

# Post-COVID Digital Banking Adoption in Kosovo: The Roles of Trust, Utility, and Physical Channels

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## Abstract

**Background:** This study examines post-COVID digital payment adoption in Kosovo, following banks' expansion of digital channels and the temporary loan moratoria introduced during the pandemic. **Objectives:** It analyses how trust and perceived utility influence digital payment usage, how reliance on ATMs and bank branches shapes these perceptions, and whether these relationships differ by gender. **Methods/Approach:** The study uses 673 survey responses collected between June 2023 and February 2024. CFA was applied to validate the constructs, SEM to estimate the proposed relationships, and multi-group SEM to test gender moderation. **Results:** Trust is the strongest predictor of digital payment usage, while perceived utility has only a marginal effect. Trust also increases perceived utility. Reliance on physical channels shows a substitution pattern: greater ATM use is associated with lower perceived utility, and more frequent branch visits are associated with lower trust. Utility–trust and ATM–branch reliance covary positively. Gender moderation is limited, although substitution effects are stronger among men. **Conclusions:** Post-pandemic digital payment adoption depends mainly on trust, supported by perceived utility. Banks should strengthen the visibility of security, reliability, and user value, while gradually nudging heavy ATM and branch users toward digital channels through targeted training.

**Keywords:** digital banking adoption, digital payments, trust, perceived utility, physical channels (ATM, branch), gender moderation, structural equation modelling (SEM), Kosovo, COVID-19

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## Introduction

This study examines post-COVID shifts in consumer behaviour around the adoption of digital payment systems in Kosovo. In line with global guidance that promoted contactless and remote transactions during the pandemic (De, Pandey, & Pal, 2020; Khatun, Mitra, & Sarker, 2021; World Bank Group, 2020), banks in Kosovo expanded digital channels, introduced payment deferrals and temporary moratoria, and strengthened remote service capabilities to sustain financial intermediation (Diebner, Silliman, Ungerman, & Vancauwenberghe, 2020; Central Bank of Kosovo, 2020, 2021). Insights from the health literature underscore the role of technology in mitigating contagion risks and supporting everyday activities (Whitelaw, Mamas, Topol, & Van Spall, 2020). Against this backdrop, understanding what drives customers to adopt – and continue using – digital banking is both theoretically and practically salient.

Building on prior work in digital finance and behavioural response to risk, our theoretical model focuses on trust and perceived utility (usefulness/effectiveness) as primary attitudinal antecedents of adoption, complemented by the role of physical channel habits (ATM usage and branch visits). The literature consistently links adoption to risk reduction, security, and confidence in institutions and technology (Chawla & Joshi, 2019; Daragmeh, Lentner, & Sági, 2021; Jung, Kwon, & Kim, 2020), in line with Health Belief Model arguments about perceived risk, self-efficacy, and protective behaviours during the pandemic. However, evidence from the Western Balkans remains limited. Few studies jointly model how trust and utility interact with ongoing ATM and branch use, or whether these relationships differ by gender—a salient moderator in some payment contexts (e.g., Switzerland and Germany; Mondada et al., 2020; Kraenzlin, Meyer, & Nellen, 2020).

We address these gaps using primary survey data from 673 retail banking customers collected from June 2023 to February 2024. The instrument captures actual usage of digital banking during the pandemic alongside multi-item measures of trust and utility, and frequency of ATM use and branch visits. Data were collected in the post-COVID period, while behavioural usage (USAGE) refers to the pandemic period, reported retrospectively by respondents. After descriptive analyses, we estimate a confirmatory factor analysis (CFA) to assess the measurement model, followed by a structural equation model (SEM) to test the hypothesised paths among trust, utility, physical channel use, and digital adoption. We then implement multi-group SEM to examine whether key relationships differ between women and men.

The results preview three contributions. First, trust emerges as the central driver of digital banking adoption, while perceived utility plays a more modest, supportive role; trust also reinforces utility perceptions, highlighting a confidence-to-cognition pathway. Second, contrary to the view that physical and digital channels necessarily complement each other, heavier reliance on ATMs and branches is associated with lower perceived utility and lower trust, suggesting substitution effects at the attitudinal level, even as overall digital capacity expands. Third, gender differences are limited overall but concentrate on links from physical channels to attitudes, with more substantial negative spillovers among men. These findings inform both theory—by integrating policy impetus, risk/trust dynamics, and channel habits—and practice, by pointing banks toward interventions that bolster trust, sharpen perceived benefits, and manage migration away from habitual cash and branch use.

## Literature review

With the cessation of financial activities, the pandemic caused an economic collapse. With restricted mobility, the World Bank, the World Health Organization,

governments, and central banks had recommended the use of digital payments as a policy instrument to mitigate the risk of COVID-19, promoting their use and increasing public awareness of digital banking as a key financial mechanism (De, Pandey, & Pal, 2020; Khatun, Mitra, & Sarker, 2021; World Bank Group, 2020). The application of technology during COVID-19 was a successful strategy, according to the health sector (Whitelaw, Mamas, Topol, & Van Spall, 2020), and it is considered one of the factors supporting customer behaviour and easing the situation (Whitelaw et al., 2020). Since banks play a role in economic and financial operations, they focused on addressing customer and community needs as a strategy to mitigate pandemic risks through digital services such as transactions, payments, deposits, account management, debt management in line with government plans for payment deferrals, fee reductions, liquidity support, online agent assistance, credit facilities, online account opening, and increased transaction limits (Diebner, Silliman, Ungerman, & Vancauwenberghe, 2020; Muthiora, 2020).

Research conducted in other countries, including Russia, China, Asian and African nations, Colombia, and Egypt, reported measures aimed at improving transfer speeds and reducing transaction fees through the end of 2020. In the UK, the introduction of contactless card payments led to limits on large transactions to manage COVID-19-related fraud risks, resulting in operational challenges such as capacity shortages and technical staffing issues amid the rapid increase in usage during the pandemic (Agur, Peria, & Rochon, 2020; Moore, 2020). In Ethiopia, banks reduced interest rates and renegotiated loans, but awareness of digital payment usage remained low (Boru, 2020). One of the relief measures included a moratorium; in Sri Lanka, a temporary moratorium on loans was implemented for several months, classifying loans under the moratorium. Despite the situation, credit issuance increased, mainly for the government and state enterprises (Central Bank of Sri Lanka, 2020). In Spain, mortgage repayments were deferred for up to 12 months and other loans for up to 6 months. In the US, banks announced foreclosure payment deferrals, while in Australia, there was a pause in loan payments and a reduction in interest rates without penalties (World Bank Group, 2020). The provision of these facilities and the Federal Reserve's restriction on physical currency during the pandemic altered customer behaviour, driven by the safety, speed, accuracy, and convenience of digital payments.

