ECONOMICS OF DEVELOPMENT
Journal homepage: https://ecdev.com.ua/
ISSN: 1683-1942
E-ISSN: 2304-6155
Vol. 25, No. 3, 2026
UDC 336.7
DOI: 10.63341/econ/3.2026.22

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Modern banking services and the impact of digitalisation

Abstract. The digitalisation of the banking industry represents a major challenge, closely linked to the growth of financial technologies and customer expectations. The purpose of this paper was to examine the main digital banking services, the key financial technologies that support them and their benefits and challenges for banks and their customers. This study was based on qualitative analysis, literature review and a systematic organisation of information related to modern digital banking services. As a result, eight key digital services that fundamentally changed the customer experience were identified, including online account management, contactless mobile payments, instant transfers, e-wallets, chatbots, online investment and automated budgeting tools. Furthermore, main financial technologies such as artificial intelligence, blockchain, cloud computing, big data and cybersecurity were shown to improve operational efficiency, transaction security and service personalisation. The results showed that the digitalisation of banking services improved accessibility, convenience, financial inclusion and budget optimisation for customers. However, this study also emphasised major challenges related to data privacy, cybercrime, reliance on technology, reduced human interaction and digital isolation. These challenges, combined with sociocultural barriers, prevent 1.3 billion unbanked adults from accessing digital banking services. The practical value of this paper lies in demonstrating the need for banks and financial institutions to invest in secure infrastructure, hybrid solutions combining digital services and human support, and data protection policies that enhance customer trust and improve the stability of digital banking services

Keywords: digital banking; customer experience; fintech; mobile application; financial inclusion

INTRODUCTION

Digitalisation has become one of the main forces driving the evolution of the global banking system. The rise of digital technologies and platforms has greatly changed traditional banking services. Banks are no longer focused solely on traditional banking activities. They are trying to build integrated ecosystems that provide fast, personalised and remotely accessible services. With globalisation and rapid technological progress, modern banking is becoming a customer-centric digital system. It is based on predictive analytics, process automation and smart banking services. The COVID-19 pandemic also played a major role in accelerating the digitalisation of banking services. Health restrictions and the rapid shift to remote work prompted millions of customers to use digital services, electronic payments and mobile applications. These changes increased competition between traditional banks and fintech companies. As a result, banks adopted more ambitious digital transformation strategies to remain competitive and attractive. Banks are investing heavily in advanced cybersecurity systems, robotic process automation (RPA) and open banking solutions. These investments contribute to improved customer service and increased operational efficiency.

Recent studies show that the digitalisation of the banking industry encompasses not only technological improvements but also changes in organisational structures, management and customer relationships. The study by A. Rodrigues *et al.* (2022) highlighted how the integration of artificial intelligence and digital technologies into banking services is reshaping decision-making processes and risk management strategies. The authors argued that banks must

Article's History: Received: 11.02.2026; Revised: 06.07.2026; Accepted: 01.09.2026; Published: 02.10.2026

Suggested Citation:
Mammadli, R. (2026). Modern banking services and the impact of digitalisation. *Economics of Development*, 25(3), 22-31. doi: 10.63341/econ/3.2026.22.

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harmonise technological innovation with data protection to maintain customer trust and the stability of the banking system. This issue is particularly critical in an environment where cyber threats are evolving at almost the same pace as technological innovation. Several recent studies have examined various aspects of the digitalisation of the banking industry. S.K. Singh *et al.* (2024), in a systematic review of trends and challenges in the digitalisation, emphasised the increasing importance of artificial intelligence, blockchain and digital wallets in improving efficiency and expanding financial inclusion. W. Pfoertsch & K. Sulaj (2023) demonstrated that artificial intelligence is essential innovation in payment systems and digital banking services through automation, real-time fraud detection and personalisation of services. H.S. Mamede *et al.* (2023) examined the convergence of AI and robotic process automation in the banking industry. They concluded that this integration could significantly improve banking operations and reduce administrative costs. At the same time, several researchers are expressing concerns about the risks of rapid digitalisation.

