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Banking innovations in the digital economy: theory and practice

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Banking innovations in the digital economy: theory and practice

Monograph

TASHKENT-2025

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INTRODUCTION

The modern financial world is undergoing a significant transformation driven by the convergence of banking and digital technology. The integration of digital technologies is no longer just a strategic option for banks; it's essential for their survival and growth in today's digitally focused environment. From online banking platforms to the adoption of advanced technologies like artificial intelligence and blockchain, digitization has fundamentally reshaped how customers interact with financial institutions.

The COVID-19 pandemic acted as a catalyst, pushing the adoption of digital banking solutions even faster and emphasizing the importance of digital infrastructure for business continuity and customer satisfaction. This monograph will examine these developments and their impact on the future of financial services.

In the direction of accelerating reforms in the banking system, increasing the size of the banking services market and developing competition in the field under the 50th goal,

As for goal number 57, special emphasis was placed on turning the country into a regional "IT-NUB" by developing digital technologies. In this:

- Complete coverage of all settlements with the Internet and increase its speed by 10 times, increase the speed of international Internet connection to 5000 Gbit/s, reach 100% coverage of optical fiber communication lines and broadband data transmission networks.
- Increase the volume of export of IT services and software products to 5 billion dollars. Reaching the top 30 in the UN E-Government ranking.
- Increase the number of IT-park residents by 10 times, increase the share of services provided by them in the GDP to 2.2%, and increase the number of jobs created in them to 100,000.

- Increasing the number of representative offices of foreign companies to 1000 by establishing the "International Center of Digital Technologies" for foreign companies in the IT park.
- Launching the first (Unicorn) startup project with a national market capitalization of $1 billion by supporting startup projects through the acceleration (development) program of the IT park.
- Launching 300 priority projects within the framework of the "Digital Government" program,
- Coverage of the city of Tashkent, the Republic of Karakalpak and the centers of the regions with the fifth generation communication network.
- Provision of international highways with full mobile internet, such goals have been put forward.

The research will ultimately provide insights and recommendations to help banks, policymakers, and researchers drive innovation and growth in the digital age. Research on banking innovation in the digital economy is crucial due to the rapid pace of technological change. Understanding this area can help banks improve services, stay competitive, and inform strategic decisions. This research also contributes to scientific knowledge and guides future studies. Given the global reach of digital technologies and financial markets, this research has broad relevance and applicability. This research will examine the impact of digital innovation on traditional banking practices, focusing on how new technologies disrupt established businesses and how these innovations spread through society. It will also explore the role of “network effects” where the value of a service increases as more people use it. The research will utilize a mixed-methods approach, analyzing both quantitative data (adoption rates, financial inclusion) and qualitative data (interviews, case studies) to gain a deeper understanding of these trends in the USA and Uzbekistan.

CHAPTER I. COMMERCIAL BANKS' INNOVATIONS AND ROLE IN THE DIGITAL ECONOMY

1.1.The theory of innovation, different perspectives on innovation and it's impact on digitization

Innovation is a word that is derived from the Latin word innovare, this means "into new". The simplest definition of innovations is doing something different. Innovation is a word that often is used in the business world and for companies this usually mean something risky, costly and time consuming . Innovation can also be explained as s new idea, product, device or novelty. It is a mind-set, a way of thinking beyond the present and into the future. Innovations is important for companies and when used well it can be a process, strategy and management technique . At a fundamental level, innovation can be the process of generating and combining ideas to make connections between current achievements and past experiences to solve future problems. This is often associated with technological feats and it play a critical role in the world economy . Innovation is big in the business world and is sustainable to create value and be strong in the competitive environment. There is a link between innovation, jobs, profit and standard of living.[1]

The term "innovation" is derived from the Latin word "novatio", which means "renewal" (or "change"), and the suffix "in" is translated from Latin as "in the direction of", if it is used as a whole "Innovatio" " translated as "in the direction of changes". The concept of innovation first appeared in scientific studies of the 19th century. The concept of "innovation" began its new life as a result of the analysis of "innovative combinations" and changes in the development of economic systems in the scientific works of the Austrian and American economist J. **Schumpeter** at the beginning of the 20th century. Schumpeter was one of the first scientists to use this term in economics in the 1900s. We should look at innovation not as any kind of

