
	Intention3			

Kaiser-Meyer-Olkin's MSA: 0.883, Bartlett's test (p-value) < 0.0001.

Construct Reliability (CR) are higher than 0.5 and 0.7 respectively. In this study both AVE and CR are higher than recommended levels, it is confirmed that each factor has enough reliability.

4.3 Path Coefficient of the Research Model

(1) Model Fit

In order to evaluate the fitness of the research model, we adopt a variety of fit indicators such as Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted GFI (AGFI), and RMSEA (root mean square error of approximation).

χ^2/df means the degree of freedom of the model divided by the chi-square showing the difference between the sample data and the estimated covariance matrix. In general, when the value is 3.0 or less, the model is judged to be suitable, and in this study, the value of 1.767 can be said to be suitable. CFI is one of the incremental fit indices and is used to compensate

for the shortcomings of Normed Fit Index (NFI). GFI is the most widely used indicator, and in this study, it was slightly lower than the standard value of 0.9, but it was found that most indicators were at an appropriate level. AGFI is a modified indicator of GFI, and in general, 0.8 or more is good, and the AGFI value of this research model was 0.845, which satisfies the standard.

RMSEA is an index indicating the degree of error indicated by the data used for analysis in the research model, and if it is less than 0.1, it is considered appropriate. The RMSEA value for this study was found to be 0.0412, which is considered an acceptable level. Incremental Fit Index (IFI) and Turker-Lewis Index (TLI) have similar concepts and show similar indicators to CFI, and if it is 0.9 or higher, it is judged appropriate. The fitness index values of our model are 0.969 and 0.957, respectively, confirming that they are suitable.

As a result of examining the above indicators, it can be confirmed that satisfactory levels of fit can be confirmed in most indicators, and that there is no problem with the fitness of the research model.

(2) Path Coefficient

Table 3 shows the path coefficients and p-value of each path based on the analysis results of the research model.

According to Table 3, Innovativeness affects only Perceived Enjoyment among users' perception, and hypothesis H1b was found to be statistically significant.

However Self-Efficacy affects Perceived Ease of Use and Enjoyment with a significance level of 0.001. On the other hand, hypothesis H2c that Self-Efficacy affects Perceived Usefulness was not supported. Hypothesis H3a that Profitability affects Perceived Ease of Use, was not supported, and hypotheses H3b and H3c, which affect Perceived Enjoyment and Perceived Usefulness, were supported with a p-value of 0.001. Through the hypotheses H4a and H4c, it can be confirmed that Reliability has a positive effect on Perceived Ease of Use and Usefulness, and it can be confirmed that H4b is not supported. Perceived Ease of Use, Perceived Enjoyment, and Usefulness all had an effect on Intention to Use, and Social Norm did not affect Intention of Use.

4.4 Interpretation of Analysis Results

Figure 2 shows the results of path analysis. It was found that personal characteristics and cryptocurrency characteristics affected Intention to Use

Table 3 Path analysis results

Hypo.	Path	Coeff.	P-value	Result
H1a	Perceived Ease of Use ← Innovativeness	0.090	0.200	not supported
H1b	Perceived Enjoyment ← Innovativeness	0.127	0.019	supported
H1c	Perceived Usefulness ← Innovativeness	−0.006	0.917	not supported
H2a	Perceived Ease of Use ← Self-Efficacy	0.467	<0.0001	supported
H2b	Perceived Enjoyment ← Self-Efficacy	0.377	<0.0001	supported
H2c	Perceived Usefulness ← Self-Efficacy	−0.068	0.322	not supported
H3a	Perceived Ease of Use ← Profitability	0.088	0.375	not supported
H3b	Perceived Enjoyment ← Profitability	0.537	<0.0001	supported
H3c	Perceived Usefulness ← Profitability	0.796	<0.0001	supported
H4a	Perceived Ease of Use ← Reliability	0.205	0.023	supported
H4b	Perceived Enjoyment ← Reliability	0.021	0.762	not supported
H4c	Perceived Usefulness ← Reliability	0.140	0.067	supported
H5	Intention to Use ← Perceived Ease of Use	0.143	0.003	supported
H6	Intention to Use ← Perceived Enjoyment	0.425	<0.0001	supported
H7	Intention to Use ← Perceived Usefulness	0.424	<0.0001	supported
H8	Intention to Use ← Social Norm	0.079	0.150	not supported

