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Personal Information Platform based on the Different Blockchain Technology

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Abstract

This study aims to investigate cases of new service marketing markets emerging through the convergence of big data, artificial intelligence (AI), and ICT technologies across various industries in the era of the Fourth Industrial Revolution, and to create demand accordingly. Individual medical biosignals are stored as separate medical data, which are managed as integrated medical big data. This data constitutes personal information that can be provided to desired medical institutions based on the individual's consent. Furthermore, as regular medical information accumulates daily as personal biosignals through smart medical devices, the created medical big data can be utilized diversely through medical information platform services employing AI-based medical image processing technologies and distributed medical data sharing systems designed to protect personal information, enabling expansion into related industrial fields.

However, since 'individual medical information' has the potential for misuse, it is essential to establish and apply security technologies for personal information protection. Therefore, with respect to various medical information platforms currently under active development—for example, blockchain-based security technologies for personal information protection such as the 'Blockchain for Medical Platform'—this study analyzed the importance of individual characteristic factors focusing on determinants of 'service acceptance intention' from a marketing perspective targeting service users.

Keywords: Blockchain, Medical information platform, Personal Data Protection, Service Marketing, Fourth Industrial Revolution

JEL Classification: M10, M30, M31

1. Introduction

1.1. Background, Necessity and Purpose of the Study

The era of hyper-connectedness with information technology (ICT) and the technological progress of the 4th industrial revolution are changing the paradigm of society as a whole. In particular, in the field of ICT, such as blockchain security technology, personal information protection, big data management, and artificial intelligence utilization, conventional industries and the above new technologies are combined in various fields to achieve rapid development of the technology. Among them, the appropriate development of IT technology and medical technology using artificial intelligence is not only fast processing of medical

services, but also how to use individual medical information databases to create new values.

Blockchain technology refers to a new technology that introduces a system called distributed ledger technology to distribute and store it on each computer connected to the blockchain, rather than integrating and managing data by a central server device in a basic general way in storing and managing data. The commercialization and development of these blockchain technologies took place in 2008 when Satoshi Nakamoto's protocol, which invented Bitcoin as a virtual currency, was first released by enabling peer-to-peer (P2P) transfers without intermediary financial institutions.

However, there is an evaluation that the industrial acceptance of the medical information platform

technology has not been universally accepted despite its technological value. There are multiple factors such as introduction cost, service user perception, and medical institution necessity and economic feasibility, but management research is needed to examine the process of introducing new technologies, and there are still insufficient studies on the acceptance intention of service users on the medical information platform for blockchain-based personal information protection.

For example, there are various factors, such as service users' interest in introducing new technologies, the convenience and economic benefits of the technology itself, and to persuade service users based on this, medical personnel, the general public, gender, and generations should be set as a comparative group, and differences between each comparative group should be analyzed between the various factors that make up the acceptance intention.

In the end, from this perspective, this study examines the determinants of service users' "service acceptance intention" for each comparative group on whether a medical information platform applying blockchain-based personal information protection security technology using AI can be introduced as a new technology, and attempts to explore significant differences in each group by dividing the comparative group by gender, professionalism, and age. Therefore, this study is different from previous studies in that it is the first attempt to focus on gender, expertise, and generational differences on 'service acceptance intention' as a moderating effect, and whether to apply AI-based personal information protection security technology to existing medical information platforms will be able to be examined by gender, expert, and age, and the main purpose of this study is to suggest to policymakers, developers, and medical institutions in order to persuade each comparative group of advantages in the development stage of applying AI and security technology when developing a new medical information platform.

2. Theoretical Background

The need of personal information protection system for medical information platform

The data platform processed by medical information platform is mainly derived from medical information platform based on personal biometric information, blood type, blood type, blood type, blood type, blood type, blood type, and disease information. Also, it is a medical platform that manages medical platform to manage medical big data as a source of personal information and

personal information protection law that manages medical big data and personal information protection law.

Recently, SK Telecom has been in crisis in crisis, as a mobile phone communication company, as well as criminal punishment company, and personal information was hacked. "SKT Yoo-mi's legal response to leakage...Comprehensive litigation comprehensive" (Yonhap News Agency, 2025).