[1] Olga Viberg,Anna Mavroudi. Digitalisation of Education: Application and Best Practices https://www.diva-portal.org/smash/get/diva2:.March 2019

innovation, but as a factor that seriously increases the efficiency of the existing system. Contrary to common misconceptions, innovation is different from discovery

Humans feel inclined to create, to advance the narrative of progress by pursuing our curiosity and yearning for change. We enjoy coming up with new ideas and developing novel methods of doing things. Yet we also have a tendency to cling to the old ways, to what is familiar and comfortable. Therefore, this complex behavior toward innovation and its societal adaptation has inspired many intellectuals to construct their own theories on innovation. Diffusion of Innovation, Linear Innovation, and Complex Innovation theories have been the primary theories used to study innovation. When observing these various theories, one may expect them to contradict one another. However, if we look at the core functionality of innovation that these theories address, we may be shocked to find that they all represent different levels or stages of innovation. These theories encompass various aspects of innovation, from a micro and macro perspective to how innovation flows within a social system. Since they reflect different degrees and stages, we should synthesize these innovation theories to provide the ideal framework for innovation. None of these theories can stand on its own.

To comprehend the various innovation theories and how they are interconnected, we must first understand what innovation encompasses and on what definitions intellectuals developed these theories.

The term “innovation” has its etymological origins from the Latin “innovare,” which translates to “bring in new things, alter established practices.” This definition is significant since many people think of innovation as exclusively a new concept, product, or service aimed to improve the human experience. We seldom think about renewal and even more infrequently of superfluous advancements.

Everett Rogers, a renowned American communication theorist and sociologist, analyzes the interconnections between time and innovation, as well as the processes by which innovation disperses. His diffusion of innovation theory,

which dates back to 1962 and has yet to be disproven, is one of the most popular and oldest theories on innovation. However, many additional innovation hypotheses appeared following Rogers' theories, indicating that Rogers' notion may have overlooked some crucial elements of innovation. In fact, I believe that the three main innovation theories, Diffusion of Innovation, Linear Innovation, and Complex Innovation theories, should be synthesized to provide the ideal framework for innovation. None of these theories can stand alone, as they are only partial representations of innovation.

This section will examine the core theories of innovation, explore diverse perspectives on its nature, and demonstrate how innovation has significantly shaped the process of digitization, leading to both opportunities and challenges.

Everett Rogers' Diffusion of Innovations Theory[2] provides a framework for understanding how new ideas and technologies are adopted by individuals and groups within a society. This theory highlights the process by which innovations spread through communication channels and social systems, influencing the rate of adoption.

Rogers identifies five categories of adopters based on their relative timing of adopting an innovation:

Innovators (2.5%): These individuals are the first to adopt a new idea or technology. They are typically adventurous, risk-taking, and eager to embrace change.

Early Adopters (13.5%): These individuals are opinion leaders and respected by their peers. They are more cautious than innovators but are still eager to adopt new ideas and technologies that offer clear benefits.

[2] Hitesh Bhasin.Jun 1 2019. Rogers, E.M. (1976). New Product Adoption and Diffusion. Journal of Consumer Research. (March). p290-301.

Early Majority (34%): This group represents the tipping point for mainstream adoption. They are pragmatic and deliberate, waiting for evidence of an innovation's success before adopting it.

Late Majority (34%): This group is skeptical and adopts new ideas or technologies only after they have become widely accepted and proven to be effective. They are often influenced by social pressure and the perceived need to conform.

Laggards (16%): These individuals are the last to adopt an innovation. They are typically resistant to change and may only adopt new ideas or technologies when forced to do so by necessity or social pressure.

Rogers' theory is highly relevant to understanding the spread of digital technologies and innovations in various sectors, including banking. For example:

Mobile Banking: Mobile banking apps with user-friendly interfaces (high compatibility) and clear benefits (convenience, accessibility) were quickly adopted by early adopters and then by the early majority.

FinTech Startups: Innovators and early adopters embraced new financial technologies (crowdfunding platforms, digital payment solutions) due to their perceived advantages and relative ease of use.

Understanding Rogers' framework provides a valuable lens for analyzing the diffusion of innovations in the digital age. By considering the adopter categories and the factors influencing adoption, companies and policymakers can better strategize to promote the successful adoption of new technologies and achieve meaningful societal impact.

