

DETERMINANTS OF USING E-BANKING SERVICES –DATA PROTECTION FOR USERS

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ABSTRACT

The emergence of the internet and the development of information technologies have enabled the rise of electronic banking, which allows clients to conduct their financial transactions in a simple and efficient manner, significantly saving time. Individuals who use electronic banking services no longer need to visit the bank in person, can avoid waiting in lines, and can comfortably manage their financial activities from home, thus experiencing a certain degree of convenience. On the other hand, the question arises as to whether banks manage their clients' data appropriately, adhering to legal regulations and frameworks, including the Consumer Protection Act, ensuring that all personal data is used exclusively for business purposes. The aim of this paper is to examine the impact of perceived usefulness, ease of use, reliability, and security on clients' intention to use electronic banking. The study also examines the use of blockchain technology, which enhances the security of financial transactions. The research variables exert a positive effect on clients' intention to use electronic banking, ultimately leading to client satisfaction and loyalty, thus offering valuable marketing insights.

Keywords: TAM Model, SERVQUAL Model, e-banking, Legal Framework, Blockchain Technology

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INTRODUCTION

The use of electronic banking allows bank clients to conduct their financial transactions quickly and easily. In today's fast-paced lifestyle, saving time is of great importance, which is exactly what electronic banking services enable [1]. On the other hand, certain individuals have a high level of uncertainty avoidance and an aversion to adopting and using advanced technologies, which can pose a problem [2]. Additionally, a certain group of people seeks assurance from banks that all their personal data will be used solely for business purposes, in compliance with Consumer Protection Laws [3]. The research starts from the TAM model (Technology Acceptance Model), whose two key variables are perceived usefulness and ease of use [4]. Essentially, people need to be aware that using electronic banking will provide certain benefits and that the system is simple and easy to use [5]. The research also builds on the SERVQUAL model (Model of Service Quality), which consists of five basic variables: reliability, security, tangibility, empathy, and employee responsiveness [6]. For the purposes of this study, the first two variables, reliability and security, will be analyzed, as the focus is on compliance with legal regulations regarding the protection of clients' data by banks. Reliability and security primarily refer to the bank providing guarantees that all clients' financial transactions will be executed efficiently and securely [7]. The study also analyzes the potential implementation of blockchain technology in electronic banking, as it provides greater security during banking transactions through the use of its codes, algorithms, and encryption [8].

The research examines whether perceived usefulness, ease of use, reliability, and security have an influence on clients' intention to use electronic banking. A positive attitude towards electronic banking further implies client satisfaction and loyalty, and in conditions of market uncertainty and strong competition, the goal of every bank is to build a large base of loyal clients and the potential to apply the CRM concept (Customer Relationship Management).

Thus, the study employs a combined methodological approach [27]. To analyze the impact of determinants of electronic banking on clients' intention to use its services, a field study was conducted in the Republic of Serbia. The respondents' answers were analyzed using the SmartPLS4 software, and a quantitative approach was applied. On the other hand, through a qualitative approach—namely, a review of existing literature and analysis of studies related to blockchain technology—the possibility of its application in electronic banking is examined.

LITERATURE REVIEW

The Theory of Reasoned Action (TRA) is a model rooted in the field of social psychology. Developed by Fishbein and Ajzen in 1975, this model defines the relationships between beliefs, attitudes, norms, intentions, and individual behavior [29]. According to this model, an individual's behavior is determined by their behavioral intention, which in turn is influenced by their attitudes and subjective norms. The Technology Acceptance Model (TAM) represents a continuation of the previous model. This research is primarily grounded in the TAM model developed by Davis in 1989, which posits that two major factors—perceived usefulness and ease of use—determine an individual's acceptance and use of technology [4]. The study also utilizes the SERVQUAL model, which consists of five basic variables: reliability, security, tangibility, empathy, and employee responsiveness [14]. Additionally, the Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. in 2003, complements this by introducing additional constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions [30]. In this study, perceived usefulness and ease of use align with TAM, while reliability and security correspond to the service quality dimension (SERVQUAL), influencing behavioral intention indirectly, as seen in UTAUT's extended constructs. The research employs variables from the TAM model (perceived usefulness and ease of use) and the SERVQUAL model (reliability and security), but in a broader context, it also relies on the TRA model, as consumers shape their behavior based on their attitudes, beliefs, and value systems. Additionally, it draws on the UTAUT model, which suggests that the acceptance of new information systems, tools, and algorithms depends on performance expectancy and effort expectancy—concepts that closely align with perceived usefulness and ease of use.

