

Adoption of Mobile Banking Services in Croatia: A Unified Theory of Acceptance and Use of Technology (UTAUT) Perspective

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Abstract: *Mobile banking services represent relatively new services enabled by the rapid development of information and communication technology. The digital nature of mobile banking allows users faster, more accessible, and cost-effective access to various banking services, while providing banks with opportunities to reach new digitally-oriented customers and optimize service delivery costs. Despite these advantages, the adoption of mobile banking in Croatia is not on par with European Union countries, particularly Scandinavian countries, where the user rate exceeds 70%. This discrepancy indicates the need to investigate the factors influencing mobile banking adoption among Croatian users. This study aims to examine the application of an adapted UTAUT (Unified Theory of Acceptance and Use of Technology) model in the Croatian context, where such research remains underrepresented. An empirical study was conducted using a questionnaire, collecting 331 valid responses. The data were analyzed using the PLS method. The results of the empirical analysis suggest partial applicability of the UTAUT model in explaining the adoption of mobile banking services among Croatian users. The constructs of performance expectancy and facilitating conditions had a direct influence on behavioral intentions and, consequently, on the adoption of mobile banking, while effort expectancy had an indirect effect through performance expectancy on intentions and adoption. Financial costs and social influence did not have a significant impact on intentions or adoption of mobile banking services.*

Keywords: mobile banking; mobile banking adoption; UTAUT model

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Introduction

Financial institutions remain one of the key industries utilizing information and communication technologies to transform their products, services, and overall business operations. As the Internet becomes ubiquitous, most banks, in addition to traditional online banking, have introduced mobile banking applications that leverage smart devices and the Internet to enable clients to access banking services remotely (Ntsiful, A., et.al., 2020). Mobile banking refers to a product or service offered by a bank or microfinance institution (bank-led model) or a mobile network operator (non-bank-led model) to facilitate financial and non-financial transactions via a mobile device, such as a mobile phone, smartphone, or tablet (Shaikh & Karjaluoto, 2015). Given its digital delivery, mobile banking allows users faster, more accessible, and cost-effective access to various banking services (Chandran, 2014). For commercial banks, offering mobile banking services enables access to new digitally-oriented consumer segments and provides more cost-effective service delivery channels for existing users.

The adoption of mobile technology as an alternative distribution channel represents a radical innovation that empowers banks to engage with society, including both banked and unbanked individuals, provides profit for mobile operators, and reduces costs for banks. The study by Dash, Bhusan, and Samal (2014) integrated user attitudes and mimetic pressure with the innovation diffusion model to explore mobile banking adoption in India. They found that compatibility, trialability, and mimetic force were key predictors of positive attitudes toward mobile banking adoption.

Despite numerous advantages, mobile banking services in Croatia, although experiencing user growth, are still not widely adopted compared to other European Union countries. According to data from the Croatian National Bank (HNB) in 2023, the number of mobile banking users increased by 7%, with 57% of banking service users having a mobile banking contract. In contrast, in most other countries, particularly Scandinavian ones, the percentage of users of such services exceeds 70% (Statista, 2024). These data suggest a need to investigate the factors influencing mobile banking adoption among Croatian service users. Scientific literature offers various models explaining factors influencing mobile banking user behavior in adopting new services or technologies, either from an organizational or consumer perspective. Among these, the Technology Acceptance Model (TAM) is widely used, providing an organizational perspective by focusing on perceived ease of use and perceived usefulness (Davis, Bagozzi & Warshaw, 1989; Jaradat et al., 2010; Shaikh & Karjaluoto, 2015; Ashique Ali & Subramanian, 2022). More recent models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh et al. in 2003, are more comprehensive, incorporating factors like performance expectancy, facilitating conditions, effort expectancy, and social influence. These factors enable a more detailed explanation of user acceptance of new technologies or services, making the model useful for predicting user behavior toward services (Garcia de Blanes Sebastian et al., 2022).

Merhi, Hone and Tarhini (2019) studied factors such as trust, security, and privacy that affect the intention to use mobile banking across different cultural contexts, further extending the UTAUT model. Additionally, previous research on mobile banking acceptance has predominantly focused on developing countries (Olivera et al., 2014; Shaikh & Karjaluoto, 2015; Wadie et al., 2015; Baptista, 2015; Balakrishnan & Shuib, 2021; Tan et al., 2021; Ashique Ali & Subramanian, 2022; Nguyen et al., 2023; Shetu et al., 2024).

This study aims to partially address these gaps by empirically testing an adapted UTAUT model in order to examine the influence of performance expectancy, effort expectancy, social influence, facilitating conditions, and financial cost on behavioral intention and actual adoption of mobile banking services in the Croatian context, which has been largely underexplored in previous research. Available research on mobile banking services in Croatia has predominantly focused on the usage phase and has explored various aspects of service quality and offerings, as well as the characteristics of mobile banking users and their impact on the intention to reuse the service or user loyalty (Vlašić, Keleminić & Šubić, 2022; Orehovački, Blašković & Kurevija, 2022).

The structure of this paper is divided into six sections. Following the introduction, the second section analyzes existing scientific literature and develops research hypotheses in line with the UTAUT model of technology acceptance. The third section outlines the data collection methodology and research sample. The fourth section includes data analysis and hypothesis testing using the Partial Least Squares (PLS) method. The fifth and sixth sections present research limitations, suggestions for future research, and conclusions, along with practical implications.