The debate surrounding the drivers of innovation often centers on two contrasting perspectives: technological determinism and the social construction of technology. Understanding these viewpoints is crucial for analyzing the role of innovation in shaping the digital landscape, particularly in the banking sector.

Technological Determinism: This perspective posits that technology is the primary driver of societal change. It argues that new technologies inevitably shape human behavior, social structures, and even cultural values. Technology is seen as an independent force that exerts a powerful influence, often regardless of social context.

The internet, with its ability to connect people globally, has transformed information sharing, communication, and commerce, profoundly impacting social interactions and cultural norms.

Limitations of Technological Determinism: While technology certainly plays a significant role, technological determinism often oversimplifies the complex interplay between technology and society. It fails to account for the role of human agency and the influence of social, cultural, economic, and political factors in shaping how technologies are developed, adopted, and used. For example, the internet's development was influenced by government funding, Cold War competition, and the emergence of hacker communities.

Technological determinism might suggest that digital technologies are forcing banks to adopt new ways of operating. This viewpoint might explain the rise of mobile banking, online payments, and AI-powered services as inevitable responses to technological advancements. However, this perspective overlooks the crucial role of regulatory frameworks, consumer demand, and competitive pressures in driving the digitization of banking.

The development of the internet was influenced by social movements advocating for free speech and access to information.

The social construction of technology perspective helps explain the diverse approaches to digital banking across different cultures and contexts. For instance, some countries prioritize financial inclusion and develop mobile banking solutions tailored to the needs of low-income populations. In other countries, digital banking

initiatives may focus on sophisticated investment tools and personalized financial advice, reflecting different priorities and cultural values.

Neither technological determinism nor social construction of technology provides a complete picture of the relationship between technology and society. A nuanced understanding acknowledges the interplay between technological advancements and social factors, recognizing that innovation is a product of both human agency and technological capabilities. In the context of banking, this means that understanding the social, cultural, and economic context is essential for developing and implementing digital banking solutions that meet the needs of diverse communities and promote financial inclusion.

Digitization has become an important driver of innovation, enabling faster development, new technologies and disruption of business models. At the same time, it is important to recognize the potential challenges, ethical considerations and responsible innovation needed to ensure that the benefits of digitization reach everyone and contribute to a more sustainable and equitable future.

Digitalization is the process of leveraging digital technologies to transform a business model, creating new revenue streams and value-producing opportunities. This involves integrating digital tools and systems into various aspects of a business's operations, from management and communication to production and customer service. In today's competitive landscape, digitalization has become essential for businesses to stay relevant and thrive.

Digital technologies provide new tools, platforms and infrastructure for innovation. These include: Digital tools enable massive data collection and analysis, leading to new insights and applications in a variety of fields. Artificial Intelligence (AI): AI algorithms can automate tasks, personalize experiences, and create new discoveries in areas such as healthcare, finance, and manufacturing. Cloud platforms provide on-demand access to computing resources, storage, and software, fueling innovation with lower barriers to entry. Digital technologies have given rise to entirely new business models based on online marketplaces, data-driven services,

and platform-based ecosystems. Digital technologies are driving disruptive innovation across industries, changing how businesses operate, create products, and changed the delivery of services. Think ride-sharing platforms, e-commerce giants and digital streaming services.

Digitization has enabled the emergence of new business models in banking, posing both challenges and opportunities for traditional institutions:

Fintech Startups: Innovative fintech companies are disrupting traditional banking models by offering niche financial services like online lending, peer-to-peer payments, and investment platforms. These startups often have a more agile and customer-centric approach, utilizing technology to deliver services faster and more efficiently.

Online Lending Platforms: Online lending platforms have become a popular alternative to traditional bank loans, connecting borrowers and lenders directly through digital platforms. This model offers greater transparency, faster approval times, and often lower interest rates compared to traditional lending processes.

Mobile Payment Solutions: Mobile payment apps like Apple Pay, OpenAI Pay, and Samsung Pay are simplifying payments and fostering a cashless society. These services offer convenience, security, and speed, transforming the way consumers make purchases and manage their finances.