The study also addresses the important issue of client data management by banks, which must comply with consumer protection laws. Blockchain technology offers decentralized data storage and immutable records, enhancing both the reliability and security of digital transactions. When applied in e-banking, it ensures that personal identification numbers, transaction histories, and sensitive client documents are

encrypted and cannot be tampered with. Unlike traditional centralized banking systems, blockchain allows distributed ledger systems that offer transparency and greater client control over personal data [31]. This level of security directly supports the legal compliance requirements outlined in consumer protection laws, providing a technical safeguard that complements organizational protocols [32].

The research starts from the TAM model (perceived usefulness and ease of use), whose focus is on the adoption of new systems. Perceived usefulness refers to a person's understanding that by using a particular technology, such as electronic banking, they will achieve certain benefits like comfort, speed, efficiency, time savings, and so on [9]. Previous studies [10, 11] have established that perceived usefulness is one of the most significant determinants of the use of electronic banking by bank clients. Ease of use refers to the level of effort an individual must invest to master a technology, and it is crucial for the bank to ensure that its electronic platform operates in a simple manner that is adaptable to clients and easy to use [12]. Previous studies [13] have found that ease of use has an influence on clients' intent to use electronic banking. The first and second hypotheses are proposed:

H1: Perceived usefulness has an important effect on clients' intent to use electronic banking.

H2: Ease of use has an important effect on clients' intent to use electronic banking.

The study also analyzes two determinants of the SERVQUAL model: reliability and security [14]. Reliability means that bank clients trust that all their financial transactions will be carried out efficiently. Previous studies [15] have established that reliability is a very important determinant of using electronic banking. Security refers to clients' belief that banks comply with consumer protection laws and legal frameworks, ensuring the protection of their personal data. Previous studies [16, 26] have shown that a high level of security is crucial for clients to use electronic banking services. The third and fourth hypotheses are proposed:

H3: Reliability has an important effect on clients' intent to use electronic banking.

H4: Security has an important effect on clients' intent to use electronic banking.

If bank clients start using electronic banking services, they will achieve a certain level of satisfaction, which further implies their loyalty to the bank. The goal of every bank is to have a large base of loyal customers and to implement the CRM (Customer Relationship Management) concept [17]. Based on this, the fifth and sixth research hypotheses can be formulated:

H5: Users' positive attitude and use of electronic banking have an important effect on their satisfaction.

H6: The level of satisfaction of electronic banking users has an important effect on their loyalty to the bank.

Based on the subject and objectives of the empirical research, as well as the formulated research hypotheses, a research model (Figure 1) was created.

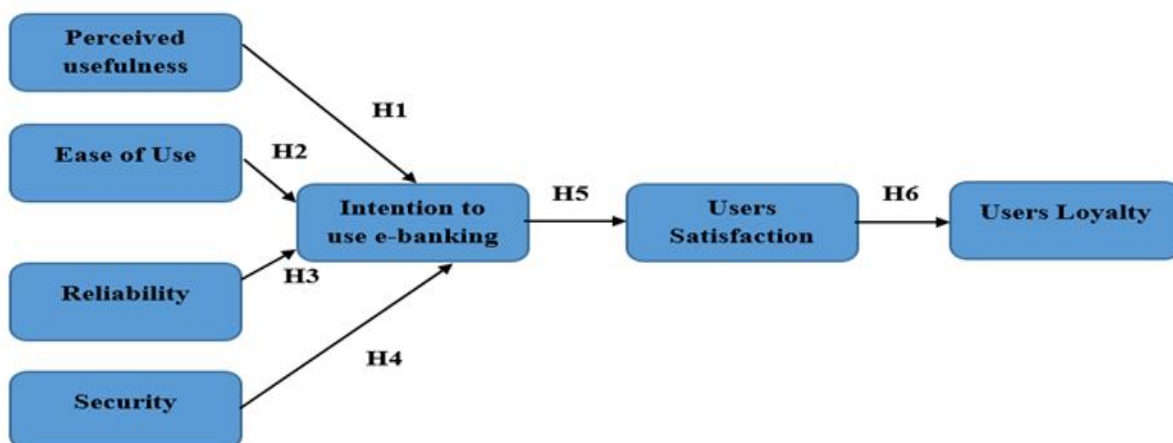


Figure 1. Research model

Source: Authors

The study also analyzes the protection of clients' data in compliance with laws and regulations and examines the blockchain technology model (Figure 2), which banks use to guarantee that all important data (such as clients' personal identification numbers, contracts regulating intellectual property rights, and property ownership documents) will be protected [18], and that all clients' financial transactions will be securely and efficiently executed [19][20].