According to N. Türegün (2025), the digitalisation of the banking industry is increasing challenges about cybersecurity and data privacy. The researcher highlighted that the integration of open platforms and fintech solutions creates new vulnerabilities that cybercriminals can exploit. Similarly, J.-P. Carrión-Salazar *et al.* (2025) revealed that cyberattacks, phishing and data breaches are major barriers to the adoption of digital services. Other research highlights the increasingly important roles of biometric technologies and artificial intelligence in securing digital banking systems. A. Patil *et al.* (2024) examined the use of biometrics and intelligent fraud detection systems in digital banking services and concluded that these technologies improve transaction security and strengthen customer trust. R. Vedapradha & R. Hariharan (2021) analysed the evolution of banking cybersecurity. They showed that AI and blockchain technologies are becoming important tools for protecting modern banking infrastructure. Recent research also emphasises the strategic importance of generative AI in banking services. According to a study by A. Kovačević *et al.* (2024), banks view advanced AI models as powerful optimisation tools. However, they also recognise them as possible sources of systemic risks and cyber threats. Central banks and regulators are gradually strengthening supervisory mechanisms. Their goal is to increase the digital resilience of the banking sector against emerging technological risks.

Furthermore, A. Demirgüç-Kunt *et al.* (2022) highlighted the fundamental role that digitalisation plays in improving global financial inclusion. Digitalisation has made banking services more accessible to people living in remote areas or regions with limited banking opportunities. They can access these services through smartphones and digital platforms. These advancements not only expand access to banking services but also reduce transaction costs and increase financial transparency. However, despite these benefits, the digital divide, limited technological knowledge and the risk of cybercrime remain serious problems for developing countries. A review of recent academic research showed that most studies focus either on technological innovations in banking industry or on issues related to cybersecurity and digital trust. Studies that comprehensively analysed the impact of digitalisation on modern banking services, considering technical, organisational and security aspects simultaneously, are rare. This gap in academic literature highlighted the importance of this research. The main purpose of this paper was to examine the most widely used digital banking services and technologies in the context of banking digitalisation and to analyse their main benefits and challenges.

MATERIALS AND METHODS

This study employed a descriptive qualitative approach based on a literature review and comparative analysis of secondary data. Its objective was to examine the digitalisation of the banking industry. The research was conducted in several stages. First, relevant literature was identified and analysed, enabling the development of a theoretical framework. Second, digital banking services and the technologies that support them were systematically examined. Third, comparative and qualitative analyses were carried out to assess the benefits, challenges and impacts of digitalisation for banks and their customers. Finally, an analysis of financial inclusion statistics was conducted to identify trends in regions of Africa and Asia regarding access to banking services.

The study used secondary data derived from peer-reviewed journal articles, books, institutional reports, regulatory publications and statistical databases. The primary academic sources were publications indexed in Scopus, Web of Science, ScienceDirect and SpringerLink. The inclusion criteria focused on publications directly addressing modern banking services, the digitisation of the banking sector and digital banking technologies, with preference given to the most recent publications to ensure the relevance and reliability of the analysis. Sources lacking academic or institutional credibility, not directly relevant to the research topic or containing outdated information were excluded. Statistical data were collected from reports and databases published by the World Bank (Demirgüç-Kunt *et al.*, 2022; Klapper *et al.*, 2025), the International Monetary Fund (IMF, 2025), and the European Banking Authority (EBA, 2025). Additional data were obtained from publications by ACI Worldwide (2024), Juniper Research (2024), Deloitte (2022), the IBM Institute for Business Value (IBM, 2026).

The data sources were selected for the period 2018-2026. This period reflects the rapid growth of digital services following the widespread adoption of technologies and digital devices. The following keyword combinations were used for the literature search: "digitalisation", "digital transformation of the banking industry", "financial technologies", "artificial intelligence", "blockchain", "cybersecurity", "mobile banking", "digital payments", "financial inclusion", "unbanked population", "customer experience" and "digital banking services". A comparative analysis was conducted. The main digital banking services were first identified and classified according to their functional purpose. The technologies underlying these services were then comparatively analysed using the following criteria: functional role, practical application in banking, advantages, limitations, and contribution to banking innovation. The qualitative analysis was based on a thematic approach. Data from the literature and selected institutional reports underwent systematic review. The data were coded

according to key research themes, including digital banking services (online and mobile banking), enabling technologies (AI, blockchain, big data and cloud computing), customer behaviour, efficiency, security and privacy, and then combined to identify recurring trends. These trends were related to the implementation of digital banking services, technological innovation, customer behaviour, efficiency and cybersecurity risks. Results from various sources were compared and integrated, leading to a better understanding of the opportunities and challenges associated with the digitalisation of the banking services.