In the same case, it is a major implications for personal information protection, and significant point of development of personal information platform, and future medical information platform.

Recently, the role of medical information platform is not only functional EMR, but it is expected to be the most effective result of the medical intelligence system using AI to be the most important result.

However, if the medical information of patients are exclusive system, it is necessary to manage personal information such as maliciously used to manage personal information leakage, such as an alternative personal information leakage.

According to the current personal information Protection Act, individual information management stocks, and the case where individual information is lost, or damage to the scope of the scope or damage to the scope.(Article 39-2 (1) of the Personal Information Protection Act, but the amount of personal information Protection Act may be exponentially expanded exponentially.

Therefore, various medical information platforms such as medical institutions, such as medical institutions and medical information management institutions and medical information management methods, such as medical institutions and medical information management methods.

On July 20,2417, the Supreme Court decided to compensate all 5 million won per capita information sold by the insurance company in the home plug-in information sold by the insurance company. The victim was confirmed that there is 20,000 million people, and if the personal information process is not proof that the individual information processing is not the intention to prove that there is no intention of damages. "I know how to wake up lmm". Supreme Court ruled "Please compensate for 4 people." (Lee, 2024)

In addition, SK Telecom, SK Telecom is confirmed that the reason for damages caused by malicious code customers due to malicious code, such as malicious code, and the company's responsibility for damages due to malicious codes (Jung & Hwang, 2025).

Therefore, it is clearly recognized that medical institutions will not support the security system through blockchain-based medical information platform.

A Case of introduction to the derived from the derived from the original personal information protection technology

Blockchain technology appeared with Bitcoin (Unitcoin) developed by Sato Nakamoto in 2008. Blockchain is a technology capable of transactions by connecting the distributed disclosure through the authentication process that many people participated through the authentication process (P2P) method. The P2P network and the distributed Director technology (Dist Technology) and smart contracts, and smart contracts, and smart contracts, which are difficult to be recognized in common.

In blockchain system, the transaction in blockchain system is stored in blockchain system, and each block is a chain structure that connects each block, and each block is the best block. In the case of blockchain technology, the main advantage of blockchain technology, which is distributed and replicated by consensus on various ways to distribute transactions by agreement.

In 2024, Busan Metropolitan City, Busan Metropolitan Government's Health Examination Center to provide blockchain-based medical information platform to provide blockchain-based medical information platform."Ha Kyungmin reporter" Blockchain-based medical information platform" (NU'EST'EST', 2024).

Currently, most medical institutions to health examination centers and health examination centers are stored in the hospital internal system, and protection of their medical records, and protection with inefficient atmosphere according to confirm their medical records. In particular, in the case of foreign patients with lack of support for language, but it was difficult to share the above information, but it can be shared by the introduced by the introduction of the above.

The "Madom" explained that the above blockchain-based medical information platform system, especially in real-time medical information platform system, and provide various language support services.

2.3. Research on Prior Studies

Prior research on the factors affecting the acceptance intention of users of medical information platforms applying blockchain-based security technology has recently occurred and is steadily increasing. The

effect of blockchain characteristics on consumer use intention: Kim Ha-gyun et al. (2024), focusing on the technology acceptance model, consisted of five categories: decentralization, security, diversity, reliability, and transparency. Blockchain characteristics and factors that influence blockchain acceptance intention (2016) Kim Jin-hwa et al. classified stability, efficiency, transparency, security, etc., Kim Jung-seok and Kim Kwang-yong (2017) classified them into security, diversity, reliability, economy, availability, etc., and Kim Sung-young and Ahn Seung-beom (2018) classified their characteristics into availability, economy, and diversity.

And Kwak Jae-hyun (2018) analyzed about 20 blockchain thesis studies, and selected the characteristics of the repeated parts more than three times among the characteristics as keywords such as security, reliability, decentralization, availability, efficiency, economy, scalability, diversity, immutability, stability, and anonymity. In the study of Kim Soo-jung et al. (2019), through literature research, it was considered that the characteristics of blockchain technology include security, economy, reliability, ease, diversity, and availability, among which security, reliability, and economy were used as research variables.