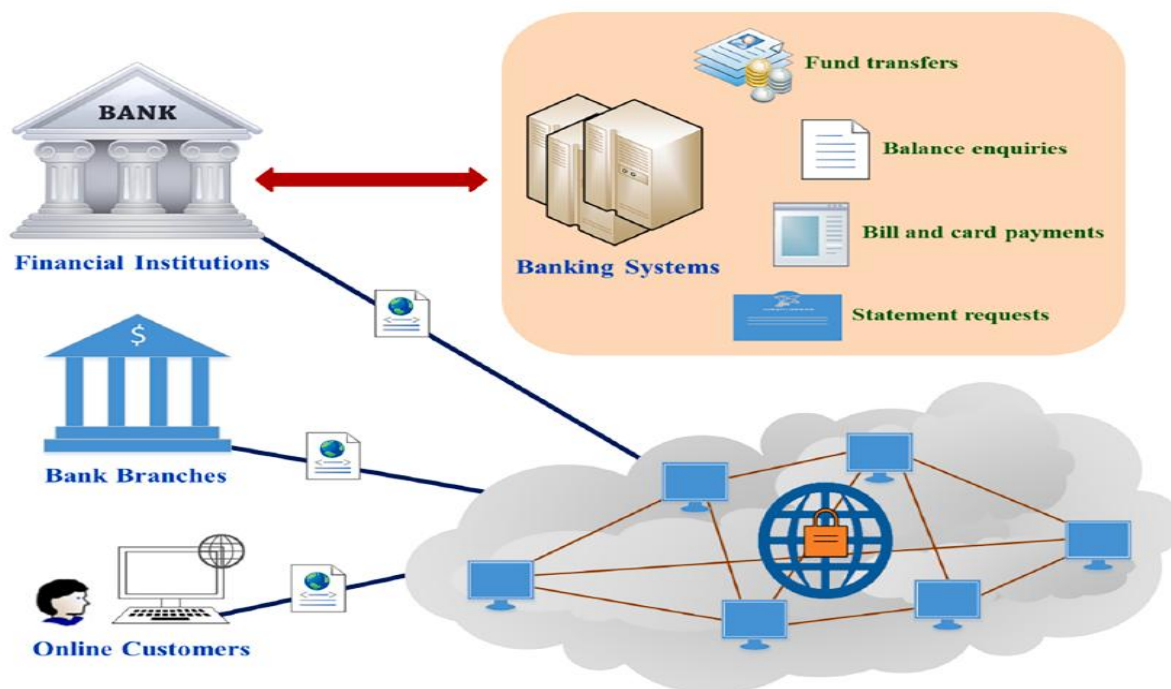


Figure 2. Online banking application based on blockchain technology – Protection of client data and adherence to legal aspects. Source: Adapted from [21]

Blockchain technology allows for a high level of trust to be established between banks and their clients in terms of the secure execution of transactions. Blockchain is a database that is not stored in one central location but consists of smaller blocks used during transactions. The decentralization of data reduces the risk of hacking attacks, and by using certain codes, ciphers, and algorithms, data encryption is enhanced. This technology is used for all types of card payments and was quite popular when Bitcoin currency first emerged [21][22][23].

In the context of e-banking, the application of blockchain technology brings the following implications [31][32][33][34]:

- **Enhanced security and data protection:** Thanks to encryption and the immutability of blockchain records, users' personal data, such as identification numbers and financial transactions, are protected from unauthorized access and tampering.
- **Increased transparency:** Blockchain enables users and banks to track transaction flows in real time, reducing the risk of fraud and increasing trust in the system.
- **Decentralized data control:** E-banking users gain greater control over their personal data, as they do not rely entirely on centralized institutions that store and process this information.
- **Faster and more efficient transactions:** By eliminating intermediaries, blockchain can accelerate the approval and verification processes of transactions, reducing costs and waiting times.
- **Support for compliance with consumer protection laws:** The technical security provided by blockchain helps banks more easily meet regulatory requirements, thereby reducing legal risks and enhancing user protection.