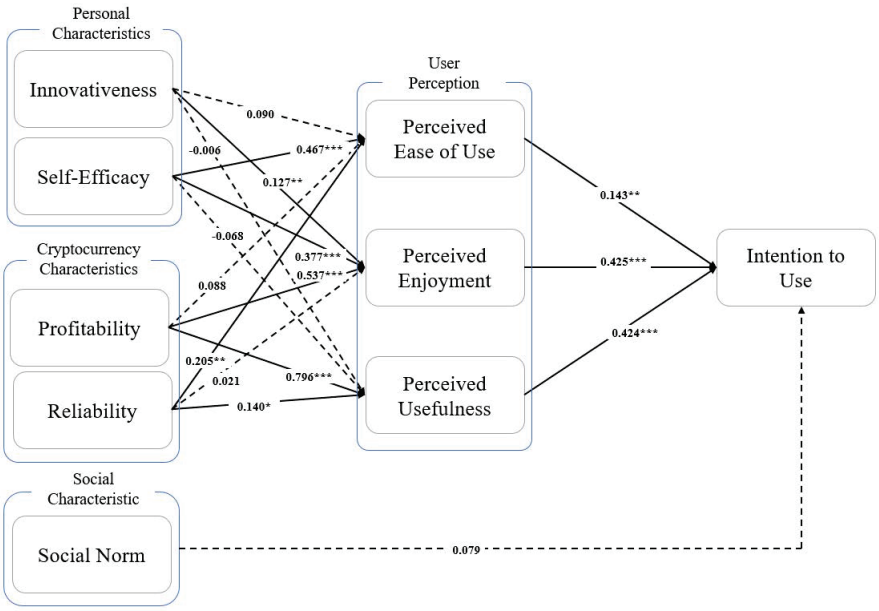

Figure 2 Analysis results.

through Perceived Ease of Use, Enjoyment, and Usefulness, while social characteristic did not have a significant effect.

(1) Personal Characteristics

Hypothesis H1b that Innovativeness, one of the personal characteristics, has a positive effect on Perceived Enjoyment was accepted, and Hypotheses H1a and H1c that Innovativeness positively affected Perceived Ease of Use and Perceived Usefulness were not supported. The higher the individual's innovativeness, the more actively he responds to new technologies, and the relatively low ease of use and usefulness of new technologies. On the other hand, it is a common phenomenon among early adopters that highly innovative people feel pleasure when using new technology, and the Innovativeness has a positive effect on Perceived Enjoyment. In particular, the use of cryptocurrency is very complex and difficult to access compared to other technologies, so it seems difficult for individual Innovativeness to affect Perceived Ease of Use.

Hypotheses H2a and H2b, testing the influence of Self-Efficacy on Perceived Ease of Use and Perceived Enjoyment, were supported and hypothesis H2c that it would affect Perceived Usefulness was not supported. Since Self-Efficacy is the kind of belief that certain problems or services can be solved positively when using them, it seems to have a positive effect on ease of use, and it seems to affect Perceived Enjoyment when using new technologies well. Due to the fundamental characteristics of cryptocurrency, users are required to have a high level of complexity in use. The higher the Self-Efficacy, the easier it is to solve these procedures, and it is judged that the positive effect on one's ability while solving problems has a positive effect on Perceived Enjoyment. On the other hand, H2c is not supported, which seems to be because the benefits that can be obtained from individual characteristics when using cryptocurrency such as Innovativeness are low compared to Profitability.

It can be concluded that personal characteristics in using cryptocurrency do not significantly affect usefulness, but positively affect enjoyment and ease of use. This result can be confirmed through the fact that Dogecoin, a coin that has no utility, is traded at a fairly high price. It can be seen that users have fun in trading and using coins and regard it as a game.