Regarding changes in customer behaviour, evidence gathered from various countries (Alexandrou & Chen, 2021; Kim, Kumar, & O'Brien, 2020; Kulisz, Bojanowska, & Toborek, 2021; Musyaffi et al., 2021; UNCTAD, 2020) indicated that nations such as Turkey, China, and the Republic of Korea, which did not widely use digital payments before the pandemic, experienced a shift in behaviour during the pandemic. Similarly, in European countries, the growth of e-commerce contributed to the rise in digital payments. At the same time, credit transfers increased in both developed and developing economies, leading to long-term changes in customer behaviour.

Conversely, in developed economies like Switzerland and Germany, fewer customers used digital payments for online shopping, with women reportedly more inclined to make online purchases. Mondada et al. (2020) emphasised that, in Switzerland, payment methods during COVID-19 were perceived as challenging, rendering cash problematic. Meanwhile, Kraenzlin, Meyer, and Nellen (2020) highlighted that card payments in Switzerland were perceived as beneficial. In New York and London, the drastic adoption of digital payments during the pandemic necessitated the modernisation of payment systems. Western Europe experienced only incremental changes, while significant impacts were observed in Asia and North America, where cash previously dominated transactions. In the US, customer behaviour shifted, with reports indicating that customers performed at least one digital

banking service per month (Schuh & Stavins., 2021). In Vietnam, digital payments became a habit during the pandemic (Yildirim & Erdil, 2023). According to sources (statista.com, n.d.; World Bank Group, 2020), there was an increase in the number of digital payment users, online banking, and online deposits and credits (Camara, 2021; Yıldirim & Erdil, 2023). However, cash remained prevalent as a store of value due to uncertainties arising from the situation, despite customer satisfaction with digital methods (Brien, 2021; PaySafe.com, n.d.). Reports also indicated that central banks did not experience a decline in cash holdings, even though their usage decreased (Boar & Wehrli, 2021).

According to the Health Belief Model (HBM), perceived risk, perceived susceptibility, self-efficacy, ease of use, and satisfaction positively influence the adoption of digital payments, both in the short term as a protective policy measure and in the long term as a driver of customer behaviour change (C.C. & Prathap, 2020). These findings align with other authors (Chawla & Joshi, 2019; Daragmeh, Lentner, & Sági, 2021; Jung, Kwon, & Kim, 2020; Patil, Tamilmani, Rana, & Raghavan, 2020; Ali et al., 2024), who emphasise that perceptions of risk, security, trust, and ease of use significantly influenced customer behaviour in retail banking during the pandemic. These factors positively influenced the adoption of digital payments, with usage levels varying with the level of trust.

Banks must address the risks and security concerns associated with digital services to mitigate inherent risks, as increased usage also heightens the likelihood of fraud, such as card data breaches involving banking agents. Furthermore, governments and regulators should play an active role in informing and educating customers (De, Pandey, & Pal, 2020). In the US and Turkey (Jung et al., 2020; Odeh Mahmoud & Mohammad, 2021), customers are more inclined to adopt online payments when trust levels are high and perceived risk is reduced. Similarly, other authors (Habibur Rahman, Al-Amin, & Sharmin Lipy, 2020) highlight that perceived risk significantly affects digital banking adoption and its performance. It should be noted that COVID-19 has negatively impacted banking performance, financial stability, credit delays, liquidity risks, and asset quality (Elnahass, Trinh, & Li, 2021). Consequently, banks are now facing significant risks caused by the pandemic, particularly in maintaining liquidity to ensure operations, preserving investor confidence, and managing monetary policy to support price stability, credit lines, and fiscal measures to address price changes. In such scenarios, digitalisation could lead to increased cash transfer provisions in the long term as a protective measure in European countries (Bank, 2020). For many economies, this presents a significant challenge, as banks continue to grapple with rising credit risks and payment delays stemming from business closures during the pandemic, and lending is likely to remain low amid the weak economic environment.

Banks have continued to provide credit with some flexibility, sufficient security, and access to deposits, thereby altering customer behaviour and improving financial literacy about the benefits of digital payments, driven by government initiatives (Carletti, Claessens, Fatás, & Vives, 2020; PWC.com, 2020; Pradhan et al., 2025). Additionally, the IMF reports that, despite economic and health crises, European banks have been able to increase loan-loss provisions and gradually absorb rising credit impairment charges without significant changes to their capital (Aiyar et al., n.d.).

Despite the increased use of digital services (Muzawar, 2020), several factors still need to be addressed to enhance customer satisfaction, expand infrastructure for service stability, improve cybersecurity, facilitate ease of use, provide online customer guidance, and increase usage skills and awareness (Abdus Salam, Saha, Habibur Rahman, & Mutsuddi, 2021; Ramaswamy, Khande, Patil, & Kalkar, 2021). Furthermore,

the G20 Italian Presidency (2021) highlights a shortage of digital tools and a lack of education on the use of digital services, exacerbated by weak economic conditions in some countries. According to Abdus Salam et al. (2021), banks need to reduce customer dissatisfaction; institutions must advance technological development and provide online guidance to clients (Fletcher & Griffiths, 2020). The pandemic has driven businesses to digitise payment systems, with significant global economic impacts expected in the coming years (Bai et al., 2021). Nevertheless, banks continue to lead, in partnership with fintech companies, in providing digital services tailored to customer needs, thereby reducing risks associated with infection, costs, and time, while changing customer behaviour. However, proficiency in using these services still requires improvement (Baicu, Gârdan, Gârdan, & Epuran, 2020; Dubey, Sonar, & Mohanty, 2020; Rinearson et al., 2020; Mouse & Ozili, 2023; Wong, n.d.). The use of technology is positively correlated with individuals' goals for adopting new solutions, especially during the pandemic, to mitigate risks (Sabbir, Akter, Khan, & Das, 2020). According to Diebner et al. (2020), banks have met four client needs during COVID-19: focusing on customer care, fulfilling client needs wherever they are, forecasting the post-COVID situation, and building agility in line with the times.