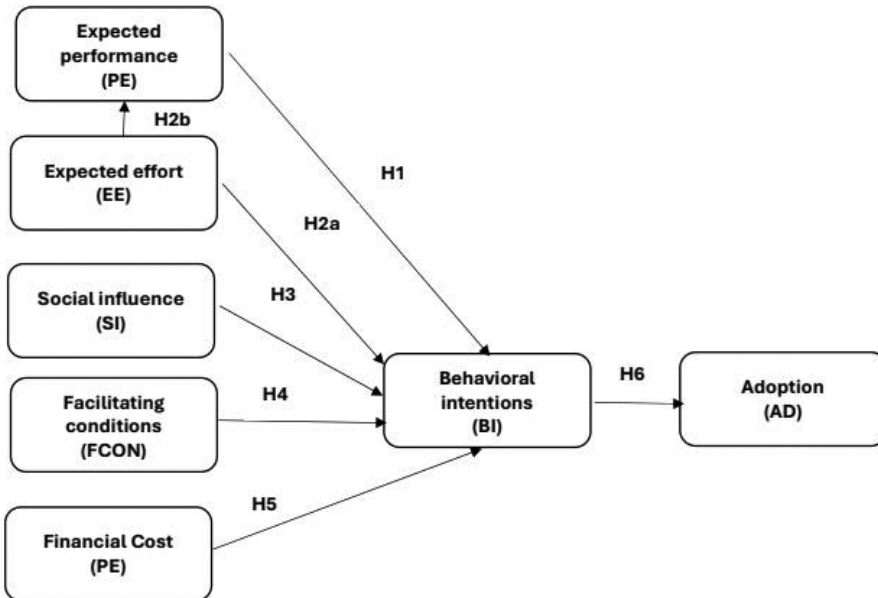
Literature review and hypotheses development

Research on factors influencing the adoption of mobile banking services is relatively common, especially in developing countries where there is resistance to adopting new technologies. To address this, numerous theoretical frameworks and models have been developed and modified over time to better explain and predict the adoption of mobile banking as a relatively new service in response to technological advancements and changes in user behavior. Among these theoretical models, the Unified Theory of Acceptance and Use of Technology (UTAUT) model by Venkatesh et al. (2003) holds a special place. This model extends the classic Technology Acceptance Model (TAM) to better explain user behavior in adopting new technologies and services. This theory also forms the basis for the conceptual model of mobile banking adoption that will be empirically tested within this study in the context of the Croatian mobile banking market.

The Unified Theory of Acceptance and Use of Technology seeks to holistically explain the factors influencing behavior and behavioral intentions regarding the use of a specific technology. It is based on integrating eight previous models and theories used to explain technology acceptance, identifying four key factors (performance

expectancy, effort expectancy, social influence, and facilitating conditions). Additionally, the original model includes four moderators (gender, age, experience, and voluntariness of technology use), which, while providing clearer insights, also contribute to the model’s complexity. Consequently, many researchers using the UTAUT model have omitted these moderators (Dwivedi et al., 2019). One limitation of the model is its focus on technology use in an organizational context. Recent research also highlights that the measurement scales employed in the model are not sufficiently adapted for application across diverse social and cultural contexts, emphasizing the need to incorporate specific adjustments of the model to the local cultural environment (Marikyan & Papagiannidis, 2025; Bayaga & Plessis, 2023). Other authors have criticized the model’s simplicity and the reduction of complex technological and social systems—composed of various components—to users’ perceptions and expectations (Shachak et al., 2019). Despite this, UTAUT accounts for more variance in behavioral intentions and actual usage than earlier technology acceptance models (Albashrawi et al., 2019) and is considered more robust in explaining user behavior toward new technologies such as mobile banking (de Blanes Sebastian et al., 2022). For these reasons, the UTAUT model has been frequently used to explain behavioral intentions in mobile banking adoption across various environments and markets (Islam et al., 2019; Rachmawati et al., 2020; Savić & Pešterac, 2020; Le et al., 2020). The conceptual model tested in the paper is presented in Figure 1.

Figure 1: The conceptual model



Source: Author’s

In the context of mobile banking adoption, it is expected that a user will be more likely to adopt the service if it enables more efficient and productive banking tasks. This expectation is covered under the “Performance Expectancy” dimension in the UTAUT model, defined as the degree to which an individual believes that the system will assist in task completion (Venkatesh et al., 2003). This dimension corresponds to the perceived usefulness of technology in the TAM model and the relative advantage in the Diffusion of Innovations Theory (Venkatesh et al., 2003). Lukić, Čolić, and Prica (2019), using the perceived usefulness dimension of the Technology Acceptance Model, indicate that perceived usefulness is a significant antecedent to the behavioral intentions of young adults. Antonijević, Ivanović, and Simović (2021) studied mobile banking adoption in Serbia using the Technology Acceptance Model, concluding that perceived usefulness is a critical variable and plays a key role in mobile banking adoption, as users prioritize the efficiency of mobile banking in terms of cost, time, and compatibility over other banking service interaction methods. Baabdullah et al. (2019) found that key factors—performance expectancy, price value, facilitating conditions, hedonic motivation, habit, system quality, and service quality—significantly impact actual usage behavior. Oliveira et al. (2014) conducted a study in Portugal, integrating UTAUT with the Task Technology Fit model and the Initial Trust Model. They found a direct influence of performance expectancy on behavioral intentions and confirmed the relationship between performance expectancy and initial trust, consistent with previous findings by Kim et al. (2009), who identified a positive relationship between relative advantage and initial trust in mobile banking. Zhou, Lu, and Wang (2010) used the UTAUT model to confirm the significant influence of performance expectancy on mobile banking adoption. Baig (2019), utilizing an adapted UTAUT model, investigated mobile banking adoption by Barclays Bank in Mozambique and concluded that performance expectancy was the most influential variable on the dependent variable, mobile banking adoption. Recent research also confirms the significant impact of performance expectancy on usage intentions and mobile banking adoption, based on a review of existing studies (Shaikh & Karjaluo-to, 2015; Tamilmani et al., 2021; Sulistyowati et al., 2021) and empirical research in specific countries (Rachmawati et al., 2020; Savić & Pešterac, 2020; Hilal & Neira, 2022). Consequently, the following hypothesis is proposed in this study:

H1: Performance expectancy of mobile banking positively affects the behavioral intentions of Croatian users toward mobile banking services.

In addition to performance expectancy, the next factor expected to influence behavioral intentions toward mobile banking adoption, according to the UTAUT model, is effort expectancy. Mobile banking is a relatively new service, and its widespread acceptance requires that transactions and other services can be performed via mobile devices with minimal user effort. Venkatesh et al. (2003) define effort expectancy

as the degree of ease associated with using the system. Many authors equate effort expectancy with perceived ease of use in the TAM model and with complexity in the Innovation Diffusion Theory. Perceived ease of use is described as a system that requires minimal effort (Davis, 1989). Bhatiasevi (2016) used an extended UTAUT model to study mobile banking adoption in Thailand, finding a positive relationship between effort expectancy and behavioral intentions, attributing this to users' higher technical knowledge, which requires less effort to learn mobile banking. Varma (2018) examined mobile banking adoption among entrepreneurs in India using the UTAUT model, finding that behavioral intentions mediated the relationships between effort expectancy, performance expectancy, and social influence with usage behavior. The study found no gender differences in behavior, confirming the UTAUT model's validity in a developing market context. Carlsson et al. (2006), using the UTAUT model, investigated mobile device/service adoption in Finland, concluding that effort expectancy directly and positively influenced usage intentions. However, this influence was minimal when attitudes toward mobile devices/services were included in the research model. Oliveira et al. (2014) found that effort expectancy was not statistically significant in explaining behavioral intentions. Contrary to other studies, Wu and Wang (2005) did not find a direct effect between effort expectancy and mobile commerce adoption, but found an indirect influence through performance expectancy. Zhou, Lu, and Wang (2010) confirmed this in their mobile banking adoption research, finding no direct influence of effort expectancy on adoption, only through performance expectancy. The following hypotheses are therefore proposed:

- H2a: Effort expectancy of mobile banking positively affects Croatian users' behavioral intentions to adopt mobile banking.
- H2b: Effort expectancy of mobile banking positively influences Croatian users' behavioral intentions through performance expectancy.

Moreover, the acceptance of a new service or technology also depends on its acceptance by other users. In the UTAUT model, this factor is represented by the Social Influence dimension. Venkatesh et al. (2003) define social influence as the degree to which an individual perceives that others believe they should use the new technology. They found that social influence did not significantly impact behavioral intentions unless moderators (age, gender, experience, and voluntariness) were included. Oliveira et al. (2014) found that social influence was not statistically significant in explaining behavioral intentions. On the other hand, Ahmed et al. (2017) found that social influence (SOI) was crucial in mobile banking adoption, with Task Technology Fit (TTF), Technology Characteristics (TEC), Performance Expectancy (PEE), Facilitating Conditions (FAC), Task Characteristics (TAC), and User Adoption (USE) further shaping users' perceptions and attitudes toward these services. Baig (2019) corroborates Carlsson's (2006) findings that social influence does not significantly

impact mobile banking adoption. However, Zhou, Lu, and Wang (2010) found that social influence significantly impacted mobile banking adoption. AlAwadhi and Morris (2008), using the UTAUT model, examined e-government system adoption in Kuwait, finding that peer social influence significantly impacted behavioral intentions for a limited period. Accordingly, the following hypothesis is proposed:

H3: Social influence positively affects the intention to use mobile banking services among Croatian users.

Facilitating conditions represent another significant factor in the UTAUT model, expected to have a direct effect on technology adoption. Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support system use (Venkatesh et al., 2003). This factor combines constructs from four different models, including perceived control from the Theory of Planned Behavior (TPB), facilitating conditions from the Model of PC Utilization, and compatibility from the Innovation Diffusion Theory. Bhatiasevi (2016) found no positive relationship between facilitating conditions and mobile banking adoption in Thailand, suggesting that users did not feel they had adequate resources to use mobile banking, nor did they feel it suited their needs. Mohammadi (2015), researching mobile banking loyalty factors in Iran, found that system compatibility was critical in shaping user attitudes toward mobile banking, while “resistance” negatively impacted perceptions of ease of use and usefulness. Carlsson et al. (2006) concluded that facilitating conditions did not significantly influence mobile banking adoption or intentions. Venkatesh et al. (2003) found that facilitating conditions were significant only when age and experience were included as moderators. Al Mashagba and Nassar (2012) researched mobile banking adoption in Pakistan using an adapted UTAUT model, concluding that facilitating conditions had a strong impact on adoption. Rahi et al. (2018) found that facilitating conditions played a minor role in predicting behavioral intentions toward online banking adoption. Facilitating conditions play an important role in mobile banking adoption intentions, particularly when moderators such as age and experience are included. Crabbe et al. (2009) argue that facilitating conditions enhancing mobile banking service delivery reinforce perceptions of usefulness and confidence, promoting positive attitudes toward mobile banking adoption. Based on bibliometric analysis, Lopez-Rodriguez and Cardozo-Munar (2023) conclude that ease of use, trust, and perceived usefulness are critical factors for mobile banking adoption. Accordingly, the following hypothesis is proposed:

H4: Facilitating conditions for mobile banking positively affect the adoption of mobile banking services.

The final factor hypothesized to influence behavioral intentions and mobile banking adoption is the financial cost of the service. Although financial cost is not part

of the UTAUT model, it is included here, as previous studies have indicated its importance in adopting new services. When deciding to accept new services, cost can be a crucial factor, as new services like mobile banking are generally expected to facilitate faster and more affordable transactions. Perceived financial cost is defined as the extent to which an individual believes that using mobile banking will incur costs (Luarn & Lin, 2005). From the user's perspective, financial cost primarily involves transaction fees and monthly fees associated with mobile banking. Baig (2019) hypothesized that financial cost impacts new technology and innovation adoption, though results indicated a relatively weak impact on mobile banking adoption. Luarn and Lin (2005) combined the Theory of Planned Behavior and the Technology Acceptance Model in their research, demonstrating the effect of financial cost on behavioral intentions in mobile banking adoption. They recommend that banks reduce perceived financial costs through creative promotional and pricing strategies. Wu and Wang (2005) argue that financial cost is an essential indicator of adoption intentions in mobile commerce, significantly negatively impacting behavioral intentions. Although financial cost was emphasized as a key variable, it had the smallest impact on users' behavioral intentions. Carlsson et al. (2006) included financial cost within the facilitating conditions factor and concluded that it did not impact mobile banking adoption. The following hypothesis is therefore proposed:

H5: The financial cost of mobile banking services positively influences users' behavioral intentions toward mobile banking.

Recent studies applying the UTAUT model to explain the acceptance of mobile banking have incorporated additional constructs such as trust, security, and perceived risk, considering them important aspects for a more comprehensive understanding of users' intentions and the actual use of mobile banking services (Apau et al., 2025). Kumar et al. (2023) found that, in the Indian context, trust and perceived risk act as moderators between behavioral intentions and the actual use of mobile banking services. Despite the acknowledged importance of these constructs, they were not included in the present study due to the intention to apply a simplified UTAUT model, supplemented with financial cost as an additional construct, in order to examine mobile banking acceptance within the Croatian context. This decision also represents a limitation of the study, as the constructs of trust, perceived risk, and security are acknowledged in the limitations section, with a recommendation for their inclusion in future research on mobile banking acceptance in Croatia.

Finally, the last hypothesis concerns the impact of usage intention on mobile banking adoption for Croatian users. Ajzen (1991) defines behavioral intentions as the amount of effort someone is willing to invest to achieve a goal. Carlsson et al. (2006) demonstrated that intentions to use mobile devices and services had a significant positive impact on the actual use of mobile services, such as MMS, search services,

and ringtones. Increased usage intention resulted in increased actual use of mobile devices and services. Oliveira et al. (2014) highlight that prior studies show that age and gender positively impact behavioral intentions toward mobile banking adoption through their effect on performance expectancy, effort expectancy, and social influence. They also found that age positively influences mobile banking adoption through its effect on facilitating conditions. They demonstrated that when there is a behavioral intention to adopt mobile banking, facilitating conditions, such as organizational and technical infrastructure supporting mobile banking, lead to its adoption. Wu and Wang (2005) found that behavioral intention to use mobile commerce significantly impacts actual usage and is an important determinant of system usage. Research findings indicate that performance expectancy and perceived usefulness indirectly influence usage through behavioral intentions, consistent with previous research by Venkatesh and Davis (2000). The final hypothesis of this study is as follows:

H6: Behavioral intention positively influences mobile banking adoption among Croatian users.

The following sections present the research methodology and test and analyze the adapted UTAUT model.

Research methodology and sample

The research was conducted through a questionnaire distributed via social networks, primarily LinkedIn. Respondents were asked to share the questionnaire link with their contacts on social networks after completing it, making the resulting sample a convenient snowball sampling type. Snowball sampling was chosen as the sampling method because the study focuses on users of mobile banking services, i.e., a group of respondents that is not easily identifiable in the general population based on official and publicly available records. The snowball sampling technique enables reaching relevant respondents more efficiently, as initial participants who use mobile banking services are asked to share the questionnaire with their contacts who also use mobile banking. This approach was considered particularly appropriate since the survey was conducted online via social networks. Finally, this method made it possible to collect a sufficient number of responses within a relatively short time and with limited resources. Nevertheless, snowball sampling may result in sample bias, the implications of which are explained in more detail in the study's limitations section. The survey was conducted from January to February 2022, and a total of 331 fully completed questionnaires were collected from respondents who use mobile banking. In the questionnaire, statements related to each factor of mobile banking acceptance were specifically marked and clearly separated from other factors. Respondents were

assured of the anonymity of their responses. They expressed their views using a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). The measurement scales used in the study are presented in Table 1.