In the end, based on these prior studies, this study selected six factors: 1) security 2) reliability 3) availability 4) diversity 5) ease of business as factors that have a major influence on 'service acceptance intention' among the characteristics of blockchain-based medical information platforms. Accordingly, in this study, these six characteristics were defined as basic attributes based on related literature and theory.

Therefore, in this study, the characteristics of the 'medical information platform applied with blockchain-based personal information protection technology' were identified as independent factors, and they were reconstructed into six independent variables.

1) Security is defined as 'the degree to which the customer's personal information and related medical data can be protected and defended from technical external attacks such as hacking or tracking', 2) Reliability is reliable for data to be trusted and there will be no errors in the data processing process, and 3) Availability is 'the degree to which data can be managed and provided conveniently at all times so that there is no problem in using it.' In addition, 4) Diversity can be implemented in various services and functions, 5) Economic benefit is defined as 'the degree to which the management entity generates economic benefits from the introduction of a blockchain-based medical information platform',

and 6) Ease is defined as 'the degree to which we think it is currently systematically easy to introduce a blockchain-based medical information platform'.

The conceptual definition of specific blockchain-related characteristics is plotted and summarized in

Table 1 below. In addition, each of the above independent variables is expected to have a significant effect on 'service acceptance intention' as such a dependent variable, so research methods such as research models and research questions are decided, and it will be presented in the next chapter.

Table 1: Conceptual Definition

Blockchain characteristics	Description	References
Security	The degree to which customers' personal information and related medical data can be protected and protected from technical external attacks such as hacking and tracking	Kim Jin-hwa (2016) etc
Reliability	The degree of trust your data can be trusted, transparent, and securely processed without errors	Kwak Jae-hyun (2018), etc
Availability	The degree to which data is managed and provided conveniently to ensure stable use at all times, so that there is no problem with use.	Kim Sung-young, Ahn Seung-beom (2018), etc
Diversity	The extent to which various services and functions can be implemented and widely used in various fields	Kim Ha-gyun (2024) etc
Economic benefit	The degree to which the management entity generates economic benefits from the introduction of a blockchain-based medical information platform	Kwak Jae-hyun (2018), etc
Easiness	How easy it is to introduce a blockchain-based medical information platform at present	Kim Soo-jung, etc. (2019)

3. Study on the Research Method

3.1 Research Model

This study focuses on the potential users of medical information platform services that can be developed in the future of medical information platform service users to predict the potential users of actual service users.

The reason why the existing technology acceptance

model, is evaluated that the existing technology acceptance model.

The main characteristics of each blockchain-based security technology (Reli) to determine the difference (A) to determine the difference of the method (Avail) of each blockchain-based security technology. The research model is as shown in <Figure 1> below.