Banking Sector in Kosovo – At the end of 2020, the number of commercial banks in Kosovo increased by 11% due to the licensing of "Banka Credins Kosovë" SH.A from Albania, while microfinance and non-bank institutions decreased by 18% after the withdrawal of two institutions. The banking sector, dominated by foreign capital (55.8% from the EU), maintains a simple balance sheet structure with minimal interconnections between system sectors, primarily through deposits at the Central Bank of Kosovo and commercial banks.

Impact of COVID-19 on the Payment System in Kosovo - Digital payments in Kosovo have proliferated, reducing operational costs and risks (Kosovo Banking Association, 2019). The pandemic accelerated digital adoption, ensuring liquidity and credit risk management, and supporting struggling businesses (Central Bank of Kosovo, 2020, 2021). Measures included remote services and online account opening, as well as a loan moratorium applied to 63.5% of the loan portfolio by May 2020, followed by loan restructuring guidelines to ease credit burdens (Central Bank of Kosovo, 2020).

In 2020, the Central Bank of Kosovo, in cooperation with the European Central Bank through the Deutsche Bundesbank, secured up to €100 million to address pandemic-related liquidity needs until March 2022. Kosovo's payment system demonstrated resilience, with improvements in infrastructure and public trust, although it still lags behind EU standards (Central Bank of Kosovo, 2020). Debit card usage increased by 8.4%, while credit cards dropped by 5.2%. Payments via POS terminals rose by 5.2%, ATM withdrawals by 4.0%, and digital banking transactions by 8.7%. Over 21.0% of the 2.3 million bank accounts had online payment access, driven by the pandemic (Central Bank of Kosovo, 2021). Banks also enhanced risk management tools and promoted financial education through official channels and social media (Central Bank of Kosovo, 2021).

## Theoretical background and hypotheses development

### *Digital banking during the COVID-19 pandemic*

The COVID-19 pandemic accelerated the adoption of digital banking, as governments, central banks, and international institutions encouraged the use of digital payments to mitigate health and economic risks (De, Pandey, & Pal, 2020; World Bank Group, 2020). Banks responded by expanding digital services such as online account management, payment deferrals, and credit facilities, thereby

ensuring continuity of financial operations (Diebner, Silliman, Ungerman, & Vancauwenberghe, 2020; Muthiora, 2020).

These developments underline the importance of customers' perceptions of utility, as digital banking was often associated with convenience, safety, and improved service quality (Whitelaw, Mamas, Topol, & Van Spall, 2020). Prior studies have shown that the perceived usefulness of digital services during crises drives actual adoption, suggesting that higher perceived utility increases the likelihood of usage. Thus, H1 is proposed: *The perceived utility of digital banking services positively influences their use during the COVID-19 pandemic.*

Another critical factor is trust. Research demonstrates that trust in banking institutions and in the reliability of digital technologies significantly shapes adoption behaviour, particularly under uncertainty (Chawla & Joshi, 2019; Daragmeh, Lentner, & Sági, 2021; Jung, Kwon, & Kim, 2020). Customers in the U.S. and Turkey, for example, were more inclined to adopt online banking when trust levels were high, thereby reducing perceived risks and increasing satisfaction (Odeh Mahmoud & Mohammad, 2021). Trust is also associated with reduced perceptions of fraud and increased confidence in transaction security (Habibur Rahman, Al-Amin, & Sharmin Lipy, 2020). Consequently, H2 is formulated as follows: *Trust in digital banking services positively influences the use of digital banking services during the COVID-19 pandemic.*

The pandemic also transformed traditional banking channels, including ATM use. In many countries, ATM transactions increased alongside digital adoption, as customers relied on them for essential financial operations while branches were closed or restricted (Central Bank of Kosovo, 2021). A greater frequency of ATM use may have enhanced awareness of digital solutions and strengthened perceptions of their practicality. Therefore, H3 is proposed: *ATM usage frequency positively influences the perceived utility of digital banking services during the COVID-19 pandemic.*

Finally, customer interactions with bank branches during the pandemic played a role in shaping perceptions of security and trust. Restrictions on in-person services and the shift toward remote transactions forced banks to reconfigure trust-building mechanisms (Diebner et al., 2020; Central Bank of Kosovo, 2020). Evidence suggests that reduced branch visit frequency may have led to increased reliance on digital channels, thereby reinforcing trust in their reliability and security (Jung et al., 2020). Accordingly, we propose H4: *Trust in digital banking services positively influences the perceived utility of digital banking services during the COVID-19 pandemic.*

Branch visits and trust are closely related. Reduced physical interactions with banking personnel have increased the importance of digital platforms as mechanisms for trust building (Diebner et al., 2020). Customers who continued to visit branches reported higher expectations for security and reliability, which, in turn, influenced their perceptions of online services. Accordingly, we propose H5: *The frequency of bank branch visits positively influences trust in digital banking services during the COVID-19 pandemic.*

### *Determinants of digital banking adoption*

Continuing from the main structural relationships, the literature also highlights several associations between the constructs that are not strictly directional but still relevant for understanding customer behaviour during the COVID-19 pandemic.

Utility and trust are interlinked. Prior studies emphasise that customer perceptions of usefulness, ease of use, and satisfaction cannot be separated from their level of trust in the system (Chawla & Joshi, 2019; Ali et al., 2024). Trust increases the perceived utility of digital services, while a strong sense of utility reinforces confidence in using them.

This reciprocal relationship suggests a positive association, leading to H6: *Perceived utility of digital banking services is positively associated with trust.*

Finally, the relationship between branch visits and ATM usage reflects broader behavioural patterns during the pandemic. Evidence shows that restrictions on branch access led many customers to rely more on ATMs for essential services. At the same time, those who maintained frequent branch interactions were also more likely to use ATMs as complementary channels (Central Bank of Kosovo, 2021). This complementary behaviour reinforces a positive association, providing support for H7: *There is a positive association between the frequency of bank branch visits and the frequency of ATM usage.*

### *Gender as a moderator*

Gender differences have been widely explored in studies of digital banking and e-commerce, particularly regarding perceptions of trust, risk, and usefulness. Evidence indicates that women are often more cautious in adopting new technologies due to higher sensitivity to perceived risks, while men typically emphasise efficiency and practicality (Mondada et al., 2020; Kraenzlin, Meyer, & Nellen, 2020). During the COVID-19 pandemic, women in Switzerland and Germany were reported to rely more on online shopping and digital payments than men. In contrast, in other contexts, men were faster to adopt innovative banking channels (Musyaffi et al., 2021).