To illustrate the financial inclusion aspect of digital banking services, the study analysed statistical data on the global distribution of unbanked adults. This data comes from the work of S. Burnett (2026) and L. Klapper *et al.* (2025). Rather than conducting a detailed demographic analysis, the study offers a descriptive statistical analysis of the number and regional distribution of unbanked adults worldwide (in regions East Asia, South Asia, Latin America, North Africa and sub-Saharan Africa). In this study, several secondary quantitative indicators were used, such as the number of users of digital banking services and mobile wallets, the volume of real-time payment transactions, the number of unbanked adults, the number of people without internet access. As with all studies based on secondary data, this study had some limitations. It did not include primary empirical data collected directly from banks or customers. In addition, digital technologies, regulatory frameworks and security threats continue to change rapidly. As a result, some findings may become less applicable over time. However, the use of multiple high-quality academic and institutional sources increases the credibility and reliability of the study's findings.

RESULTS

In line with the purpose of this study, the results identified main patterns in the digitalisation of modern banking services. In particular, they highlight the widespread use of digital technologies that are changing how services are delivered. To assess these changes, it is useful to consider the most widely used digital banking services. Online account management enables remote access to core banking functions, including balance and transaction monitoring, personal data management, card control and automated spending notifications via mobile applications. Digital channels handle more than 70% of regular banking activities, which has significantly reduced branch visits and service costs (Klapper *et al.*, 2025). Contactless payments based on Near Field Communication (NFC) technology enable cardless transactions through smartphones and other compatible devices. Mobile payment solutions, including Apple Pay, Google Pay and Samsung Wallet, combine contactless transaction processing with biometric authentication, contributing to shorter processing times and enhanced payment security. By 2024, contactless payments accounted for more than 60% of in-store card transactions in many developed countries. At the same time, the number of mobile wallet users worldwide has exceeded 4 billion (Juniper Research, 2024).

Instant transfers enable funds to be transferred between accounts within seconds, including outside standard banking hours. Compared with traditional transfer methods, which may require several hours or days for settlement, real-time payment systems provide substantially faster access to funds. In many such systems, transactions are processed in less than 10 seconds. Global real-time payment volume exceeded 266 billion transactions in 2023 (ACI Worldwide, 2024). Banks increasingly use AI-powered chatbots to automate routine customer support functions. These systems provide information on account-related matters, assist with basic service requests and explain banking procedures. Their continuous availability enables banks to reduce customer waiting times and improve the efficiency of service delivery. According to IBM (2026), AI-powered chatbots can resolve approximately 70-80% of routine customer enquiries without human intervention, potentially reducing customer service costs by up to 30%. Online investment services provide customers with direct access to financial markets through mobile applications and web-based platforms. These services support transactions involving stocks, bonds and other financial instruments and may incorporate analytical tools and automated advisory systems, including robo-advisors, to support investment decision-making.

Banking applications increasingly incorporate spending analysis and budgeting tools that support personal financial management through automated transaction categorisation and expenditure monitoring. Some applications also provide notifications when predefined spending limits are exceeded or when substantial payments are anticipated. More broadly, the digitalisation of banking services has transformed the ways in which customers manage financial transactions and interact with financial institutions. Continued investment in digital technologies reflects banks' efforts to improve operational efficiency, maintain competitiveness and enhance the accessibility and quality of service delivery. Artificial intelligence is one of the most widely used technologies in the banking industry. By leveraging AI, banks can automate various tasks, such as responding to customer inquiries, analysing financial data, and detecting fraudulent activity (Horobets *et al.*, 2025). AI is also used to assess credit risk by predictively analysing borrowers' financial behaviour. Banks use algorithms that can identify suspicious transactions in real time to prevent bank fraud. According to EBA (2025), AI-based fraud detection systems can achieve accuracy rates exceeding 90%. These applications can contribute to higher operational efficiency and lower service-related costs. Table 1 summarises the main areas of AI application in banking and their effects on financial institutions and customers.