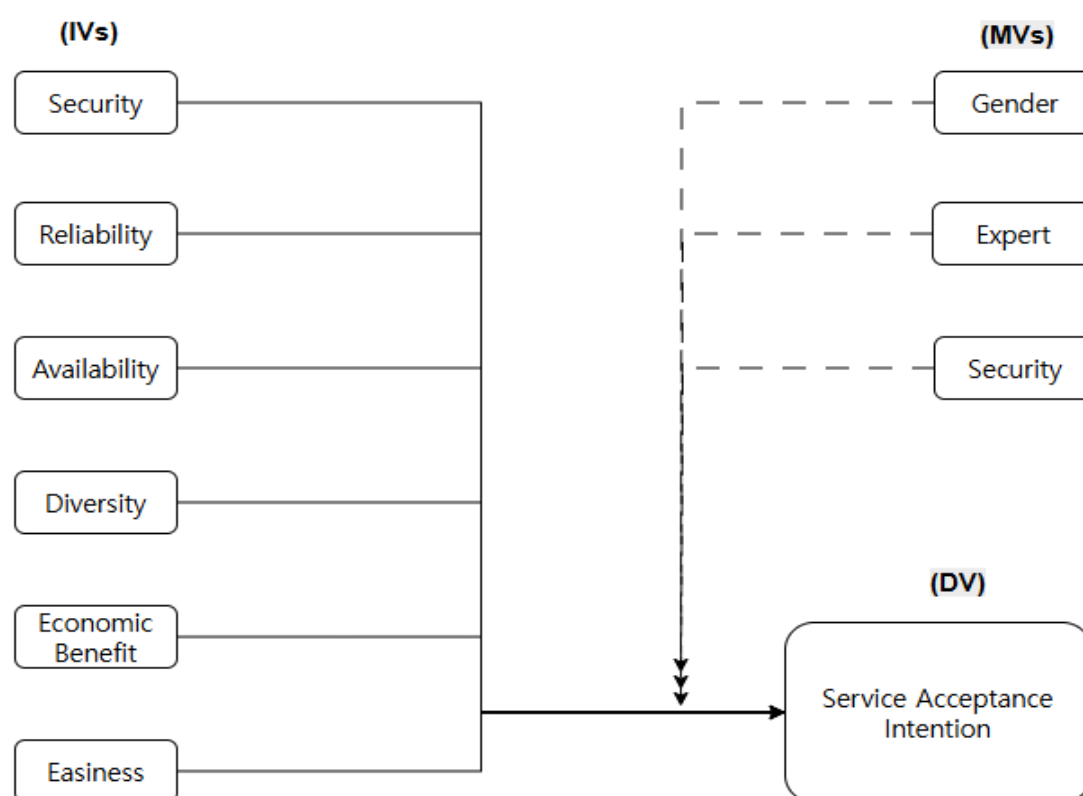


Figure 1: Research Model

3.2. Research Questions

The main purpose of this study is to investigate the correlation between the service acceptance intention based on the characteristics of the blockchain-based medical information platform and the regulating factors among the comparative groups. Based on the theoretical background of previous studies, the research questions were composed as follows.

- 1) Research Question (RQ1): Which of the six main characteristics of the medical information platform (e.g., security, reliability, availability, diversity, economy, ease, and hereinafter referred to as 'platform characteristics') that will be equipped when applying blockchain security technology has a significant effect on the user's 'service acceptance intention'?
- 2) Research Question (RQ2): Will there be a significant difference in propensity according to 'gender' for each characteristic factor in 'platform characteristics' and 'service acceptance intention'?
- 3) Research Question (RQ3): Will there be a significant difference in propensity according to the understanding of each characteristic factor according to 'professionalism' in 'platform

characteristics' and 'service acceptance intention'?

- 4) Research Question (RQ4): Will each characteristic factor show a significant difference in propensity according to the age level of 'age' in 'platform characteristics' and 'service acceptance intention'?

3.3. Study Subjects and Analysis Methods

- 1) Information on security, data, personal information leakage, personal information protection, personal information protection, data protection, data, and reliability. In various areas, it will be used to be used in various fields, and the use of economic conditions, and maintenance of the use of economic improvement costs, and maintenance costs.

In order to specific data, each measurement questions, each measurement questions, each measurement text and standard deviation is derived by using the Likert.

Table 2: Questionnaire Item

IVs	QUESTIONNAIRE	SCALE
SEC	It is necessary to be safe from the dangers of hacking	Likert 1~5
	It is necessary to prevent the leakage of personal information	
	It is important to protect personal medical information.	
	It is important to secure data loss by distributed storage of medical information.	
	It is necessary to introduce a real-time tracking management system for personal medical information data.	
REL	The reliability of the personal information provided will increase.	Likert 1~5
	Trust in the quality of medical services itself will increase.	
	Confidence in the authenticity of medical data will increase.	
	It will be safe from data loss.	
	The data processing process will be monitored transparently.	
AVA	It is important to make it available at all times.	Likert 1~5
	There should be no functional problems or bugs in using it.	
	It should always operate stably from electrostatic light disturbances.	
	Data should be managed and data recovered conveniently.	
	Preparations should be made to use alternative means even in the event of a communication failure.	
DIV	Records should be processed and managed in various forms	Likert 1~5
	Medical information records should be searchable and tracked in various categories.	
	Various information service provision and systems should be prepared.	
	Various additional functions should be implemented.	
	It should be able to be used in various fields.	
ECO	The cost of introducing the system should be economical.	Likert 1~5
	The cost of maintaining the system should be economical (such as monthly costs)	
	The cost of use that the user has to pay per case must be economical.	
	With the introduction of the system, the expected value, such as the promotion of hospitals, should be high.	
	With the introduction of the system, the contribution to increasing sales of hospitals should be high.	
EAS	It should be easy and comfortable to use the interface.	Likert 1~5
	It should be at a level that patients can easily use and adapt.	
	The timing of the introduction of the medical information platform is now appropriate.	
	I think the current level of blockchain-related technology is stable.	
	I am willing to use related above medical services if they are provided.	