Traditional banks face challenges in adapting to these new business models, as they often operate with legacy systems and a more bureaucratic structure. However, they also have the opportunity to embrace innovation, partner with fintech startups, and develop their own digital offerings to remain competitive.

Increased Efficiency & Productivity: Leveraging Digital Technologies

Digital technologies have significantly improved efficiency and productivity in banking operations, automating tasks and leveraging data analytics to gain insights.

Automated Loan Approvals: AI algorithms are being used to streamline loan application processes, analyzing credit history and financial data to make faster and more accurate approval decisions. This not only improves efficiency but also reduces the risk of human error.

Fraud Detection Algorithms: Sophisticated AI models can detect patterns and anomalies in transactions, identifying potential fraudulent activities in real-time. This proactive approach minimizes financial losses and enhances security for customers.

Personalized Financial Advice: Data analytics allows banks to understand customer needs and preferences better, offering personalized financial advice, investment recommendations, and budgeting tools tailored to individual goals and risk profiles.

Improved Access & Financial Inclusion: Bridging the Gap

Digital banking has the potential to bridge the financial inclusion gap, extending access to financial services for underserved populations:

Mobile Banking in Developing Countries: Mobile banking solutions have been particularly effective in reaching people in remote areas with limited access to traditional banking infrastructure.

While digitization offers significant opportunities, it also presents challenges:

Digital Divide: Unequal access to technology and digital literacy skills can exacerbate existing inequalities. Efforts to bridge the digital divide are crucial for ensuring equitable access to financial services.

Data Privacy & Security: The increased collection and analysis of personal financial data raise concerns about data privacy and security. Robust regulations and

ethical data management practices are essential to safeguard sensitive information and maintain customer trust.

Cybersecurity Threats: Digital banking systems are vulnerable to cyberattacks, requiring strong security measures to protect customer data and financial transactions. Ongoing vigilance and investment in cybersecurity infrastructure are vital to mitigating these risks.

1.2. Dependence of bank innovations on digitization, the process of digitization in banks in the world.

Technological development is changing society, economy, banks and banking activities. The change in technology initially shifted banking operations from branches, which were traditional distribution channels, to automated teller machines (ATMs), telephone, Internet banking, and mobile devices, and later distribution channels. This change has not stopped, and the concept of understanding cloud-based applications, big data and reading big data has gained importance over time. In addition, cryptocurrencies have entered the scene of everyday life. The development of digital communication has made it possible to communicate with people all over the world.

In the past, banks were more in the form of buildings and there were some types of remote services. But this type of banking caused inconvenience to the customers and led to many traffic jams in the banks. Therefore, new types of services have appeared in banks in the age of technology. In order to bring convenience to customers, banks began to abandon traditional services.

Traditional banking services would be:

- service of employees in buildings to customers
- all types of paper documents
- customers standing in line, etc

But the world is developing and the age of technology brings convenience. Banks, like other industries, are being innovated every day, and people all over the world are enjoying the digitization of banks, i.e. remote banking, banking services on their smartphones without leaving home.

First of all, we need to understand what digital banking is. **Digital banking** can be defined as enabling banking operations and transactions by implementing or providing information through digitization of information through Internet, mobile, ATM and similar technology-based channels. Digital banking can provide cheaper, more convenient services. , and contains fewer errors. While digitization offers banks a cost advantage, this translates to the customer as a better customer experience, more usable and cheaper products. Digital banking is mainly a result of digital transformation in the world. The increase in internet usage is common in the use of social networks, and the change in the way data is collected has increased the expectations and demands of the new generation of technology natives and old banking customers who have adopted this technology. In short, service expectations are focused on faster, better quality and cheaper technology-based channels and services.

Digital banks. While traditional banking is shrinking around the world, digital banking applications, mobile payment systems, and banking apps, recently launched in the UK and EU, have seen rapid growth. Monzo, Starling Bank and Revolut stand out as digital-only banks. These banks are not adopting digital banking as a channel strategy and are leading the way with the digital services they offer. One of their key strategies is personalization of digital services. According to a study by Global Data, 28% of people in the UK want to use digital banking. This figure is 35% in the world. It has been claimed that 41% of UK consumers do not approve of the idea of a single 'digital bank'. The UK and EU are looking forward to Digital Banking and Mobile banking and Open Banking by increasing their investment in Fintech. and provide better opportunities to users. It is worth noting that while Turkey still uses strong wet signature and identity verification for bank accounts, in

Europe it can be easily opened around mobile accounts. Therefore, we can emphasize that digital practices are developing in such countries. Monzo is an app for iOS or Android that tries to create a banking structure based on requests and feedback from participants. It is possible to send money to other banks by opening a UK bank account over the phone.