Research suggests that perceived utility may have different levels of importance across genders: for men, efficiency and convenience are primary motivators, whereas for women, security and reliability weigh more strongly in usage decisions (Chawla & Joshi, 2019; Ali et al., 2024). Therefore, H8a is proposed: *The effect of perceived utility on the usage of digital banking services differs between men and women.*

Similarly, trust in banking institutions and technologies tends to be a stronger determinant of adoption for women, who are more likely to avoid perceived financial or security risks (Habibur Rahman, Al-Amin, & Sharmin Lipy, 2020; Odeh Mahmoud & Mohammad, 2021). This leads to H8b: *The effect of trust on the usage of digital banking services differs between men and women.*

In terms of ATM usage, studies show that women in some regions reduced their reliance on cash withdrawals faster than men, reflecting different perceptions of safety and hygiene during the pandemic (Boar & Wehrli, 2021). For men, ATM usage may have acted as a complementary channel that reinforced perceptions of practicality. Hence, H8c is proposed: *The effect of ATM usage on the perceived utility of digital banking services differs between men and women.*

Trust is also closely connected to utility perceptions. Evidence suggests that women tend to rely more on trust in technology and institutions to shape their perceptions of usefulness, whereas men may adopt new services based solely on functionality (Daragmeh, Lentner, & Sági, 2021). Accordingly, H8d is proposed: *The effect of trust on the perceived utility of digital banking services differs between men and women.*

Finally, regarding branch visits, research highlights that women may place greater importance on personal interactions with banking staff as a basis for building trust, while men are more likely to transition away from physical branches toward digital channels (Schuh & Stavins., 2021; Yildirim & Erdil, 2023). This suggests that physical presence has distinct trust-related implications across genders, leading to H8e: *The effect of bank branch visits on trust in digital banking services differs between men and women.*

In summary, the literature demonstrates that the COVID-19 pandemic significantly reshaped customer behaviour and accelerated the adoption of digital banking, driven by perceived utility, trust, and changes in traditional banking practices. Prior

studies also suggest that these relationships may vary across demographic groups, particularly gender, highlighting the need for a more detailed empirical examination. Building on these insights, the following section outlines the research methodology applied to test the proposed hypotheses and assess the moderating role of gender in digital banking adoption during the pandemic.

## Methodology

### *Research instrument*

This investigation aimed to assess the influence of the post-COVID era on consumer acceptance of digital payment systems in Kosovo. This study examines how characteristics, including trust, perceived utility, ease of use, and security, affected the acceptability and sustained use of digital banking services post-pandemic. This study is underpinned by a theoretical model based on prior research on digital payment adoption, emphasising the impact of the post-pandemic context, including measures such as the proliferation of digital banking and financial moratoria. H8b cannot be tested because the male coefficient for TRUST → USAGE is unavailable, which would have enhanced consumer satisfaction and acceptance of digital payment methods.

The research is based on primary data collected via an open Google Forms link using an online convenience/snowball approach across the Kosovo region. Eligibility required adult residents with at least one bank account; both users and non-users of digital banking during the COVID-19 period were invited.

Table 1 provides an overview of the research instrument applied in this study. The dependent variable captures respondents' binary decision to use digital banking services during the COVID-19 pandemic, reflecting actual adoption behaviour. Independent variables are grouped into three main categories.

First, the utility of digital banking services (UTILITY) is measured through three items assessing positive attitudes toward digital technologies, the practicality of digital banking during the pandemic, and perceived improvements in service quality. These items are consistent with previous studies emphasising the importance of perceived usefulness in technology adoption (Baicu et al., 2020).

Second, the instrument includes behavioural indicators related to branch visits (BRANCH) and ATM usage (ATM). These variables account for changes in traditional banking habits, which may influence customers' adaptability and reliance on digital channels during the crisis.

Third, the level of trust (TRUST) is measured using four items that cover both institutional trust in banks and technological trust in digital services. The items capture multiple dimensions of trust, including reliability, overall confidence in banking institutions, trust in online/mobile banking, and perceptions of ease and security.

Although the survey was fielded post-COVID (June 2023–February 2024), the USAGE variable retrospectively captures whether respondents used digital banking during the COVID-19 pandemic; usage is therefore measured retrospectively, while attitudinal items reference the same pandemic period.

Overall, the instrument integrates both attitudinal and behavioural dimensions, ensuring a comprehensive assessment of factors influencing digital banking usage during the COVID-19 pandemic. The combination of established constructs (utility and trust) with context-specific measures (branch and ATM usage) allows for a nuanced analysis of adoption drivers.

Table 1

Research instrument description

Content	Code	Item	Modalities
<b>Dependent variable</b>			
<b>Usage of digital banking services</b>	USAGE	Did you use digital banking services during the COVID-19 pandemic?*	1-Yes; 0-No
<b>Independent variables</b>			
<b>Utility of digital banking services (UTILITY)</b>	UTILITY1	The COVID-19 pandemic affects your positive attitude towards digital technologies.	Likert scale (1-5) (1-completely disagree, 5-completely agree)
	UTILITY2	During the COVID-19 pandemic, the use of digital banking services was practical.	
	UTILITY3	During the COVID-19 pandemic, the use of digital banking services increased the quality of my banking services.	
<b>Bank branch frequency visits &amp; the adaptability of banking services during the pandemic</b>	BRANCH	How often did you visit bank branches/agencies during the COVID-19 pandemic?	1 = Never; 2 = Once per month; 3 = Every two weeks; 4 = Weekly; 5 = More than once per week.
	ATM	How often did you use bank ATMs (Automated Teller Machines) during the COVID-19 pandemic?	
<b>Level of trust (TRUST)</b>	TRUST1	The technology used for digital banking services is reliable	Likert scale (5-Very high, 4-High, 3-Medium, 2-Low, and 1-Very low)
	TRUST2	Your current level of trust in banking institutions during the COVID-19 pandemic.	
	TRUST3	To what extent do you currently trust (during the COVID-19 pandemic) online/mobile banking services?	
	TRUST4	The use of the internet and mobile banking services (during the COVID-19 pandemic) was easy and trustworthy.	