Table 1. Application of AI in banking services

Feature	Description	Impact
Customer inquiries	Instant response AI chatbots	Reduced average response times (e.g., from minutes to seconds), increased first-contact resolution rates and improved customer satisfaction
Fraud detection	Real-time monitoring of transactions	Improved fraud detection efficiency, reduced false positive rates, reduced financial losses from fraudulent transactions and accelerated detection

Table 1. Continued

Feature	Description	Impact
Credit risk assessment	Predictive borrower analysis	Improved forecasting accuracy, reduced loan default rates and more consistent loan approval decisions
Operational efficiency	Automation of repetitive tasks	Reduced transaction processing time, lower manual workload, reduced operational costs and increased employee productivity

Source: prepared by the author based on A. Rodrigues *et al.* (2022) and H. Horobets *et al.* (2025)

Blockchain is a secure and transparent technology for storing and transmitting information. It is mainly used in banking to increase transaction security and reduce the need for intermediaries. Since all blockchain transactions can be verified and are extremely difficult to change, the risk of fraud is lower. Figure 1 shows the structure of blockchain technology. This technology also makes international money transfers faster and cheaper. In addition, blockchain increases customer trust and strengthens the competitiveness of banks by increasing the security and traceability of financial transactions (Tsai *et al.*, 2024).



Figure 1. Blockchain structure

Source: prepared by the author

Cloud computing enables banks to manage and store data on remote servers accessible via the internet. This technology offers great flexibility and reduces the cost of maintaining traditional IT infrastructure. It is estimated that cloud computing can reduce IT operating costs by approximately 40-45%. It also improves system scalability and service availability (Fig. 2). As a result, banks can process large amounts of data in real time and quickly adjust capacity as needed (Cheng *et al.*, 2022).

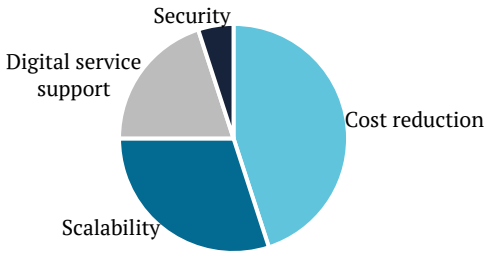


Figure 2. Distribution of the benefits of cloud technologies in the banking sector

Source: prepared by the author based on A. Muduli & A. Choudhury (2026) and S.E. Lolemo & H.B. Pandya (2025)

Cloud technologies support the development and delivery of digital banking services, including mobile banking applications and online payment platforms. Their adoption can improve the scalability, processing efficiency and flexibility of banking operations. From a security perspective, cloud service providers employ data protection and cybersecurity mechanisms intended to safeguard customer information and maintain service reliability. Mobile banking applications represent a widely used channel for remote access to banking services, enabling functions such as fund transfers, bill payments and account monitoring. These applications enhance service accessibility by allowing customers to perform routine banking operations remotely and outside traditional branch hours. Figure 3 shows the distribution of usage of main mobile banking features. In 2024, the number of mobile banking users worldwide exceeded 3 billion (IMF, 2025). Customer satisfaction is also consistently higher among active mobile banking users than among customers who mainly use branch services. Banks also use real-time notifications to inform customers of transaction status and enhance security. Banks like Revolut and Starling have integrated budgeting tools into their apps to help customers manage their spending more effectively. Mobile banking increases customer satisfaction and loyalty by offering fast and easily accessible services (Nandy *et al.*, 2026).

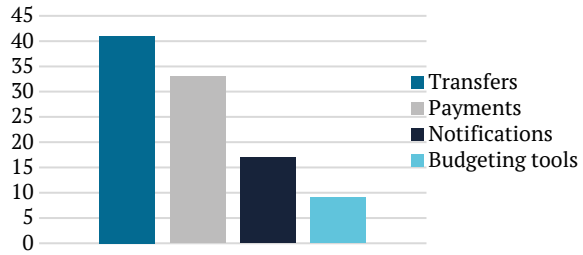


Figure 3. Mobile banking features usage in 2025 (%)

Source: prepared by the author based on L. Klapper *et al.* (2025) and S. Burnett (2026)

Big data is a technology that leverages vast amounts of data to derive strategic and valuable insights. In the

banking industry, big data helps analyse customer behaviour and personalise banking products (He *et al.*, 2023). This allows banks to offer products tailored to the individual needs of each customer. Figure 4 shows the characteristics of big data.