Digital Banking Trends 2024

We are entering a world where AI assistants provide financial assistance, mobile apps immerse us in an augmented world, and self-driving cars outperform humans in driving. Such advances usher in an entirely new era for digital banking and redefine how consumers perceive their wealth. A forward-thinking bank should be at the forefront of new levels of online, smartphone and multi-service advancements that meet customers' demands for financial power, income, trust and privacy. Even in the age of the most amazing technologies, a slightly elevated perspective is not enough by itself. The future of every bank depends on how effectively it uses innovation to focus on customer requirements, desires and actions. So, let's take a look at the popular digital technologies used by modern banks.

APIs

In a highly connected world, a bank's success will be determined by its ability to create and contribute to digital networks. An important element is the bank's ability to integrate its products and services internally and externally with various third-party products and applications. This is mainly facilitated by the API.API (Application Programming Interfaces) allows two software systems, applications or other resources to exchange information and communicate. In other words, APIs allow banking services to interact with each other or with third-party products in real time.

Cloud computing

Banks are experiencing an influx of new challengers to the financial sector, including fintech firms, BigTech and even non-financial entities. To compete effectively, owners must act with flexibility and agility. Many organizations have already integrated cloud technologies into their digital marketing. Banks can use cloud technology to store data and applications and access flexible computing resources over the Internet. Popular public cloud service providers such as Microsoft Azure and Google Cloud Platform provide a wide range of services that enable banks to effectively build and scale digital innovation.

Internet of Things (IoT)

IoT is one such technology that helps in real-time data analytics by making the user experience more personalized and personalized. With real-time data analytics, IoT makes the consumer experience more personal and personalized. Thanks to IoT and its digital connectivity through gadgets, customers can make cashless transactions within seconds. In addition, the Internet of Things has transformed the financial ecosystem by combining risk reduction, authentication mechanisms (biometric sensors) and cross-channel access.

Big Data Analytics

With billions of customers, banks and financial institutions are undoubtedly the most data-intensive entities in the global marketplace.

Banks that can consistently deliver personalized offers and experiences for their consumers will emerge as the next winners in the digital banking game. The key to figuring out what customers want and need can be found in the mountains of data captured on various banking platforms. Banks can only create personalized financial services that help customers by fully listening to them and analyzing data. Banks can use data from various sources including online payments, ATM

transactions, e-banking, IoT devices, customer data captured for KYC, biometric authentication, etc.

1.3. Traditional and digital services of banks today and their differences.

Banks affect our daily lives and this is especially important when running a business. In addition, it is very important to choose the right bank for the company. Choosing means deciding between traditional and digital banking.

What are traditional banks?

A traditional bank is a financial institution that conducts most of its business on-site. Most traditional banks still rely on physical locations to fulfill their banking needs, although some offer limited online banking services. To help with this, a traditional bank will have branches all over the country and many will have their own branded ATMs. Traditional banks are ultimately chartered and have their own banking licenses. They often provide a variety of financial services, including bank accounts, debit and credit cards, lending, credit reports, and many other options. Customers should expect to pay more for different services, as they all come with a price.

Advantages and disadvantages of traditional banking

While traditional banking doesn't always offer the same convenience as digital banking, it does offer a wide range of services, so you can find everything you need in one place. If you value personal customer service the most, a traditional bank may be better.

Table 1.2.1

Advantages and disadvantages of traditional banks

Feature	Advantages	Disadvantages
Security	- Securely insured by FDIC (US) or equivalent institutions.	- Potential for data breaches and security vulnerabilities.
	- Strong history and established security protocols.	- May not offer the same level of security as some online banks.
Services	- Personalized financial advice and guidance from bankers.	- Often have higher fees for services like wire transfers and overdrafts.
	- Physical branches provide face-to-face interaction and immediate assistance.	- Limited opening hours and potential long wait times at branches.
Trust and Reputation	- Customers feel more secure with a physical presence and history of stability.	- Some customers might perceive them as less transparent than online banks.
	- Experienced customer service representatives available in person, by phone, or online.	- Customer service can be impersonal and less efficient at times.