The survey was conducted between March 12, 25 and 20 days. In relation to the online survey, and live online survey was conducted by randomly selected, and live without related to the region and live without related to the region.

Specifically, it was shown in <Table 3>.

Table 3: Demographic characteristics of survey participants (n=256)

MVs	CATEGORY	N	%
Gender	Male	133	51.9
	Female	123	48.1
Expert	General public	132	51.5
	Medical staff	124	48.5

4. Results

4.1. Results of the Importance Analysis of Service Acceptance Intention (dependent variable) based on Platform Characteristics (independent variable)

Regarding the research question (RQ1), it was set as 'Which of the six main characteristics of the medical information platform (e.g., security, reliability, availability, diversity, economy, ease, and hereinafter referred to as 'platform characteristics') that will be equipped when applying blockchain security technology has a significant effect on the user's 'intention to accept services'.

As a way to solve this problem, through the independent sample t-test, each of the six major independent variables was divided into high and low groups according to the level of interest in each factor (M, average; 1) gender, 2) professionalism; 3) age-specific groups with the highest average value were set as high or low groups for each independent variable, but they were not specifically bound to which group) to test whether there was a significant difference in the dependent variable, 'service acceptance intention'.

Looking at the test results, as shown in Table 4 below, in the case of each High group, there was a significant difference in each independent variable, '6 characteristic factors'. In the case of the Low group, regardless of which group it was, the interest in the characteristic was not high, so it was found that it exceeded $P < 0.1$, so there was no significant difference.

Specifically, the P value was close to < 0.01 , indicating that the security was very significant without any difference in the group. On the other

hand, the reliability and ease of business were also close to < 0.01 in the case of the High group, showing high significance. As a result, it was revealed that the security was significantly more influential than other variables, and the significance was also large, which was found to be the most decisive factor in the 'intention to accept the service'.

On the other hand, the reliability and the high group criterion ($t = 6.782$, $p = 0.016$) also reached 6.931, so it was found that security and reliability were the most decisive factors in the 'intention to accept services' in which service users choose services.

However, the ranking of other independent variables was found to be 3rd place ease ($t = 4.152$, $p = 0.012$), 4th place economic benefit ($t = 3.644$, $p = 0.024$), 5th place diversity ($t = 3.183$, $p = 0.019$), 6th place availability ($t = 2.326$, $p = 0.089$), indicating that the mutual meaning of low-ranking independent variables was not significant.

On the other hand, regardless of which group they belong to, they were classified into high and low groups (LOW) with high average values based on the average value of each group. This significance probability or significance measurement result (p-value) was significantly lower in the low group than in the high group, indicating that they were not interested in the difference between each independent variable, so the test value of the low group was excluded from the judgment.

In the end, members of each group generally value security and reliability as "the need to apply blockchain-based security technology to medical information platforms" regardless of differences in collective tendencies such as gender, professionalism, and age, which are differences between groups.

These specific verification results were plotted and presented as <Table 4>.