RESEARCH METHODOLOGY

The research was conducted in 2024 in Serbia (Belgrade, Novi Sad, Kragujevac) using a survey method on a sample of 458 respondents who provided their answers on a Likert scale ranging from 1 to 7. The respondents were segmented according to demographic characteristics such as gender, status, and education, with an overview presented in Table 1. The respondents' answers were analyzed using the statistical software SmartPLS 4, applying appropriate statistical analyses.

Table 1. Demographic characteristic of respondents

		Number of respondents	Percentage of respondents
Gender	Female	247	53.9%
	Male	211	46.1%
	Total	458	100%
Status	Unemployed	58	12.7%
	Employed	187	40.8%
	Student	213	46.5%
	Total	458	100%
Education	Primary education	19	4.1%
	High school	261	57.0%
	University	178	38.9%
	Total	458	100%

Source: Authors

This study employs a **mixed-methods approach**, integrating both quantitative and qualitative methodologies. The **quantitative approach** was utilized to examine the usage of electronic banking services in Serbia. Complementing this, the **qualitative approach** involved a comprehensive review of existing literature to explore the potential implementation of blockchain technology within electronic banking. The objective is to enhance clients' trust and facilitate the execution of all financial transactions through electronic banking applications.

The research variables—perceived usefulness, ease of use, reliability, security, intention to use e-banking, user satisfaction, and user loyalty—were measured through corresponding statements derived from relevant literature in the field of management. An overview of these statements is presented in Table 2. Each of the research variables was measured using three statements, which the respondents rated on a scale from 1 to 7. Subsequently, the degree of correlation among these statements was examined using the statistical software SmartPLS 4, in order to assess whether each variable was individually measured appropriately, as well as to determine the overall validity of the research model. These analyses will be presented in detail within the empirical research results section.

Table 2. Statements from the questionnaire

Research variables	Statements	Source
Perceived usefulness	<ol style="list-style-type: none"> Services provided by electronic banking are highly useful. Through electronic banking, I perform all necessary financial transactions. By using electronic banking services, I significantly save my time. 	Adapted from [3]
Ease of use	<ol style="list-style-type: none"> Using electronic banking services is very simple. The user interface is very well designed and facilitates the use of electronic banking. Banking electronic platforms are very easy to use. 	Adapted from [12]
Reliability	<ol style="list-style-type: none"> I have confidence that all electronic banking transactions I perform will be executed efficiently. I believe that all banking transactions are carried out in compliance with legal principles. I have complete trust in my bank and its employees. 	Adapted from [9]
Security	<ol style="list-style-type: none"> I believe that the bank takes care to protect its clients' data when using electronic banking. Adherence to the legal framework and consumer protection laws is crucial when using electronic banking. Electronic banking services are protected by specific codes, and the data encryption is of very high quality. 	Adapted from [9]
Intention to use e-banking	<ol style="list-style-type: none"> I plan to use electronic banking services. By using electronic banking, I feel comfort. I plan to conduct all my transactions electronically. 	Adapted from [3]
Users' satisfaction	<ol style="list-style-type: none"> I am pleased with the electronic banking. I am pleased with the speed of bank transactions. The bank manages client data well. 	Adapted from [2][3]
Users' loyalty	<ol style="list-style-type: none"> I will continue to use electronic banking. I will advise my friends to use electronic banking. I will advise my family to use electronic banking. 	Adapted from [2][3]

Source: Authors

RESEARCH RESULTS

To group the statements into factors (research variables), confirmatory factor analysis was utilized in the study (Table 3).

Table 3. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	573.625
	Df	10
	Sig.	.000

Source: Authors' calculation using SmartPLS 4 software

It can be concluded that there is a corresponding level of correlation among the statements constituting the research variables, indicating that all statements are interrelated, allowing them to be grouped into the previously mentioned factors (research variables). The value of the *Kaiser-Meyer-Olkin (KMO)* coefficient of 0.789 is greater than the threshold of 0.60, suggesting that all correlation matrices are suitable for conducting confirmatory factor analysis. Additionally, the value of the *Bartlett's test of sphericity* shows statistical significance ($\chi^2 = 573.625$, Sig = 0.000), confirming the relevance and reliability of applying confirmatory factor analysis [24].