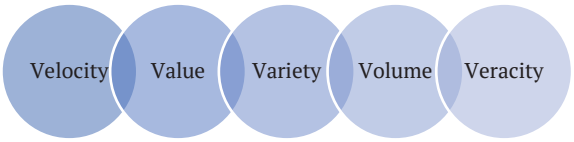


Figure 4. Characteristics of big data
Source: prepared by the author based on W. He *et al*. (2023)

Data analytics also helps detect financial risks and fraud by identifying unusual patterns. For example, banks can detect suspicious credit card transactions and block them immediately. Big data improves banks' decision-making, risk management and competitiveness. With the development of digital banking services, cybersecurity has become a major priority for banks. Biometric authentication methods such as facial recognition, fingerprint recognition and voice recognition enhance the security of user authentication. These methods are more secure than traditional passwords, because passwords can be stolen or hacked (Kaixiang *et al.*, 2024). Banks also use advanced encryption systems to protect sensitive customer data. For example, the banking applications of HSBC and Barclays require two-factor authentication before approving high-value transactions. By using these technologies, banks reduce the risk of cyberattacks and strengthen customer trust in digital banking services. Table 2 provides a detailed classification of the features of cybersecurity technologies.

Table 2. Features of cybersecurity technologies

Security feature	Description	Benefit
Biometric authentication	Facial, fingerprint, voice recognition	Increased authentication success rates, reduced account takeovers, fewer password reset requests and shorter user login times
Encryption	Protection of sensitive data	Reduced customer data breaches, lower unauthorised access and improved compliance with data protection regulations
Two-factor authentication	Verification of high-value transactions	Reduced unauthorised transaction rates, increased securely authenticated transactions, increased customer trust and reduced fraud-related losses
Cyberattack protection	Advanced monitoring and response	Reduced cybersecurity incidents, reduced mean time to detection and response to attacks, reduced financial losses from cyber incidents and improved service availability

Source: prepared by the author based on A. Kovačević *et al*. (2024) and N. Türegün (2025)

The cybersecurity measures presented in Table 2 play distinct but interdependent roles in digital banking services. Biometric and two-factor authentication primarily ensure access control and user authentication. These mechanisms enable customer identity verification and reduce the likelihood of unauthorised access to accounts and transactions. Encryption technologies protect sensitive information by preventing unauthorised disclosure and mitigating the risks associated with data breaches. Cybersecurity measures focus on the detection, prevention and response to cyber threats, enabling financial institutions to identify and address potential attacks more efficiently. Together, these technologies form a multi-layered approach to digital banking security, contributing to improved protection of financial data, reduced exposure to cyber risks and enhanced reliability of digital services.

Digital financial technologies provide many benefits to banking customers. One of the main benefits is accessibility. Through banking mobile apps and websites, customers can check their account balances, send money and pay utility bills anytime, anywhere. This is especially convenient for residents in rural areas with few bank branches. This eliminates the need for long trips to the nearest bank branch. Furthermore, digitalisation makes banking services more accessible to people with mobility difficulties or time constraints (Ananda *et al.*, 2020). Digital technologies make banking services far more convenient and faster. Customers no longer have to wait in long lines for simple banking tasks. Transactions can be completed in seconds, even on weekends and public holidays. Studies show that digital banking transactions typically take less than a minute. Similar transactions completed at a bank branch often take 15-30 minutes, including waiting times (Deloitte, 2022). This enhances the customer experience and saves time in daily life (Müller *et al.*, 2024).

Digital banking services leverage data and artificial intelligence to provide personalised services and products to customers. Banking applications can analyse spending habits and recommend solutions tailored to each user's needs. For example, they can send notifications if a customer exceeds their monthly budget. They can also provide personalised savings plans to help customers reach their financial goals. Banking platforms such as Monzo and Bank of America also offer automated advice on spending and investing. This personalised approach helps customers manage their finances more effectively and increases their trust in banking services. Automated payments are another important advantage of digital banking services. Customers can schedule recurring payments such as utilities, rent and monthly fees. This eliminates the need to enter payment details manually every month. Automated payment systems significantly reduce missed payments and improve on-time bill payments for both households and businesses. Businesses also benefit from this feature, processing payroll and supplier payments quickly and securely (Daoud & Anaya, 2025).