Source: Compiled by the author based on the information[3]

The future of banking is digital - especially if you're a business owner. With digital banking, you can reduce fees, have better integration with accounting software, collaborate securely with your team, and have a better view of how much money you earn, save, and spend every day.

[3] Compiled by the author based on the information

So, now we look out some types of services in banks and we may know their pros and cons when people use traditional and digital bank services through differentiating them

1. Choosing a traditional bank or a digital platform has a significant impact on **opening an account**. You can apply for a fincra account online in minutes as long as you provide all the necessary information for a successful account verification. But opening an account at a traditional bank takes much longer. Although some major banks have begun to offer an online application process, most require you to visit a location in person before starting your application.

2. When talking about digital banking, it's hard not to talk about fees, or the lack thereof. Entering the market using a sophisticated business model, digital banks have raised the bar for the amount of services businesses can expect before incurring banking costs. Most neo-banks offer free or almost zero fees, unlike the high technical fees and hidden costs associated with traditional banks. For example, you don't have to maintain a minimum balance or pay account fees when you use fincra.

3. **Customer service** is the following key difference between digital and traditional banking. To emphasize this, a well-known digital bank provides online assistance, while a traditional bank only provides assistance in person. Thanks to the faster and more detailed customer service that digital platforms can provide, more business owners are now switching to digital banking. For example, apart from visiting the office in Lagos (Nigeria) or the office in Canada, you can contact fincra customer service and chat support via email.

In 2023, an estimated 2.8 billion people worldwide used mobile banking . In developed countries, mobile banking adoption is often above 80%, with some exceeding 90%.[4] In 2023, 89% of US adults used mobile banking apps . Mobile

[4] https://www.statista.com/statistics/1440760/mobile-and-online-banking-penetration-worldwide-by-country/ Statista Research Department, Feb 29, 2024

banking is a key enabler of financial inclusion in developing countries. In Kenya, mobile money services such as M-Pesa have dramatically increased financial access.

Although mobile banking is becoming increasingly popular, online banking still plays an important role. In 2023, more than 80% of adults in developed countries used online banking services for various tasks. In Europe, online banking adoption rates often exceeded 90%.

The fintech sector will receive more than $120 billion in venture capital funding in 2022 (CB Insights). This shows the huge interest and investment in fintech, which has further fueled the digitization of banks. The EU's PSD2 regulations have spurred the adoption of open banking services, with many banks now offering APIs for third-party services.

Open banking services are gaining popularity worldwide, with various countries adopting similar systems.

Banks around the world are increasingly investing in digital technologies. According to Blockchain Market information, The global banking technology market is expected to reach $700 billion by 2025.

Now we make also sure about pros and cons of digital banks.

Table 1.2.2.

Pros and cons of digital banks

Feature	Pros	Cons
Accessibility & Convenience	24/7 access, mobile-first experience, fewer physical branches	Limited personal interaction, potential reliance on technology
Fees & Charges	Lower fees, transparent pricing structures	Hidden fees or charges not clearly advertised
Account Opening & Management	Streamlined onboarding process, quick and easy account setup	Potential for fraud or security breaches

Feature	Pros	Cons
Customer Service	Online chat support, email support, FAQs & tutorials	Limited options for complex issues or personal assistance
Financial Products & Services	Comprehensive range of products (e.g., savings accounts, loans, investments)	Limited access to traditional banking services (e.g., financial advice)
Security & Data Protection	Robust security measures, encrypted data transmission	Potential for data breaches or cyberattacks
Transparency & Communication	Real-time account updates, clear communication channels	Potential for delayed or inaccurate information
Innovation & Technology	Integration with latest technologies (e.g., AI, biometrics), personalized financial management tools	Potential for technical glitches or system failures
Sustainability	Reduced environmental impact, paperless banking	Potential for digital divide, accessibility issues for individuals without technology access

Source: Compiled by the author based on the information

Currently, in the digital economy, banks are using various innovative technologies in the process of digitization. Below I have given examples of some of the ones used by online banks in the world. Digital banks are leaders in using technology to deliver innovative and seamless financial experiences. They often use advanced technologies that traditional banks may be slower to adopt. Some of the key technologies powering digital banks today include:

1. Cloud Native Architecture:

Digital banks are built on cloud-native architectures that allow them to rapidly scale their operations and adapt to changing customer demands.