Table 1: Measurement scales used in research

Factor	Item	Statement	Author
Performance Expectancy	PE1	I find mobile banking useful.	Venkatesh et al. (2003)
	PE2	Mobile banking enables me to use banking services more efficiently.	
	PE3	Mobile banking enables me to use banking services more productively.	
Effort Expectancy	EE1	Interaction with mobile banking is clear and understandable.	Venkatesh et al. (2003)
	EE2	Mobile banking is easy to use.	
	EE3	Learning to use mobile banking was simple.	
Social Influence	SI1	People who influence my behavior think that I should use mobile banking.	Venkatesh et al. (2003)
	SI2	People important to me think I should use mobile banking.	
	SI3	My surroundings support the use of mobile banking.	
Financial Cost	FC1	I believe the cost of equipment required for mobile banking is high.	Wu, Wang (2005)
	FC2	I believe the cost of accessing mobile banking is high.	
	FC3	I believe the fees for financial transactions through mobile banking are high.	
Facilitating Conditions	FCON1	I have the resources necessary to use mobile banking.	Venkatesh et al. (2003)
	FCON2	I have the necessary knowledge to use mobile banking.	
	FCON3	Customer service is available to help if I have difficulties using mobile banking.	
Behavioral Intention	BI1	I intend to use mobile banking for transferring funds.	Oliveira et al. (2014), based on Kim et al. (2009)
	BI2	I intend to manage my bank account using mobile banking.	
	BI3	I intend to use mobile banking to pay bills.	
Adoption	AD1	I use mobile banking for making payments.	Zhou, Lu, Wang (2010)
	AD2	I use mobile banking for transferring funds.	
	AD3	I use mobile banking to manage my bank account.	

Source: Author's

Of the total respondents, 29.9% were male, and 70.1% were female. In terms of educational level, 36.6% of respondents had completed high school, 22.4% had completed an undergraduate degree, 37.5% had a graduate degree, and 2.8% had completed a doctoral degree. Regarding age, the majority of respondents, 43.5%, were between 26 and 35 years old, 24.2% were between 16 and 25, 19.9% were between

36 and 45, and the remaining 11.5% were over 46 years old. Over 75% of respondents were employed, while 17.5% were students; the remaining respondents were either unemployed or retired. In terms of monthly income, most respondents, 38.7%, had an income between EUR 663 and EUR 1061, 21.5% between EUR 265 and EUR 663, 15.1% between EUR 1061 and EUR 1460, 13% had a monthly income below EUR 200, and 9.7% had a monthly income exceeding EUR 1460.

Results

The PLS-SEM method was used for analysis and hypothesis testing in this research, applying the SmartPLS software (v.3.3.7) (Ringle, Wende, and Becker, 2015). The advantages of the PLS-SEM method include its suitability for smaller sample sizes, its lower sensitivity to data distribution, and its applicability to complex models with both formative and reflective theoretical constructs (Ringle, Sarstedt, and Straub, 2012; Hair et al., 2022). Additionally, PLS-SEM is more appropriate for analyses aimed at prediction rather than explanation (Hair et al., 2013), which is the case in this study. The following sections will first analyze the measurement models of individual constructs to assess the validity and reliability of the scales, specifically indicator reliability, convergent validity, and discriminant validity. Subsequently, the structural model will be analyzed, and the proposed hypotheses will be tested.

Measurement model analysis

Before testing the structural model, the reliability and validity of the measurement scales were assessed. To evaluate the measurement models of individual constructs, a bootstrapping technique with 10,000 subsamples was applied, following recommended guidelines (Hair et al., 2022). The constructs used align with theoretical foundations and are conceptualized as reflective constructs, as in previous studies (Venkatesh et al., 2003; Wu and Wang, 2005). Consequently, the indicators are considered interchangeable and share similar content (Jarvis, MacKenzie, and Podsakoff, 2003). The analysis of the measurement model is presented in Table 2.

Table 2: Indicators of internal consistency reliability and convergent validity

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	Cronbach α	C.R.	AVE
SI1 <- Social influence	0,792	0,102	7,799	0,825	0,872	0,695
SI2 <- Social influence	0,808	0,108	7,488			
SI3 <- Social influence	0,897	0,056	16,057			
FC1 <- Financial cost	0,922	0,058	15,887	0,834	0,897	0,748
FC2 <- Financial cost	0,957	0,056	16,999			
FC3 <- Financial cost	0,690	0,098	7,069			
BI1 <- Behavioral intention	0,909	0,023	39,333	0,814	0,890	0,730
BI2 <- Behavioral intention	0,840	0,057	14,789			
BI3 <- Behavioral intention	0,811	0,046	17,824			
PE1 <- Expected performance	0,854	0,038	22,575	0,862	0,915	0,783
PE2 <- Expected performance	0,921	0,019	49,282			
PE3 <- Expected performance	0,879	0,022	39,216			
EE1 <- Expected effort	0,916	0,015	60,668	0,900	0,938	0,834
EE2 <- Expected effort	0,931	0,015	61,732			
EE3 <- Expected effort	0,892	0,021	42,875			
FCON1 <- Facilitating conditions	0,759	0,068	11,114	0,636	0,804	0,579
FCON2 <- Facilitating conditions	0,838	0,034	24,370			
AD1 <- Adoption	0,677	0,063	10,680	0,806	0,886	0,722
AD2 <- Adoption	0,844	0,031	27,579			
AD3 <- Adoption	0,888	0,020	45,322			