Digital banking services play an important role in financial inclusion. They provide banking services to people who were previously excluded from the traditional banking services. Mobile payment services have enabled millions of people in Asia and Africa to make transactions, save money and receive financial assistance. This convenience has supported economic development and reduced social inequality. It has also facilitated access to loans and

banking services tailored to the needs of enterprises, as well as self-employed individuals. According to the World Bank, by 2021, approximately 79% of adults worldwide had a banking account (Demirgüç-Kunt *et al.*, 2022). In Sub-Saharan Africa, mobile money accounts have become a main financial service for hundreds of millions of adults. Although the number of adults with bank accounts continues to grow globally, it is estimated that in 2024, approximately 1.3 billion adults worldwide still lacked bank accounts and direct access to modern banking services. The vast majority of these individuals live in developing countries (Klapper *et al.*, 2025). According to the reports of L. Klapper *et al.* (2025) and S. Burnett (2026), Figure 5 illustrates the demographic proportion of unbanked adults in the regions of East Asia, the Middle East, South Asia, Latin America, North Africa and sub-Saharan Africa.

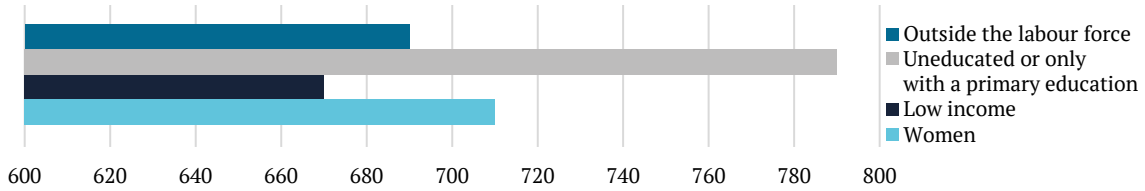


Figure 5. Demographic proportion of unbanked adults (in millions)
Source: prepared by the author based on L. Klapper *et al.* (2025) and S. Burnett (2026)

Barriers to accessing digital banking services show broad similarities across regions; however, the predominant constraint varies by regional context. These include the limited availability of digital banking service providers in African countries, socio-cultural restrictions on women's access to mobile phones in Middle Eastern countries, low-income levels in South Asian countries, and inadequate digital infrastructure in rural areas across these regions. While digitalisation of banking services offers many benefits, it also creates significant challenges for banks and customers. Security is one of the biggest issues in digital banking services. Cybercriminals use various methods, including malware, phishing and hacking, to steal money and personal information (Asmar & Tuqan, 2024).

Banks continue to report that phishing is one of the main causes of digital banking fraud. Although the use of multi-factor authentication has significantly reduced account takeover fraud, it still accounts for a large proportion of reported cyber incidents. For example, customers may receive fake messages that appear to come from their banks. These messages can lead to the theft of their login information. Attacks on banking systems can cause significant financial losses and disrupt operations. To reduce these risks, banks invest heavily in data encryption, two-factor authentication and fraud detection systems. Digital banking services collect vast amounts of personal and financial data. This includes customer identity, spending habits and transaction records. Storing so much sensitive information in one place increases the risk of data misuse and leakage. Furthermore, some companies may use customer data for commercial or advertising purposes without sufficient transparency. Therefore, banks must develop strong data protection policies and comply with privacy regulations (Barjaktarović Rakočević *et al.*, 2023).

Banking operations are becoming increasingly dependent on digital infrastructure and IT systems. This dependence can cause problems when technical failures, network outages or software errors occur. For example, in January 2025, Barclays experienced a major IT outage that lasted for more than two days. Many customers were unable to access online banking services, make payments or complete transactions. During the same period, customers could not receive their salaries on time. This outage also occurred during the UK tax return deadline and affected thousands of users. (Reuters, 2025). In February 2025, Halifax and Bank of Scotland experienced another outage. This disrupted mobile banking and payment services for several hours. As a result, customers were unable to transfer money or access their accounts (Makortoff & Banfield-Nwachi, 2025). These incidents show that over-reliance on technology can increase operational risks. It can also expose banks to service disruptions and cyberattacks targeting servers and payment systems (Sharma, 2025). Therefore, investment in backup systems, regular updates and business continuity plans is essential for banks and financial institutions.