(2) Cryptocurrency Characteristics

Hypothesis H3a that Profitability among cryptocurrencies characteristics will have a positive effect on Perceived Ease of Use was not supported, and Hypotheses H3b and H3c that Profitability would have a positive effect on

Perceived Enjoyment and Perceived Usefulness were accepted. Profitability is a very important factor in cryptocurrency, and in the current market atmosphere where cryptocurrency is viewed as an investment tool, it is considered a very natural phenomenon to have a positive effect on usefulness. The reason for the positive effect on Perceived Enjoyment seems to be that users who have benefited from cryptocurrencies feel pleasure from accumulating wealth. On the other hand, the fact that it does not affect ease of use seems to have occurred because the convenience of the cryptocurrency used by users does not change significantly even if the Profitability of the cryptocurrency is high.

H4a and H4c were adopted that the Reliability characteristics would have a positive effect on Perceived Ease of Use and Perceived Usefulness. On the other hand, hypothesis H4b that Reliability affects Perceived Enjoyment was not supported. Reliability has a major influence on the Intention to Use in various new technologies, and it emerges as an even more important factor when financial transactions such as cryptocurrency occur. The higher the Reliability, the more stable transactions are possible in cryptocurrency transactions, and this seems to have a positive effect on the Perceived Ease of Use.

(3) Social Characteristic

Hypothesis H8 that social characteristic would influence Intention to Use was not supported. It is judged that users are using cryptocurrency according to their own judgment rather than the opinions of others at the present time when cryptocurrency is being used as an investment target where financial transactions are actually made. In fact, when you ask others for opinions about cryptocurrency purchases online, you can get a lot of responses called DYOR (Do Your Own Research). In the end, it can be said that the above result was obtained because the investment choice is made by the person himself/herself. However, in the case of users without experience, it was judged that social characteristic could have an effect, so to analyze this more clearly, additional analysis was performed by separating cryptocurrency users and non-users.

Hypotheses H5, H6, and H7 that Perceived Ease of Use, Perceived Enjoyment, and Perceived Usefulness have a positive effect on Intention to Use were all accepted. It has been proven that each factor affects the Intention to Use in the technology acceptance model and most of the new technology acceptance studies, and the same results were obtained in this study.

(4) Multi-group Analysis

In this research, we performed a multi-group analysis to determine the differences between the behaviors of respondents with and without cryptocurrency experience.

Path analysis was conducted for two groups of cryptocurrency users and non-users, and the analysis results for users are shown in Figure 3 and the analysis results for non-users are shown in Figure 4. In addition, Table 4 shows the comparison of path analysis results of two groups. The colored part of the table shows the difference between the two groups.

Looking at the group comparison results, there are cases where the hypothesis test results of the two groups are opposite. Hypothesis H1b and H5 was supported in user group, but not supported in non-user group. On the other hand, hypotheses H4a, H4b, and H8 were not supported in the User group, but were supported in the Non-user group.

The conflicting results of Hypothesis H1b show that users of user groups with innovative tendencies perceive joy through their experience of using cryptocurrency. However, the people in the non-user group had no experience of using it and had no chance to enjoy it.

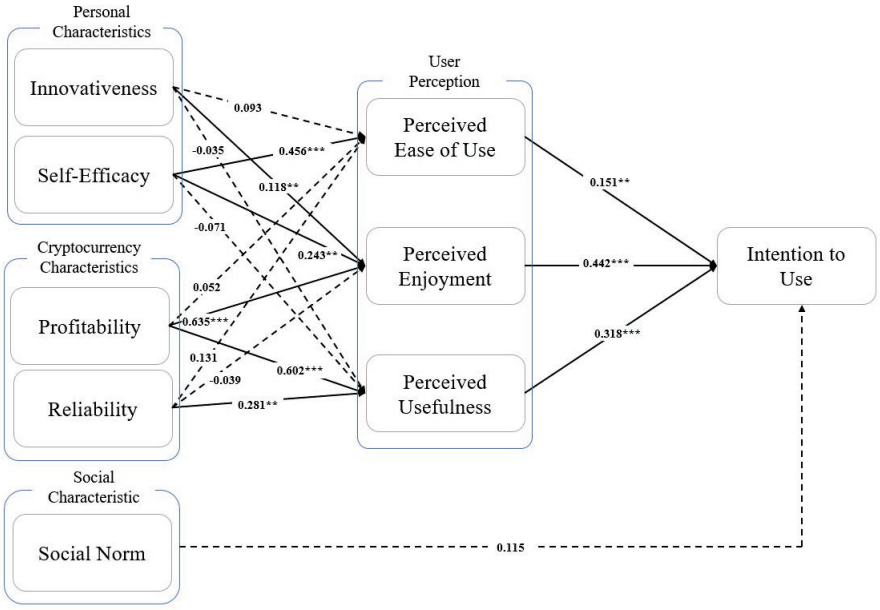

Figure 3 Analysis results (users).