Table 4: Comparison of Differences in Service Acceptance Intention According to Group Level (High vs. Low)

IVs	Group	M	t	p	p-value
SEC	High	3.69	6.931	0.019	< 0.05
	Low	3.37	6.607	0.403	
REL	High	3.97	6.782	0.016	< 0.05
	Low	3.45	5.084	0.303	
AVA	High	3.42	2.326	0.089	< 0.05
	Low	3.21	1.984	0.118	

DIV	High	3.37	3.183	0.019	<0.05
	Low	3.21	2.604	0.090	
ECO	High	3.49	3.644	0.024	<0.05
	Low	3.27	3.212	0.393	
EAS	High	3.45	4.152	0.012	<0.05
	Low	3.28	3.680	0.477	
fn. 1) High Group: $p < 0.05$, Low Group: $p > 0.1$)					

4.2. Results of the Analysis of the Moderating Effects according to the 'Gender' of Platform Characteristic Factors

Regarding the research question (RQ2), in terms of 'platform characteristics' and 'service acceptance intention', will each characteristic factor show a significant difference in propensity according to 'gender'.

As a way to solve this problem, in order to test the difference between 'gender' regarding the importance of the characteristic factors of the blockchain-based medical information platform, an independent sample t-test was conducted for each group by dividing each 'male' and 'female' group as 'gender'. However, by easing the statistical criteria, only data that meet the significance level $p < 0.1$ criterion were sampled.

Security ($t=8.915$, $p < 0.1$) was the highest in the results of the independent sample t-test according to gender of men and women, followed by Reliability ($t=7.723$, $p < 0.1$) which was found to be the second. Relatively, Availability ($t=6.324$, $p < 0.1$), Diversity ($t=5.084$, $p < 0.1$), Economic Benefit ($t=6.471$, $p < 0.1$), and Ease of 6 (Ease of Business) ($t=6.931$, $p < 0.1$) were found to be similar

When comparing the average, the difference between "gender" was 1) found to be much more important to men for security ($M=4.03$) and reliability ($M=3.35$), and 2) women for security ($M=3.31$) and ease ($M=2.88$).

On the other hand, in terms of ease, it was revealed that men ($M=2.55$) and women ($M=2.88$), indicating that women had a relatively higher average than men, so it was revealed that women were the only items that revealed a higher average than men, and likewise, women thought much more about ease than men.

The results of the independent sample t-test for the difference between the sexes were revealed as shown in Table 5 below.

Table 5: Perceptions of blockchain-based medical information platform between male and female

IVs	Gender	N	M	SD	t
SEC	Male	133	4.03	1.087	8.915
	Female	123	3.31	0.985	
REL	Male	133	3.35	0.985	7.723
	Female	123	2.50	0.729	
AVA	Male	133	3.31	1.268	6.324
	Female	123	2.44	0.879	
DIV	Male	133	3.05	0.907	5.084
	Female	123	2.54	0.693	
ECO	Male	133	3.41	0.872	6.471
	Female	123	2.74	0.788	
EAS	Male	133	2.55	0.832	6.931
	Female	123	2.88	0.972	
fn. statistical significance was determined at the 0.1 level (p ≤ 0.1).					

4.3. Analysis Results according to the "Speciality" of Platform Characteristics of Platform Characteristics Factors

Regarding the research problem (RQ3) and "platform characteristics" and "service acceptance" and "service acceptance" and "service acceptance" according to understanding the understanding."

In order to solve this, the difference according to the importance of blockchain-based medical information platform characteristics of blockchain-based medical information platform characteristics factors. However, only data was summarized as a sample that meets the statistical standards that meet the significant level $p < 0.1$.

The results of independent expression results according to the difference between 'normal', and $=7.744$ and $=7.744$). However, the fifth-ranked diversity ($t= 3.079$, $p < 0.1$), 6th priority availability (Avail= 1.450), 6th ranking availability ($t=1.450$).

Compared to the average difference in "M=43) and reliability ($M=43$) and reliability ($M=4.33$) and reliable ($M=42$) ($M=4.2$).

In the case of medical personnel, it was revealed that

the average is formed near the average of each independence ($M=3.0$ and ordinary). This seems to be because medical personnel recognized as a risk recognition for the security level, or the degree of service acceptance of service accommodation in terms of the need.

On the other hand, it was found that the average of "Eas" is more important to use the average of "e.g., the average of the $M=320$).