Cloud platforms reduce operational costs by eliminating the need for expensive infrastructure. Cloud providers often offer robust security measures that protect sensitive data.

2. Microservices and APIs:

Digital banks use microservices to break down complex systems into smaller, independent components, allowing for faster development and easier maintenance. APIs allow for seamless integration with third-party services, allowing banks to offer greater capabilities and collaboration.

3. Artificial Intelligence (AI):

AI provides personalized recommendations, tailored financial advice and fraud detection.

AI chatbots and virtual assistants provide 24/7 support by answering frequently asked questions and solving common problems.

4. Big Data Analytics:

Digital banks use big data analytics to understand customer behavior, financial habits and needs, leading to personalized product offerings and financial management tools. Data analysis helps identify unusual patterns and anomalies that may indicate fraudulent activity. Data on data supports more accurate risk assessment and credit rating.

5. Mobile First Design:

Digital banks prioritize mobile-first design, ensuring that their apps and services are user-friendly and accessible on any device. The user experience is streamlined, making it easier for customers to manage and manage their funds.

6. Blockchain technology:

Some digital banks are exploring blockchain technology to enable secure and transparent transactions, particularly cross-border payments and cryptocurrency integration. Blockchain also powers decentralized financial applications, offering alternatives to traditional banking services.

7. Biometrics and Security:

Digital banks use multi-factor authentication using biometrics (fingerprint, facial recognition) along with traditional passwords to increase security. Advanced security systems and AI are used to detect and prevent fraud in real time.

8. Open source technologies:

Many digital banks use open source technologies to foster collaboration, accelerate development, and engage a large community of developers.

9. Payment innovations:

Digital banks often integrate with mobile payment platforms, enabling seamless payments via smartphones. They can offer their own digital wallet to make online payments easier and safer. Digital banks are pushing the boundaries of innovation in financial services. Their adoption of these technologies will redefine how people interact with their money, providing faster, more convenient and personalized experiences.

So, when it comes to digital services we should say, digital services more better than traditional services and people prefer digital services in almost every countries in today's world because of it's comforts. Now I give information some kinds of digital services which are used by banks in developed and developing countries.

Mobile banking apps, fintech partnerships, and blockchain-based solutions are just a few examples of key verticals driving the digital banking narrative. The synergy between these verticals creates a dynamic ecosystem that prioritizes

comfort, convenience and innovation. As traditional banking institutions and barriers collapse and digital solutions become more embedded in everyday financial activities, the stage is set for a transformative journey that promises a user experience and a reshaped financial landscape.Below, I will shed light types of digital banking services and their definitions:

Account Management: A digital banking hub is the ability to manage accounts online and through mobile apps. This includes viewing balances, viewing transaction history, transferring money between accounts, paying bills, and managing account settings. Digital account opening processes have simplified the onboarding experience, allowing customers to apply, upload documents, and complete verification steps without visiting a physical branch.

Payments and Transfers: Digital banking has greatly improved payment and transfer options. Contactless payments through mobile wallets such as Apple Pay and Google Pay are becoming commonplace, providing convenience and security at the point of sale. Peer-to-peer (P2P) transfers allow individuals to send money to each other instantly, while online payments simplify the management of recurring expenses. International money transfers are now faster and more efficient through digital platforms, reducing processing times and fees. Digital wallets offer secure storage of payment information, eliminating the need for physical cards for online purchases.

Savings and Investments: Digital banking platforms offer a variety of savings and investment options, including high-yield savings accounts that provide competitive interest rates. Customers can access investment accounts to manage stocks, bonds, mutual funds and other assets online. Robo-advisors provide algorithm-based investment advice and portfolio management tailored to individual risk tolerance and financial goals. Financial planning tools such as budgeting software, spending trackers and goal-setting functions allow customers to effectively manage their finances.