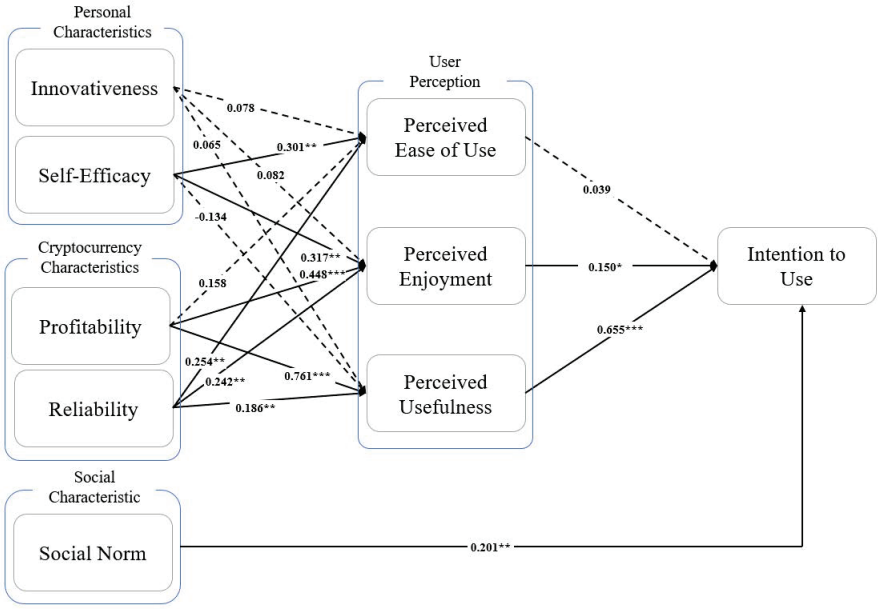

Figure 4 Analysis results (non-users).

Table 4 Comparison of path analysis results for multi-group

Hypo.	Path	User	Non-User
H1a	Perceived Ease of Use ← Innovativeness	not supported	not supported
H1b	Perceived Enjoyment ← Innovativeness	supported	not supported
H1c	Perceived Usefulness ← Innovativeness	not supported	not supported
H2a	Perceived Ease of Use ← Self-Efficacy	supported	supported
H2b	Perceived Enjoyment ← Self-Efficacy	supported	supported
H2c	Perceived Usefulness ← Self-Efficacy	not supported	not supported
H3a	Perceived Ease of Use ← Profitability	not supported	not supported
H3b	Perceived Enjoyment ← Profitability	supported	supported
H3c	Perceived Usefulness ← Profitability	supported	supported
H4a	Perceived Ease of Use ← Reliability	not supported	supported
H4b	Perceived Enjoyment ← Reliability	not supported	supported
H4c	Perceived Usefulness ← Reliability	supported	supported
H5	Intention to Use ← Perceived Ease of Use	supported	not supported
H6	Intention to Use ← Perceived Enjoyment	supported	supported
H7	Intention to Use ← Perceived Usefulness	supported	supported
H8	Intention to Use ← Social Norm	not supported	supported

Contradicting results of Hypothesis H5 implies that people with experience in using cryptocurrency have a positive effect on their intention to use it if it is convenient, and on the contrary, those without experience have no intention of using it even in an easy-to-use environment.

The difference in multi-group test results of hypotheses H4a and H4b implies that the user group recognizes the reliability of cryptocurrency as an independent factor that has nothing to do with ease of use and enjoyment, and the non-user group seems to recognize that it is easy to use and enjoyable if it is a reliable technology, such as the results shown in general TAM.

The conflicting results of Hypothesis H8 implies that User groups already have experience in use, so they determine their intention to use it with or without social norms, and non-user groups are affected by the behavior or social atmosphere of people around them.