As digital banking services become more widespread, direct contact between customers and bank employees is gradually decreasing. While mobile banking applications are convenient, they cannot always replace the human support needed for complex transactions such as mortgages and financial advice. For example, older adults and those unfamiliar with digital tools may find it difficult to resolve issues using only chatbots and automated services. The reduction in human interaction can make some customers feel isolated and dissatisfied (Ghosh & Golder, 2026). Therefore, banks need to maintain a balance between automation and personalised service. The digital divide is a significant social challenge in the development of digital banking services. In particular, the elderly, people living in rural areas and low-income groups do not always have access to the internet or the necessary digital devices. In accordance with International Telecommunication Union (2024), an estimated 2.6 billion people worldwide still did not have access to the internet in 2024. This has limited their ability to access digital banking services. Physical bank branches are gradually closing around the world, forcing customers to use unfamiliar digital tools. This situation risks exacerbating social and economic inequalities. Overall, the findings show that digitalisation has reshaped banking services and brings many benefits for both banks and customers. At the same time, these advantages are accompanied by major challenges. These include security threats, privacy concerns, dependence on technology, unequal access to digital services and reduced human support. The results show that the long-term success of

digital banking services depends on striking the right balance between technological innovation and security, reliability and effective management of customer support. This will help ensure that digital banking services remain efficient, secure and accessible to all users.

DISCUSSION

The results of this study demonstrate that digitalisation has greatly altered modern banking services. It has improved accessibility, increased transaction speeds and provided a more personalised customer experience. Analysis of various banking and financial services reveals that digital technologies have become central to financial institutions' strategies. These findings support several recent studies on banking innovation and the digitalisation of banking services. A. Muduli & A. Choudhury (2026) found that the use of digital technologies significantly improves the efficiency and competitiveness of banks. Furthermore, the authors emphasised that even small banks can compete with larger banks through the digitalisation of their services. These findings are consistent with the results of this study, which show that digital services enable banks to provide faster and more accessible services to a wider range of customers.

Similarly, S. Kamboj *et al.* (2022) investigated mobile banking platforms. They found that always-on access to banking services improves customer satisfaction. Their study notably emphasised the convenience of mobile apps and the speed of banking transactions. This is especially evident when looking at services that make everyday banking easier, including instant transfers and payments. A study by S.E. Lolemo & H.B. Pandya (2025) focused on the quality of digital banking services from a customer perspective. The authors showed that ease of use, security and customisation are the most important factors in assessing digital banking services. The results of this study support these findings. They show that banks can use artificial intelligence and big data tools to provide personalised services tailored to individual customer needs.

Furthermore, D. Kang & N. Shin (2026) examined how customers view digital banking services. Their research revealed that customers particularly value the stable availability, ease of use and speed of online services. However, the researchers emphasised that concerns about cybersecurity and limited digital skills are major barriers to the adoption of digital services. These observations are consistent with the findings of this study regarding risks associated with security, privacy and the digital divide. A study by N. Del Sarto *et al.* (2025) focused on the relationship between traditional banks and fintech companies. The authors revealed that banks are collaborating with technology companies to accelerate digitalisation and improve banking services. The study also confirmed that technologies such as e-wallets, online platforms and mobile applications are essential elements of the modern banking industry.

M. Shabir *et al*. (2023) conducted a study during the COVID-19 pandemic. Their study revealed that this health crisis increased the use of mobile banking applications and digital payments. The authors highlighted reliability, speed and performance as the main reasons for customers to adopt digital banking services. This analysis confirms the findings of this study that customers prefer services that are fast, accessible and always available. From a technical perspective, T. Felipe *et al.* (2026) investigated the impact of main digital innovations on the banking industry. Their research revealed that these technologies improve data management, security and overall efficiency within banks. The results of this study are follow the same pattern, highlighting the role of AI in fraud detection, blockchain in ensuring security and cloud computing in developing digital services.

Z. Yu & J. Liu (2025) explored the digitalisation of banking services from a risk management perspective. Their research revealed that digital technologies help reduce fraud, improve regulatory compliance and make financial transactions efficient. These results are consistent with the findings of this study, particularly regarding the importance of cybersecurity, biometrics and fraud detection systems. Finally, the study of G. Osuma (2025) on financial inclusion in African countries revealed that digitalisation improves access to banking services for people in rural areas and previously excluded from the banking system. This study supports the important role of technologies in reducing financial inequality. However, as many researchers have reported, limited internet access, low literacy and economic constraints continue to hinder full financial inclusion. Overall, the reviewed research confirms that digitalisation is an important milestone in the development of the global banking industry. Digital technologies significantly improve operational efficiency, service quality and customer experience. At the same time, this evolution also creates considerable challenges such as cybersecurity, data protection, technology dependency and digital exclusion. Therefore, banks must continue to invest in technological infrastructure, security and digital education programs. These efforts are necessary to achieve a secure, sustainable and inclusive digital transformation.