Note: \* (retrospective measure, asked in 2023–2024)

Source: Authors' work related to Baicu et al. (2020)

### Sample

We employed a cross-sectional online convenience/snowball sample using an open Google Forms link. Eligibility required adult residents of Kosovo with at least one bank account; both users and non-users of digital banking during the COVID-19 period were invited. Participation was voluntary and anonymous; informed consent was obtained on the first survey page, no personally identifying information was collected, and the study adhered to institutional ethical guidelines for minimal-risk survey research.

Data collection followed the World Health Organisation (WHO) pandemic timeline; in May 2023, WHO announced that COVID-19 was no longer a Public Health Emergency of International Concern (World Health Organisation, 2023).

A total of 673 respondents participated. Males accounted for 56.3%, females for 43.3%, and the remaining 0.4% reported other/prefer not to say (percentages may not sum to 100 due to rounding). The majority were aged 26–35, 55.4% reported postgraduate education, and 39.4% reported a monthly income of €400–€600. Two observations contained item non-response; consequently, descriptive Ns vary slightly across variables (e.g., Table 2 reports N = 671).

Our results align with studies from other countries (Awanis & Gamble, 2021; Institute, 2020; Rahaman, Luna, Kejing, Ping, & Taru, 2021), which indicate that men are more engaged in e-banking, perceive it as easier to use, and hold more accounts than women. Agur et al. (2020) also note lower e-banking usage among women and older groups. Other studies (Schuh & Stavins, 2021; Braimllari, 2021; Polasik et al., 2020; Gallegos, 2025) have found that younger, higher-educated, and higher-income clients use digital payments more frequently, partly due to heightened health awareness during the pandemic. Similarly, Wisniewski et al. (2021) report increased usage among women and older groups when ease of use is emphasised, and knowledge barriers are reduced. Research by Schuh & Stavins (2021), Shaikh et al. (2022), and Ali et al. (2024) indicates that COVID-19 positively influenced digital payment adoption, with clients making at least one online payment per month across demographic segments.

In sum, the demographic profile mirrors international patterns: younger, higher-educated, and higher-income individuals were more likely to adopt digital banking, while gender- and age-related differences remain context-dependent – reinforcing the value of examining demographic moderators in subsequent model testing.

### *Statistical analysis*

The statistical analysis was conducted in several stages to test the proposed research model and hypotheses. First, descriptive statistics were applied to summarise the demographic profile of respondents and their basic patterns of digital banking usage. This step provided insights into age, gender, education, and income distributions, which were later used to interpret differences in adoption behaviour.

Second, the reliability and validity of the research instrument were assessed through confirmatory factor analysis (CFA). The measurement model included the latent constructs of utility and trust, evaluated using factor loadings, composite reliability (CR), and average variance extracted (AVE). These procedures ensured that the latent constructs were measured accurately and consistently.

Third, the structural equation model (SEM) was applied to test the relationships between constructs. The dependent variable, digital banking service usage, was regressed on the latent constructs of utility and trust. In contrast, ATM usage and branch visits were modelled as predictors of utility and trust. Goodness-of-fit indices, such as CFI, TLI, RMSEA, and SRMR, were used to evaluate the model's adequacy. Given the binary USAGE indicator and ordinal items, SEM was estimated with a categorical-data estimator (WLSMV, probit link) using polychoric/polyserial correlations; standard errors were robust.

Finally, a multi-group analysis (MGA) was performed to assess potential differences across gender. The invariance of measurement was tested to confirm that the constructs were comparable between male and female respondents. Subsequently, path coefficients were compared across groups to determine whether the effects of

utility, trust, ATM usage, and branch visits on digital banking adoption differed significantly between men and women.

Through this multi-step analytical approach, the study ensures the robustness of measurement and the validity of structural relationships, enabling a comprehensive understanding of the factors influencing digital banking adoption during the COVID-19 pandemic.

## Results

This section presents the study's empirical findings. The results are structured in four parts. First, descriptive statistics provide an overview of the sample characteristics and key variables. Second, the measurement model is assessed to confirm the reliability and validity of the constructs. Third, the structural equation model is tested to evaluate the hypothesised relationships between utility, trust, ATM usage, branch visits, and digital banking adoption. Finally, the moderating effect of gender is examined through multi-group analysis to identify potential differences between male and female respondents.

### Descriptive statistics

The descriptive analysis provides an overview of the respondents' demographic characteristics and their patterns of digital banking usage during the COVID-19 pandemic. These results provide a foundation for understanding the sample composition and for contextualising subsequent analyses.

Table 2  
Descriptive statistics of the research variables

Variable	N	Min	Max	Mean	SD
UTILITY1	671	1	5	4.261	1.033
UTILITY2	671	1	5	4.382	0.967
UTILITY3	671	1	5	3.729	0.854
BRANCH	671	1	5	1.674	0.914
ATM	671	1	5	2.344	0.957
TRUST1	671	1	5	4.413	0.838
TRUST2	671	1	5	4.371	0.878
TRUST3	671	1	5	4.373	0.870
TRUST4	671	1	5	3.620	0.899

Notes: UTILITY and TRUST items measured on 1–5 Likert scales; BRANCH and ATM coded 1–5 as defined in the instrument; TRUST4 was included in descriptives but excluded from the CFA to improve model fit (see Measurement model).

Source: Authors' work

Table 2 presents the descriptive statistics of the research variables. The results show that respondents generally perceive digital banking services as highly useful, with mean values for UTILITY1 and UTILITY2 well above 4, and UTILITY3 somewhat lower yet still above the scale midpoint. These findings confirm that digital banking was widely perceived as beneficial during the pandemic period.

By contrast, the mean values for BRANCH and ATM are below the midpoint of the scale, indicating relatively infrequent reliance on physical channels. This is consistent with the restrictions and behavioural shifts observed during the COVID-19 pandemic, when consumers increasingly preferred remote access to financial services in order to reduce physical contact and comply with social distancing measures.