Table 4. Reliability analysis

Research variables	Cronbach's alpha	Composite reliability (rho_a)
Perceived usefulness	0.821	0.833
Ease of use	0.811	0.877
Reliability	0.878	0.858
Security	0.797	0.769
Intention to use e-banking	0.773	0.808
Users' satisfaction	0.864	0.878
Users' loyalty	0.885	0.887

Source: Authors' calculation using SmartPLS 4 software

The Cronbach's alpha indicators and composite reliability values are greater than the statistical threshold of 0.70, indicating that the research variables are measured through appropriate statements. A Structural Equation Model (SEM) was implemented in the study to analyze the effects of perceived usefulness, ease of use, reliability, and security on clients' intentions to use electronic banking services, as well as to examine whether their positive intention impacts their satisfaction, which ultimately should ensure a base of loyal customers for the bank (Table 5).

Table 5. Structural Equation Model (SEM)

Hypothesis	Original sample (O)	Standard deviation (STDEV)	T statistics (IO/STDEVI)	P values
Perceived usefulness → Intention to use e-banking	0.358	0.037	6.157	0.000**
Ease of use → Intention to use e-banking	0.311	0.078	5.947	0.000**
Reliability → Intention to use e-banking	0.448	0.059	6.987	0.000**
Security → Intention to use e-banking	0.442	0.048	6.512	0.000**
Intention to use e-banking → Users' satisfaction	0.521	0.024	7.154	0.000**
Users' satisfaction → Users' loyalty	0.557	0.034	7.877	0.000**

Note: Level of statistical significance: **0.01

Source: Authors' calculation using SmartPLS 4 software

It can be concluded that Perceived usefulness (coefficient = 0.358, $p = 0.000$), Ease of use (coefficient = 0.311, $p = 0.000$), Reliability (coefficient = 0.448, $p = 0.000$), and Security (coefficient = 0.442, $p = 0.000$) have a positive and notable effect on clients' intent to use electronic banking, thus confirming hypotheses H1, H2, H3, and H4. The formation of a positive attitude and intention regarding the use of electronic banking services positively influences client satisfaction (coefficient = 0.521, $p = 0.000$), thereby confirming hypothesis H5. Finally, if clients achieve an appropriate level of satisfaction, it further implies their loyalty (coefficient = 0.557, $p = 0.000$), thus confirming the last hypothesis, H6.

DISCUSSION OF RESULTS

The results indicate that reliability and security have a greater impact than perceived usefulness and ease of use on clients' decisions to utilize electronic banking services. It can be concluded that, although it is important for a financial transaction to offer benefits and be easy to perform, it is of critical importance that it is reliable and secure. This finding is consistent with the assertions of this study, which emphasize that the application of blockchain technology should enhance data encryption and client data protection, as well as elevate the security of banking transactions to a higher level. Improving the security of electronic banking transactions through advanced information systems and algorithms is essential for protecting sensitive client data, preventing fraud, and ensuring compliance with legal regulations [28]. By implementing encryption, biometric authentication, and AI-based monitoring systems, banks can strengthen user trust and enhance the overall safety and efficiency of digital financial services. It is also essential that clients achieve a certain level of satisfaction and, over time, develop loyalty, as this enables banks to secure stable revenues, long-term profitability, and a competitive advantage in the market [26].

CONCLUSION

The study was conducted with the aim of analyzing the determinants that influence bank clients' intention to use electronic banking, with a focus on data protection in compliance with legal regulations and standards. The research results showed that perceived usefulness, ease of use, reliability, and security have a positive effect on the use of electronic banking, which in turn implies client satisfaction and loyalty. The originality of the research lies in the holistic approach to the research model, where the comprehensive impact of the research variables on clients' intention to use electronic banking, as well as their level of satisfaction and loyalty towards banks, is examined. Additionally, the contribution of the research is reflected in the analysis of blockchain technology, which can significantly improve the security of financial transactions through the use of specific codes and algorithms, as well as the decentralization of data, which protects against hacking attacks. The theoretical implications fill a research gap in the literature, while the managerial implications provide useful marketing insights to banks and their clients, as well as guidance suggesting that all banks should implement blockchain technology in their operations. A limitation of the study is the relatively small statistical sample, while directions for future studies could focus on analyzing other notable antecedents of clients' intention to use electronic banking, such as the content of banks' websites, customer support services, and similar factors.

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