CONCLUSIONS

Digitalisation has made banking services faster, more accessible and more customer-centric. The findings of this study showed that main digital banking services included online account management, mobile banking applications, contactless payments, instant money transfers, digital wallets, AI-powered chatbots, online investment platforms and automated budgeting tools. They allowed customers to access banking services anytime, complete transactions faster, manage their finances more easily and improve access to banking services for both individuals and businesses. The study identified AI, blockchain, big data analytics, cloud computing and biometric authentication as key technologies driving digitalisation in banking services. AI improves customer service, helps detect fraud and supports credit risk assessment. Blockchain makes transactions more secure and transparent. Big data analytics help banks deliver personalised banking services. Cloud computing gives banks greater operational agility. It also allows them to develop digital banking services more quickly. Biometric authentication increases security by providing a more secure way to verify customer identity.

While digital banking offered many benefits, the study also identified several important challenges. The main risks included cybersecurity threats such as phishing, malware, hacking and fraud. There were also privacy concerns associated with banks collecting and processing large amounts of personal and financial information. Other risks

included reliance on digital technologies, which can lead to service disruptions if systems fail. The decline in face-to-face interactions in customer service was another concern. In addition, the digital divide can prevent the elderly, people living in rural areas and other digitally disadvantaged groups from accessing banking services. These findings highlight the need for continued investment in security, data protection, digital infrastructure and digital inclusion programs. Such efforts will help ensure that everyone can benefit from digital banking services. Future research should explore how emerging technologies such as decentralised finance and next-generation artificial intelligence will impact the future development of banking services. It should also examine their implications for customer trust, financial inclusion and banking regulation.

ACKNOWLEDGEMENTS
None.

FUNDING
None.

CONFLICT OF INTEREST
None.

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Сучасні банківські послуги та вплив цифровізації

Анотація. Цифровізація банківської галузі являє собою серйозний виклик, тісно пов'язаний зі зростанням фінансових технологій та очікувань клієнтів. Метою цієї статті було дослідження основних послуг цифрового банкінгу, ключових фінансових технологій, що їх підтримують, а також їхніх переваг і викликів для банків та їхніх клієнтів. Це дослідження базувалось на якісному аналізі, огляді літератури та систематичній організації інформації, пов'язаної із сучасними послугами цифрового банкінгу. В результаті було визначено вісім ключових цифрових послуг, які принципово змінюють досвід клієнтів, включаючи онлайн-керування рахунками, безконтактні мобільні платежі, миттєві перекази, електронні гаманці, чат-боти, онлайн-інвестиції та автоматизовані інструменти бюджетування. Крім того, показано, що основні фінансові технології, такі як штучний інтелект, блокчейн, хмарні обчислення, великі дані та кібербезпека, покращують операційну ефективність, безпеку транзакцій та персоналізацію послуг. Результати показали, що цифровізація банківських послуг покращує доступність, зручність, фінансову інклюзію та оптимізацію бюджету для клієнтів. Однак це дослідження також підкреслило основні проблеми, пов'язані з конфіденційністю даних, кіберзлочинністю, залежністю від технологій, зменшенням взаємодії з людьми та цифровою ізоляцією. Ці виклики, у поєднанні із соціально-культурними бар'єрами, перешкодили 1,3 мільярду дорослих, які не користуються банківськими послугами, отримати доступ до цифрових банківських послуг. Практична цінність цієї статті полягає в демонстрації необхідності для банків та фінансових установ інвестувати в безпечну інфраструктуру, гібридні рішення, що поєднують цифрові послуги та людську підтримку, а також політики захисту даних, що підвищують довіру клієнтів та покращують стабільність цифрових банківських послуг

Ключові слова: цифровий банкінг; клієнтський досвід; фінтех; мобільний застосунок; фінансова інклюзія