Trust in digital banking also emerges as a significant factor, with consistently high mean values for TRUST1, TRUST2, and TRUST3, each above 4. The slightly lower mean

for TRUST4 suggests that specific aspects of trust – possibly related to security – remain more challenging for banks to address. Overall, the descriptive results underscore the strong perceived utility and trust in digital banking services during the pandemic, while also highlighting the importance of physical service channels.

### Measurement model

The measurement model was assessed using confirmatory factor analysis (CFA) to evaluate the reliability and validity of the constructs. Factor loadings, composite reliability (CR), average variance extracted (AVE), and discriminant validity measures were applied to ensure the robustness of the latent variables.

The chi-square statistic for the factor model ( $\chi^2 = 67.486$ ,  $df = 8$ ,  $p < 0.001$ ) is significant, indicating that the model does not perfectly reproduce the observed covariance matrix (Table 3). This result is not unexpected, given the chi-square test's sensitivity to sample size, where even minor discrepancies between the observed and model-implied covariance matrices can yield statistical significance. Compared to the baseline model ( $\chi^2 = 2101.556$ ,  $df = 15$ ), the factor model represents a substantial improvement in fit.

Table 3  
Chi-square Test

Model	$\chi^2$	df	p
Baseline model	2101.556	15	—
Factor model	67.486	8	< .001

Source: Authors' work

The fit indices suggest that the measurement model demonstrates an acceptable to good fit (Table 4). Specifically, the CFI (0.971) and TLI (0.947) exceed the recommended threshold of 0.90, indicating satisfactory incremental fit. The SRMR (0.039) is well below the conservative cutoff of 0.08, providing further support for model adequacy. However, the RMSEA (0.105, 90% CI [0.083–0.129]) exceeds the generally accepted threshold of 0.08, pointing to some degree of model misfit. Nevertheless, given the strong performance of the other indices, the model fit may still be considered adequate, albeit with room for improvement.

Table 4  
Fit Indices

Index	Value
CFI	0.971
TLI	0.947
RMSEA	0.105 (90% CI: 0.083–0.129), $p=4.248 \times 10^{-5}$
SRMR	0.039

Source: Authors' work

The standardised factor loadings for the TRUST construct are uniformly high (0.863–0.876), with corresponding  $R^2$  values (0.745–0.767) indicating that the latent factor explains a substantial portion of variance in the observed indicators (Table 5). Conversely, the UTILITY construct shows moderate loadings for two indicators (0.667 and 0.778) but a weaker loading for UTILITY3 (0.527), which yields an  $R^2$  of only 0.277. This suggests that UTILITY3 may not capture the latent construct as strongly as the other items. Overall, the loadings support the validity of the TRUST construct and provide partial, albeit less robust, evidence for UTILITY.

Item TRUST4 was excluded from the CFA due to a lower loading and to improve model fit; reliability statistics for TRUST1–TRUST3 are reported.

Table 5  
Factor Loadings and R<sup>2</sup>

Construct	Indicator	Std. Loading	R <sup>2</sup>	95% CI
UTILITY	UTILITY1	0.667	0.445	0.614–0.720
	UTILITY2	0.778	0.606	0.732–0.824
	UTILITY3	0.527	0.277	0.463–0.591
TRUST	TRUST1	0.867	0.752	0.842–0.892
	TRUST2	0.876	0.767	0.852–0.900
	TRUST3	0.863	0.745	0.838–0.888

Source: Authors' work

The reliability statistics in Table 6 confirm the robustness of the TRUST construct, which demonstrates high internal consistency (Cronbach's  $\alpha = 0.902$ ; McDonald's  $\omega = 0.902$ ) and strong convergent validity (AVE = 0.755, above the recommended threshold of 0.50). In contrast, the UTILITY construct shows comparatively weaker psychometric properties, with Cronbach's  $\alpha$  (0.691) and McDonald's  $\omega$  (0.699) falling slightly below the 0.70 threshold for satisfactory reliability. Its AVE value (0.455) is also marginally below the recommended level, indicating limited convergent validity. Nevertheless, given the limited number of indicators, retaining all three items – including UTILITY3 – is justified to preserve construct coverage. This suggests that while the UTILITY construct may not fully meet the most stringent psychometric criteria, it still provides meaningful insights into the perceived usefulness of digital banking services during the pandemic.

Table 6  
Reliability and Validity

Construct	AVE	Cronbach's $\alpha$	McDonald's $\omega$
UTILITY	0.455	0.691	0.699
TRUST	0.755	0.902	0.902

Source: Authors' work

Overall, the CFA results support the adequacy of the measurement model. The TRUST construct demonstrates strong psychometric properties, with high loadings, reliability, and convergent validity, confirming it as a well-defined latent factor. Although the UTILITY construct exhibits lower reliability and marginally insufficient convergent validity, its inclusion remains important to capture the perceived usefulness of digital banking services during the pandemic. Taken together, the model provides a satisfactory basis for subsequent structural equation modelling, while highlighting the need for cautious interpretation of the UTILITY construct.

### Structural equation model

The structural model was tested to examine the hypothesised relationships between utility, trust, ATM usage, branch visits, and digital banking adoption. Model fit indices were evaluated, and the significance of path coefficients was analysed to determine the strength and direction of the effects.

As shown in Table 7, trust and, to a lesser extent, perceived utility are the primary drivers of digital banking adoption. The path USAGE  $\leftarrow$  TRUST is positive and statistically significant ( $\beta = 0.400$ ,  $p = 0.019$ ). USAGE  $\leftarrow$  UTILITY is positive and marginally significant at the 10% level ( $\beta = 0.306$ ,  $p = 0.081$ ), so H2 is supported and H1 is supported at a =

.10. Trust also strongly increases perceived utility (UTILITY ← TRUST:  $\beta = 0.290$ ,  $p < .001$ ), supporting H4. In contrast to the hypotheses, greater reliance on physical channels is associated with less favourable views of digital: UTILITY ← ATM is negative ( $\beta = -0.056$ ,  $p = 0.027$ ) and TRUST ← BRANCH is negative ( $\beta = -0.134$ ,  $p < .001$ ), so H3 and H5 are not supported due to sign reversal. Substantively, heavier use of ATMs and branch visits appears to substitute for digital channels, dampening perceived usefulness and trust.