5 Conclusion

This research aimed to identify the structural relationship among factors affecting the intention to use cryptocurrency. We established a research model consisting of personal characteristics, cryptocurrency characteristics, user perception and social characteristic. In addition, a multi-group analysis was performed by separating respondents with/without experience of using cryptocurrency.

As a result of the analysis, it was found that personal characteristics and cryptocurrency characteristics have a positive effect on the use of cryptocurrency through Perceived Ease of Use, Perceived Enjoyment, and Perceived Usefulness. In particular, it was found that individual Innovativeness affected Intention to Use through Perceived Enjoyment, and Self-Efficacy affected Intention to Use through Perceived Ease of Use and Perceived Enjoyment. Based on these results, it can be said that personal characteristics may not be useful for cryptocurrency use, but if an individual responds positively to a new technology or believes that they can solve a problem on their own, they will enjoy using cryptocurrency and will be more likely to use it. When implementing cryptocurrency, it seems that it will be possible to use it more actively if it not only makes it convenient for users to use it, but also provides a part where they can feel pleasure without special features like Dogecoin.

Among the characteristics of cryptocurrency, Profitability had a positive effect on Intention to Use through Perceived Enjoyment and Perceived Usefulness, and Reliability had a positive effect on Intention to Use through

Perceived Ease of Use and Perceived Usefulness. Users consider cryptocurrency as an investment, so if it can bring a high level of economic benefit, they will be more active in using cryptocurrency even if it is somewhat inconvenient to use. Also, it will be important to demonstrate a high level of trust using a blockchain, as the higher the level of Reliability, the more users can use the cryptocurrency.

As a result of multi-group analysis for users and non-users, it was found that social characteristic of non-users had a positive effect on their Intention to Use. Non-users are potential customers who are likely to use cryptocurrency in the future, and since these non-users use cryptocurrency through social influence, it will be necessary to establish marketing activities that consider social characteristic rather than other characteristics for them. In addition, non-users are more likely to use cryptocurrency through social characteristic, so in order to prevent related fraud or improper investment, related systems and fraud prevention measures should be presented in detail to induce correct use of cryptocurrency.

The use of cryptocurrency has an investment purpose, so it can be seen that users and non-users value the factors of Profitability and Reliability. From the perspective of Social Norm, the social impact on cryptocurrency is not significant, but it implies that non-user group interested in cryptocurrency may be affected by social environment. Individuals' innovative tendencies did not affect all user perceptions in consideration of the risks from investment.

Therefore, it suggests that companies that exchanges cryptocurrency or that uses blockchain technology should emphasize the possibility of generating profits/losses and the safety of transactions to investors, and consider in advance whether individual tendencies are suitable for cryptocurrency transactions.

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Biographies

Sang Hoon Lee received his Bachelor of Information Engineering from Daegu University in 2013, Master of Computer and Information Engineering from Daegu University in 2015, and PhD in Information Engineering from Daegu University in 2018. He is currently a researcher and lecturer in the School of Computer and Information Engineering, Daegu University, Republic of Korea. His main research fields are recommendation systems, intellectual property rights and smart systems. Recently, he is working as an advisor to several projects in the blockchain and NFT fields.

Hyun-Seok Hwang is a Professor of Business Administration and a research fellow of Hallym Business Research Institute at Hallym University, Chuncheon, Republic of Korea. He received his PhD, Master, Bachelor in Industrial and Management Engineering from the Pohang University of Science and Technology (POSTECH), South Korea. His research interests cover Fintech, Big Data Analytics, and Digital Contents. He is also a director of fintech start-up and a deliberation committee member of the government's information institution.

Su-Yeon Kim received her Bachelor of Science in Mathematics from Pohang University of Science and Technology (POSTECH) in 1991, her Master of Science in Information Industry from Soongsil University in 1997, and her PhD in Industrial Engineering from POSTECH in 2003. She has worked for many years in IT consulting, including information strategy planning and data modeling for financial institutions, and is currently a professor in the Department of Computer and Information Engineering, Daegu University, Republic of Korea. Her research interests includes technology management, recommendation systems, and intellectual property management. She works as an informatization advisor for a local government in Korea, and recently founded a technology-based startup and serves as the CEO.