Source: Author's calculation

Most factor loadings were above the recommended threshold of 0.7, except for the variables FC3 and FCON3, whose factor loadings were 0.690 and 0.677, respectively. However, as the Composite Reliability (C.R.) and Average Variance Extracted (AVE) indicators for individual constructs exceeded the recommended values of 0.7 and 0.5, these variables were retained for further analyses. Overall, the measurement scales demonstrated satisfactory levels of internal consistency reliability and convergent validity. Discriminant validity of the model was tested using the Fornell-Larcker (1981) criterion and the calculation of the HTMT indicator. The results of the discriminant validity assessment are presented in Table 3

Table 3: Fornell Larcker criterium and HTMT ratio

	Social influence	Financial cost	Behavioural intention	Facilitating conditions	Expected performance	Expected effort	Adoption
Social influence	0,834						
Financial cost	0,078 (0,07)	0,865					
Behavioural intention	0,241 (0,31)	0,135 (0,16)	0,854				
Facilitating conditions	0,191 (0,41)	0,133 (0,17)	0,648 (0,80)	0,761			
Expected performance	0,392 (0,35)	0,144 (0,28)	0,660 (0,53)	0,550 (0,63)	0,885		
Expected effort	0,341 (0,16)	0,241 (0,12)	0,418 (0,85)	0,423 (0,65)	0,559 (0,40)	0,913	
Adoption	0,161 (0,15)	0,088 (0,11)	0,676 (0,88)	0,566 (0,61)	0,509 (0,43)	0,364 (0,70)	0,849

Source: Author's calculation

Based on the data from Table 2, it can be concluded that the Fornell-Larcker criterion was met. All AVE indicators for individual constructs were greater than the squared correlations between the corresponding constructs. Additionally, all HTMT values were below 0.9 (Ringle & Sarstedt, 2015). Therefore, it can be concluded that the level of discriminant validity for the measurement scales used is satisfactory.

Structural model analysis

After verifying the quality of the measurement scales, an analysis of the structural model was conducted. The results of the structural model analysis and hypothesis testing are presented in Table 4.

Table 4: Structural model analysis

Hypotheses	Original Sample (O)	Standard deviation (STDEV)	T Statistics (O /STDEV)	R ²	f ²	Q ²	Hypothesis
Direct effect							
H1: PE-> BI	0.629*	0.086	7.321	0.441	0.454	0.303	Accepted
H2a: EE -> BI	0.070	0.069	1.008	0.441	0.006	0.303	Rejected
EE -> PE	0.559*	0.076	7.384	0.313	0.455	0.236	
H3: SI -> BI	-0.032	0.039	0.819	0.441	0.001	0.303	Rejected
H4: FCON -> AD	0.221*	0.076	2.907	0.485	0.055	0.341	Accepted
H5: FC-> BI	0.030	0.039	0.776	0.441	0.002	0.303	Rejected
H6:BI -> AD	0.533*	0.073	7.345	0.485	0.320	0.341	Accepted
Indirect effect							
H2b: EE-PE-BI	0,352*	0,076	4,650				Accepted
EE-PE-BI-AD	0,225	0,058	3,860				
PE-AD	0,335	0,073	4,610				
FC-AD	0,016	0,021	0,752				
SI-AD	-0,017	0,021	0,795				

*P<0,05

Source: Author's calculation

According to the results of the structural model analysis, hypotheses H1, H2B, H4, and H6 were accepted, while hypotheses H2, H3, and H5 were rejected. The construct of performance expectancy (H1: $\beta = 0.629$), ($p < 0.05$) has a statistically significant positive effect on behavioral intentions. The construct of effort expectancy (H2B: $\beta = 0.559$), ($p < 0.05$) has a statistically significant positive impact on behavioral intentions through performance expectancy, with an indirect effect ($\beta = 0.352$) and an explained variance of 31.3% ($R^2 = 0.313$). The constructs of effort expectancy (H2a: $\beta = 0.070$), ($p > 0.05$), social influence (H3: $\beta = -0.032$), ($p > 0.05$), and financial cost (H5: $\beta = 0.030$), ($p > 0.05$) do not have a statistically significant effect on behavioral intentions. The constructs of facilitating conditions (H5: $\beta = 0.221$), ($p < 0.05$) and behavioral intention (H6: $\beta = 0.533$), ($p < 0.05$) have a statistically significant positive effect on adoption. The model ultimately explains 44.1% of the variance in behavioral intentions ($R^2 = 0.441$) and 48.5% of the variance in adoption ($R^2 = 0.485$). The Q2 values obtained through the Blindfolding technique were greater than zero for certain endogenous latent variables, indicating the predictive relevance of the model's paths (Hair et al., 2017). Based on the calculated f^2 values, it can be concluded, following Cohen (1988), that the construct of performance expectancy has a strong effect on behavioral intention ($f^2 = 0.45$), effort expectancy has a strong effect on performance expectancy ($f^2 = 0.46$), behavioral intention has a strong effect on adoption ($f^2 = 0.32$), and facilitating conditions have a weak effect on adoption ($f^2 = 0.06$). Furthermore, the constructs of effort expectancy, social influence, and finan-

cial cost have a weak effect on behavioral intention ($f^2 < 0.06$). The research findings are discussed in detail in the discussion and conclusion sections of the paper.