Table 7  
Structural model results and hypothesis testing (SEM)

Hyp.	Path (Outcome ← Predictor)	Std. $\beta$	SE	z	p	95% CI	Decision
H1	USAGE ← UTILITY	0.306	0.175	1.747	0.081*	[-0.037, 0.650]	Supported
H2	USAGE ← TRUST	0.400	0.171	2.343	0.019**	[0.065, 0.734]	Supported
H3	UTILITY ← ATM	-0.056	0.025	-2.218	0.027**	[-0.105, - 0.006]	Not supported
H4	UTILITY ← TRUST	0.290	0.021	13.882	< .001***	[0.249, 0.331]	Supported
H5	TRUST ← BRANCH	-0.134	0.034	-3.947	< .001***	[-0.201, - 0.068]	Not supported

Notes: Std.  $\beta$  = standardized coefficient; SE = standard error; CI = confidence interval:

\* Statistically significant at 10% level; \*\* 5%; \*\* 1%; H1 is significant at  $\alpha = 0.10$  (marginal)

Source: Authors' work.

Table 8 shows that both covariance hypotheses are supported. UTILITY ↔ TRUST is positively associated (estimate = 0.290,  $p < 0.001$ ), consistent with the idea that higher trust coexists with higher perceived usefulness. ATM ↔ BRANCH is also positively associated (estimate = 0.458,  $p < 0.001$ ), indicating that the use of one physical channel tends to be accompanied by the other. Methodologically, note that H6 refers to a factor-level correlation and should be interpreted alongside (but not as duplicating) the directed path TRUST → UTILITY in the structural model.

Table 8  
Covariances and hypothesis tests (H6–H7)

Hypothesis	Relationship	Estimate	Std. Error	z-value	p	95% CI	Decision
H6	UTILITY ↔ TRUST	0.290	0.021	13.882	< .001	[0.249, 0.331]	Supported
H7	ATM ↔ BRANCH	0.458	0.033	13.713	< .001	[0.392, 0.523]	Supported

Source: Authors' work

Taken together, the structural results in Table 7 indicate that trust is a robust driver of digital banking adoption, with perceived utility exerting a more negligible, marginal effect ( $\alpha = .10$ ). Trust also strongly enhances utility perceptions (TRUST → UTILITY), while heavier reliance on physical channels (ATM use and branch visits) is associated with lower perceived utility and trust, contrary to H3 and H5. Complementing these findings, Table 8 shows positive covariance between UTILITY and TRUST, and between ATM and BRANCH, suggesting that attitudes toward digital move together and that physical channel habits cluster.

These baseline relationships raise a natural question: do they hold equally for women and men? Given the pronounced links involving physical channels, it is plausible that channel preferences—and their implications for digital attitudes—vary by gender. The following section, therefore, implements a multi-group SEM to test H8a–H8e, comparing path coefficients across women and men and evaluating whether gender moderates the key structural links identified above.

### The moderating effect of gender

To assess whether the relationships differ across gender, a multi-group analysis (MGA) was conducted. Measurement invariance was assessed and found acceptable for between-group comparisons, and path coefficients were compared across male and female respondents to identify potential gender-moderating effects.

In Table 9, between-group tests indicate limited overall moderation by gender, with apparent differences only on links from physical channels. The effect of utility on usage does not differ significantly between women and men (H8a not supported;  $z = 0.94$ ,  $p = 0.347$ ), although it is more substantial and significant for men ( $\beta = 0.724$ ,  $p = 0.006$ ) than for women ( $\beta = 0.377$ ,  $p = 0.146$ ). The ATM → UTILITY path differs markedly (H8c supported;  $z = -5.03$ ,  $p < 0.001$ ): it is slight and borderline positive for women ( $\beta = 0.061$ ,  $p \approx 0.092$ ) but clearly negative for men ( $\beta = -0.195$ ,  $p < 0.001$ ). The TRUST → UTILITY path is stable across genders (H8d not supported;  $z = 0.57$ ,  $p = 0.570$ ). Finally, BRANCH → TRUST is significantly more negative for men (H8e supported;  $z = -2.83$ ,  $p = 0.005$ ), being near zero for women ( $\beta = -0.007$ ,  $p = 0.904$ ) and negative for men ( $\beta = -0.198$ ,  $p < .001$ ). H8b cannot be tested because the male coefficient for TRUST → USAGE was not estimable in the multi-group model (the path was not identified/converged). Overall, gender differences focus on how physical channels relate to digital attitudes, with men showing more substantial displacement effects.

Table 9  
Multi-group SEM (gender moderation): path differences (H8a–H8e)

Hyp.	Path (Outcome ← Predictor)	Female $\beta$ (SE)	Male $\beta$ (SE)	$z$ (diff)	$p$ (diff)	Decision
H8a	USAGE ← UTILITY	0.377 (0.259)	0.724 (0.263)	0.94	0.347	Not supported
H8b	USAGE ← TRUST	0.379 (0.173)	—	—	—	Not estimable (model did not converge)
H8c	UTILITY ← ATM	0.061 (0.036)	-0.195 (0.036)	-5.03	< .001	Supported
H8d	UTILITY ← TRUST	0.259 (0.034)	0.283 (0.025)	0.57	0.570	Not supported
H8e	TRUST ← BRANCH	-0.007 (0.057)	-0.198 (0.036)	-2.83	0.005	Supported

Notes: (i) Standardised coefficients (Std.  $\beta$ ) shown by group, with z-tests for between-group differences computed as  $z = (\beta_M - \beta_F) / \sqrt{SE_F^2 + SE_M^2}$ . Two-tailed p-values. (ii) Diff = difference in path coefficients between men and women. The decision refers to whether the between-group difference is statistically significant at  $\alpha = 0.05$

Source: Authors' work

In summary, the results confirm the measurement model's reliability and validity and provide empirical support for several hypothesised relationships. Utility and trust emerged as key determinants of digital banking usage, while ATM usage and branch

visits shaped perceptions of both. The multi-group analysis further revealed that gender moderates some of these effects, underscoring the relevance of demographic factors in understanding digital banking adoption. These findings are consistent with prior research and highlight both the standard drivers and the contextual nuances of digital banking behaviour during the COVID-19 pandemic. The following section discusses these results in detail, outlining their theoretical and practical implications.