Through this, a result of analyzing the overall variables through independent expression, it was revealed that the general personality based on average value of the average value according to average value of the average value. Medical was summarized in relation to such as the "speciality" was summarized in <Table 6> below.

Table 6: Perceptions of blockchain-based medical information platform between General public and Medical professional

IVs	Expert	N	M	SD	t
SEC	General	132	4.33	0.911	7.744
	Medical	124	3.16	1.067	
REL	General	132	4.28	0.950	6.528
	Medical	124	3.24	1.143	
AVA	General	132	2.60	0.938	1.450
	Medical	124	2.41	0.810	
DIV	General	132	2.88	1.023	3.079
	Medical	124	2.50	0.753	
ECO	General	132	2.77	0.966	7.550
	Medical	124	3.66	0.863	
EAS	General	132	4.19	0.657	7.125
	Medical	124	3.20	1.046	
fn. statistical significance was determined at the 0.1 level (p ≤ 0.1).					

5. Conclusion

Each individual's medical information is very sensitive. Until recently, medical information was kept separately by each medical institution, and even though it was their own medical data, it was difficult for each individual to access the information itself. However, with the era of big data, each individual

increasingly wants access to his or her own personal medical information, and reading examination records of other medical institutions even at actual medical sites is helpful for medical practice.

The most important thing in accessing such medical information is the establishment of a security management system. Since the existing centralized security management system is highly likely to leak all information at once due to hacking, it is vulnerable to personal information protection and security, so the necessity of introducing or developing a medical platform system that applies blockchain-based security technology that distributes and manages data and facilitates personal information protection is recognized in the big data era of the current information technology society.

Therefore, this study investigated the 'intention to accept services' of potential service users for each factor, such as security, reliability, availability, diversity, economic benefit, and ease, which are the characteristics of a medical information platform applying blockchain-based security technology, to identify the necessity of introducing the above system and what should be focused on when developing it.

Among them, in the results of the importance analysis of service acceptance intention, it was found that the factor related to security was the first priority that all groups considered important in common. This is the necessity of applying blockchain security technology to medical information platform services, and the security of each individual's medical information should be given priority above all else.

On the other hand, the second priority was reliability, and service users were found to be important for "the degree of trust that data can be trusted, transparent, and safely handled without errors." It was found to be the third-priority ease, the fourth-priority economic benefit, the fifth-priority diversity, and the sixth-priority availability, but according to the analysis of independent sample t-test results, the difference in influence between the subordinates was not significant.

On the other hand, the analysis of moderating effects by gender, professionalism, and age divided groups shows that men value security over women and women value ease over men,

Except for security and reliability, it was found that medical personnel valued economic benefits more than general people, and general people valued ease more than medical personnel.

In terms of security, reliability, availability, diversity, and economic benefit, most independent variables

according to age were measured in their 40s and 50s overall high in average value, indicating that they were most interested in them than other groups, but in terms of ease, those in their 60s and older were found to be the most interested. On the other hand, in terms of economic benefit, those in their 20s and 30s showed remarkable interest, and the average value was measured to be higher in availability and diversity than other groups.

The limitation of this study is that the 'intention to accept services' was investigated at the level of objective and common-sense understanding, with only 250 data samples and no measurement of the level of understanding of how much customers understand blockchain technology, so the 'values' of each service user would have had to be reflected a lot.

Meanwhile, artificial intelligence (AI) utilization technology is also gradually developing, and research on the use of AI and the role of AI in blockchain-based medical information platforms has been relatively insufficient.

In future research, it will be necessary to investigate and analyze the difference in 'service acceptance intention' of each service user by reflecting the various characteristics of the medical information platform using AI.

In addition, in conjunction with developing AI technology, it will be possible to design questionnaires through in-depth discussions with medical officials to investigate and analyze the intention to accept 'service' by diversifying the comparison group into more groups.

And technically, it is limited to independent sample t-test and MANOVA multivariate analysis of variance, so using other tools, for example, multiple regression analysis or structural equation model (SEM), to complement and develop future research can produce good results.

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