Research Limitations and Suggestions for Future Research

The conducted research has certain limitations that may serve as a foundation for future studies on the acceptance of mobile banking. This research was carried out during the COVID-19 pandemic, an external factor that influenced the increased acceptance of mobile services regardless of other factors associated with mobile banking acceptance. Therefore, the proposed model should be tested in post-pandemic conditions. Additionally, the sample structure consisted mainly of female respondents, which hinders the generalization of research results, and mostly younger individuals. A larger and better-structured sample with a more even distribution of respondents across selected demographic characteristics would yield more relevant results. Such sample bias is a consequence of using the snowball sampling method via social networks. This approach may lead to an overrepresentation of digitally more active individuals who share similar demographic characteristics (Etikan et al., 2016). This may influence the significance of the relationships established in the proposed model. For instance, research indicates that younger mobile banking users may be more strongly motivated by expected performance and perceived usefulness when adopting mobile services (Dendrinis & Spais, 2024; Abegeo Neto & Figueiredo, 2023). On the other hand, perceived security of the service may be more important for older mobile banking users (Hanif & Lallie, 2021). With regard to gender, studies suggest a stronger influence of ease of use and social influence among older female users, while expected performance plays a more significant role for male users (Dendrinis & Spais, 2024; Venkatesh et al., 2003). Nevertheless, there are studies in which these effects were not fully confirmed, highlighting the importance of considering geographic and cultural contexts when testing the UTAUT model (Rahman et al., 2024; Merhi et al., 2019). In this sense, the obtained results largely reflect the attitudes of digitally more prepared, younger users. Given that certain demographic variables in other foreign contexts (Tam and Oliveira, 2016, Merhi, et. al., 2019) were used as moderators and showed a significant impact on the adoption of mobile banking services, future studies could benefit from including variables such as gender, age, income, and education as moderators in the model. In particular, age is notable in this regard. Studies indicate differences in the acceptance of mobile banking services between younger and older populations, with older individuals being less inclined towards new technologies (Shams et al., 2020). Finally, due to the previously mentioned characteristics of the sample's structure and size, an analysis of the moderating effects of specific demographic characteristics on the relationships within the model was not conducted. This was due to the inability to meet the assumptions required

for applying the PLS-SEM method and to ensure statistically valid and reliable measurement scales for individual respondent groups (Hair et al., 2022).

Furthermore, one limitation of the research pertains to the model itself, which is used to explain the adoption of mobile banking. The Unified Theory of Acceptance and Use of Technology (UTAUT) does not account for cultural differences (e.g., values, personality traits, lifestyle, orientation toward innovation, technological proficiency, etc.) in the adoption of mobile banking (Dwivedi et al., 2019hr). It is recommended that selected aspects of cultural differences be included in future research on mobile banking adoption. Additionally, another drawback of the UTAUT model is its omission of trust and security factors, which have been shown in some studies to be significant predictors of mobile banking adoption (Akturan and Tezcan, 2012; Giovanis et al., 2019). Therefore, it would be necessary to expand the proposed model to include these factors and assess its suitability for the Croatian context.

Discussion and conclusion

Advancing development of information and communication technologies, as well as various social changes, such as the fast-paced lifestyle and shifting values, have influenced changes in service user behavior in how individuals use certain services. A particular need has arisen for users to access certain services more quickly and efficiently. Business banks have adapted to these changes and new trends, increasingly offering mobile banking services to better meet users' needs and fulfill growing expectations. Since mobile banking is a relatively new service that depends on technology, it was essential to identify the influential factors in its acceptance.

In this context, the theoretical contribution of the paper comes from applying an adapted UTAUT model to the Croatian mobile banking market, establishing direct positive effects of the theoretical constructs of performance expectancy and facilitating conditions, and indirect positive effects of effort expectancy through performance expectancy on behavioral intentions and mobile banking adoption. The results of the conducted empirical research indicate a partial application of the UTAUT model in explaining the acceptance of mobile banking services among Croatian users, creating a basis for comparison with other technology acceptance or new service adoption models. Finally, the research results provide a foundation for certain practical implications and recommendations for the marketing management of business banks regarding the improvement of mobile banking services.

The most significant construct highlighted was performance expectancy, confirming its impact on behavioral intentions in forming users' behavioral intentions toward mobile banking services, thus supporting previous studies (Lukić, Čolić, Prica, 2019; Antonijević, Ivanović, Simović, 2021; Oliveira et al., 2014; Zhou, Lu, Wang, 2010; Baig, 2019). Bank management should focus its efforts on the construct of perfor-

mance expectancy to improve the efficiency, productivity, and usefulness of mobile banking, thereby significantly influencing the formation of behavioral intentions.