## Discussion and conclusion

### *Summary of research*

This study examined how perceived utility, trust, and reliance on physical channels (ATMs and branch visits) relate to the adoption of digital banking during the pandemic period. Motivated by practical questions for banks – what levers most effectively encourage digital uptake – we analysed survey data from retail bank customers, capturing their use of digital services, attitudes toward usefulness and trust, and ATM and branch usage habits. We also investigated whether these relationships differ between women and men.

The findings indicate that trust is the primary driver of digital banking adoption, with perceived utility contributing to a lesser extent. Trust also reinforces perceived utility, underscoring its central role in shaping favourable attitudes toward digital services. Utility and trust are positively associated, while ATM use and branch visits are themselves positively related – consistent with the idea that customers who rely on one physical channel tend to rely on the other. Contrary to the initial expectation that physical use might foster positive attitudes toward digital, greater reliance on ATMs and branches is associated with lower perceived utility and lower trust, suggesting substitution rather than complementarity between physical and digital channels in this context.

Gender-based analyses reveal limited moderation overall, but highlight notable differences in the links from physical channels to attitudes: the negative associations between ATM use and perceived utility, and between branch visits and trust, are stronger among men than among women. Taken together, the results highlight trust as the key lever for digital adoption, the need to address the “pull” of physical channels when designing migration strategies, and the potential value of targeted interventions by gender where reliance on physical channels remains high.

### *Theoretical contributions*

This study adds to the COVID-19–era digital finance literature by clarifying how trust and perceived utility jointly shape digital banking adoption in a policy environment that explicitly promoted contactless payments (De, Pandey, & Pal, 2020; World Bank Group, 2020; Whitelaw et al., 2020). First, we show that trust is the primary, proximal driver of use, while utility plays a more modest, supportive role. This pattern is consistent with work arguing that adoption hinges on risk reduction and confidence (Jung et al., 2020; Odeh Mahmoud & Mohammad, 2021; Habibur Rahman, Al-Amin, & Sharmin Lipy, 2020) and complements Health Belief Model perspectives that place perceived risk and self-efficacy at the centre of protective technology uptake during the pandemic (C.C & Prathap, 2020).

Second, we document a dual link between trust and utility: beyond trust's direct effect on usage, trust also strengthens perceived utility. This extends pre-pandemic models of digital banking (e.g., ease-of-use/utility pathways) by adding an empirically supported confidence → cognition channel under crisis conditions, aligning with

studies that tie security, reliability, and clear communication to more favourable utility judgements (Chawla & Joshi, 2019; Patil et al., 2020; Daragmeh, Lentner, & Sági, 2021).

Third, we provide evidence that physical channel reliance (ATMs, branches) substitutes – rather than complements – positive digital attitudes. Greater ATM use is associated with lower perceived utility, and more frequent branch visits are associated with lower trust. This result nuances reports of broad digital uptake spurred by policy and behavioural shifts (UNCTAD, 2020; Schuh & Stavins., 2021; Yıldırım & Erdil, 2023) by showing that, at the attitudinal level, heavy engagement with cash- and branch-based routines can dampen beliefs about mobile banking—even as many systems were scaling digital capacity (Agur, Peria, & Rochon, 2020; Diebner et al., 2020). It also helps reconcile cross-country heterogeneity—such as persistent cash preferences despite rising digital usage (Boar & Wehrli, 2021; PaySafe.com, n.d.)—by identifying a mechanism (habitual physical use) that erodes trust/utility assessments.

Fourth, our multi-group analysis by gender reveals that most structural relations are similar across women and men; however, the negative spillovers from physical channels to digital attitudes are more substantial among men. This adds granularity to pandemic behaviour studies that noted gendered differences in specific digital payment contexts (e.g., Europe and Switzerland; Mondada et al., 2020; Kraenzlin, Meyer, & Nellen, 2020) by pinning the divergence to specific attitudinal pathways rather than to a wholesale shift in the determinants of adoption.

Finally, by examining a small, under-studied market during an acute shock (Kosovo), our evidence complements country reports on rapid digital enablement and liquidity safeguards (Central Bank of Kosovo, 2020, 2021) and contributes context-sensitive theory: when public and industry actions lower perceived risk and expand remote access (Diebner et al., 2020; Bai et al., 2021), trust becomes the keystone, reinforcing utility beliefs and translating into use, while entrenched cash/branch habits can still blunt attitudinal gains. Together, these contributions integrate policy impetus, risk/trust dynamics, and channel habits into a coherent explanation of digital migration under crisis.

### *Practical implications*

For banks seeking to accelerate digital uptake, the results highlight trust as the central lever. Priorities include visible security and privacy safeguards, reliable uptime and performance, swift problem resolution, transparent communication on incidents, and guarantees that reduce perceived risk. Strengthening perceived utility requires streamlined onboarding, enhanced feature discoverability, faster task completion, and clear articulation of use cases that surpass the branch/ATM in convenience and value.

Because physical usage can dampen digital attitudes, institutions should target heavy ATM/branch users – especially men – with migration nudges: digital-first incentives, contextual prompts at ATMs/branches, assisted in-app setup, and staff coaching that pivots routine transactions to mobile. Branch roles can be reframed to focus on advisory and complex needs, with KPIs that reward digital enablement. Continuous A/B testing, funnel analytics (from activation to habitual use), and segmentation by channel dependence will help align investments with measurable shifts in adoption.

### *Limitations and future research directions*

The evidence is based on cross-sectional, self-reported data from a specific pandemic context, which limits causal inference and generalisability beyond similar settings. Some effects are modest or near conventional significance thresholds, and

one group-specific coefficient was not estimable, warranting cautious interpretation of gender contrasts. Unobserved factors (e.g., digital literacy, perceived risk, habit) may confound relationships, and objective usage logs were not available.

Future work should employ longitudinal designs or field experiments to establish causality; link surveys to administrative clickstream/transaction data; and replicate post-pandemic across markets and institutions. Extending the model to include perceived risk, service quality, habit, customer effort, and financial capability could clarify mechanisms (e.g., trust → utility → usage mediation). Additional moderators (age, urban/rural, digital skills) and finer channel metrics (types of ATM/branch tasks) would enrich heterogeneity analyses. Finally, testing measurement invariance more comprehensively and exploring latent interactions or panel SEM would strengthen the robustness and theoretical reach of these conclusions.

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