Although effort expectancy does not have a direct impact on behavioral intentions, it should not be overlooked, as the research confirmed its indirect effect on behavioral intentions through performance expectancy, corroborating previous studies (Oliveira et al., 2014; Zhou, Lu & Wang, 2010; Wu & Wan, 2005). Based on these results, it can be assumed that mobile banking users in Croatia are relatively familiar with using mobile banking and feel comfortable doing so, perceiving it as easy to use. This is also confirmed by other studies, which suggest that greater user experience with mobile services and established usage habits, particularly in mature markets, may reduce the impact of effort expectancy on usage intentions and the acceptance of mobile banking (Mukarromah & Setyono, 2024; Saxena, Gera & Taneja, 2023; Nur & Panggabean, 2021). Furthermore, the weak effect of effort expectancy on behavioral intentions and service acceptance in the context of mobile banking can also be explained by certain demographic characteristics of users, such as education level and age. Specifically, younger and more highly educated mobile banking users—such as those included in this study—tend to be more digitally literate and quicker in adopting new technologies, making effort expectancy less important compared to other factors (Merhi, Kone & Tarhini, 2019; Jafri et al., 2024). Despite the results, business banks should continue investing in the development and design of mobile banking applications to reduce user effort and enhance user perception.

Social influence emerged as an insignificant construct, which aligns with previous studies (Oliveira et al., 2014; Carlsson, 2006; Baig, 2019), indicating that society does not influence the formation of behavioral intentions. It can be concluded that mobile banking users in Croatia are not susceptible to social influence when forming behavioral intentions, suggesting a greater emphasis on the benefits that mobile banking brings. This is also suggested by other studies, which indicate that the influence of the construct social influence is minimal or not significant for mature users of services with prior experience, or in contexts where a relatively high level of trust in banks exists. In such cases, expected performance and the benefits of the service become more important (Tan & Lau, 2016; Armansyah, 2021; Saxena, Gera & Taneja, 2023). Consequently, bank management should direct communication efforts toward individuals by highlighting the benefits of mobile banking rather than using social norms to elicit desired behavior. Financial costs were also found to be insignificant, supporting previous studies (Baig, 2019; Carlsson, 2006). This result can be explained by assuming that Croatian mobile service users are willing to bear the necessary financial costs to enjoy the numerous benefits offered by mobile banking, indicating they are not price-sensitive. Additional studies confirm that among younger respondents, as well as those who place greater value on the expected performance of mobile banking services, the role of financial cost in shaping usage intentions and adoption may be diminished (Sharma, 2024; Purohit, Kaur & Chaturvedi, 2022).

Facilitating conditions have a direct impact on mobile banking adoption, which is consistent with previous research (Al Mashagba, Nassar, 2012). Business banks can assist customers by providing support in case of difficulties, such as customer service. Additionally, banks should make various resources accessible through the app or website, like video tutorials on service usage and troubleshooting common issues with mobile banking. Such communication efforts should especially target older users, who tend to be less inclined to adopt new technologies.

Behavioral intentions strongly influence the adoption of mobile banking, as confirmed by previous studies (Carlsson, 2006; Oliveira et al., 2014; Wu, Wang, 2005). Business banks aim to increase the number of mobile banking users, making the transition from behavioral intentions to actual use crucial.

In addition to the above, the conducted study offers several practical implications for commercial banks, managers, and regulatory institutions. The results confirm that performance expectancy is a key factor in shaping the intention to use and the acceptance of mobile banking in Croatia. In this respect, commercial banks should direct the development of mobile banking services toward features that maximize value for users, such as faster transactions, service personalization, one-click accessibility, integration of mobile banking with other services (e.g., parking payments, investment, communication with specific institutions, etc.), as well as the inclusion of artificial intelligence and chatbots to enable faster communication with the bank. Furthermore, banks should regularly conduct user satisfaction surveys and involve customers in service design.

Although the proposed model did not include the constructs of security and trust, previous research has identified them as important factors in mobile banking acceptance (Merhi et al., 2019). Therefore, regulatory institutions should encourage banks to continuously invest in new security protocols for mobile services, while ensuring more transparent communication and user education regarding security measures and data protection.

Finally, the greater acceptance of mobile banking among younger, more educated, and digitally literate users highlights the need for the development of dedicated educational programs (e.g., online guides, tutorials, in-branch workshops) tailored for older users and those with lower levels of education. The study also revealed that financial cost has no significant effect on the intention to use or the acceptance of mobile banking. This suggests that banks should build their competitiveness in mobile banking primarily on service development, quality enhancement, and customer relations, rather than on price-related elements, in order to increase users' intention to adopt and accept mobile banking services. Finally, the adapted UTAUT model for the Croatian mobile services market has not been fully confirmed, providing grounds for using other models or extending the current model with additional theoretical constructs, such as perceived security and risk, trust in services, user readiness, and personal innovativeness, which have been partly tested in studies in other countries. For example, Kumar et al. (2023)

demonstrated that perceived risk and trust function as moderators between behavioral intentions and the actual use of mobile banking services in India.

Given its advantages for users and the increasing digitization of society, greater acceptance of mobile banking services by Croatian users can be expected, provided that adequate security and privacy measures are ensured when using mobile banking services.

Declarations

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Conflicts of interest/Competing interests

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Availability of data and material

The data supporting the findings of this study are available upon request.

Code Availability

Not applicable; however, analysis can be provided upon request.

Authors' Contributions

Dragan Benazić: conceptualization, writing (original draft), writing (review & editing), methodology, data curation and analysis. Marko Paliaga: writing (original draft), writing (review & editing), literature review. Matko Biuk: conceptualization,

writing (original draft), writing (review & editing), literature review, data collection and analysis.

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