Loans and Credit: Digital loan applications have simplified the borrowing process, allowing customers to apply for personal loans, mortgages and business loans completely online. Digital credit card management allows customers to track spending, access rewards programs and manage account settings. Digital mortgage origination platforms streamline the entire process from initial application to loan approval.

Customer service and support: Digital banking prioritizes customer service and support, offering various channels for assistance. AI-powered chatbots and virtual assistants provide quick answers to common questions and basic support. Live chat sessions allow real-time interaction with bank representatives, while email support provides secure communication for more complex inquiries.

Security and Fraud Prevention: Digital banks prioritize security and fraud prevention. Multi-factor authentication, often involving a combination of passwords, one-time codes, and biometrics, increases account security. Biometric authentication methods such as fingerprint, facial recognition, and voice recognition provide an additional layer of protection. Advanced fraud detection systems powered by AI monitor transactions and detect potential fraudulent activity in real time.

Open Banking: Based on regulations and customer demand, open banking allows banks to securely share customer financial information with authorized third-party applications. This allows financial aggregators to combine account information from different institutions, providing a unified view of finances. Third-party applications may use open banking data to offer customized budgeting tools, investment advice and other personalized financial management solutions.

Emerging Digital Services: The digital banking landscape continues to evolve rapidly with new innovations emerging. Digital currencies such as Bitcoin and Ethereum are increasingly integrated into banking services, allowing customers to buy, sell and manage digital assets. Blockchain technology is being explored for secure and transparent transactions that could revolutionize cross-border payments

and other financial transactions. Offering financial services in virtual worlds and augmented reality environments.

Conclusion on Chapter I, This chapter explored the crucial role of commercial banks in the digital economy, focusing on the impact of innovation and digitization on their operations and service offerings. It examined the various theoretical perspectives on innovation, analyzing its impact on digitization and the dynamic relationship between the two. The chapter dived deep into the dependence of bank innovations on digitization, exploring the global trends and processes involved in digitizing banking operations. It further differentiates between traditional and digital banking services, highlighting the distinct characteristics and implications of each in the modern financial landscape. Ultimately, this chapter provided a comprehensive understanding of how commercial banks are adapting and innovating to thrive in the evolving digital world.

CHAPTER II. CURRENT SITUATION AND SYSTEMATIC ANALYSIS OF DIGITAL BANKING, DIGITAL ACTIVITIES OF BANKS (FOREIGN EXPERIENCE)

2.1. Analysis of the successfully implemented digital banking systems in the United States

The United Kingdom, the United States, Sweden and Denmark are often cited as leaders in the adoption of online banking. These countries boast high levels of internet penetration, tech-savvy populations and favorable regulatory environments for digital financial services. Additionally, countries such as South Korea, Canada and Australia have also witnessed significant growth in the adoption of online banking and are considered to be ahead of the curve in terms of digital financial services.

In the 2nd part of my research, I give the reason why I take the USA as a foreign experience. The United States presents itself as the perfect setting for a monograph on "Banking Innovations in the Digital Economy (Theory and Practice)." . It's a global leader in financial technology, a hotbed of innovation where companies like PayPal, Stripe and Square have revolutionized payments. This dynamic environment encourages both established banks and emerging fintechs to experiment and develop new solutions. The US has a diverse digital banking landscape, with many successful neobanks such as Chime, Current, Revolut and Varo Money, providing rich examples of how digital banks are changing the industry. In addition, major US banks are actively investing in digital transformation, launching innovative services and partnering with fintechs. This thriving ecosystem provides a wealth of information and research resources, including leading universities with renowned finance and technology programs, extensive industry reports, and extensive data generated by the financial sector. The US market offers a veritable testing ground for theoretical models related to digital banking, consumer behavior and financial regulation. Specific case studies on digital bank startups, partnerships, acquisitions, and regulatory changes provide rich

insights that will make your research highly relevant and impactful. Your findings can contribute to understanding the future of banking and its impact on the digital economy, ultimately informing policymakers, regulators and financial institutions in their efforts to promote innovation and financial inclusion. In summary, the US offers a unique combination of advanced digital banking, a thriving fintech ecosystem, abundant research resources and real-life examples, making it an ideal location for a monograph exploring banking innovation in the digital economy.

First of all we should know how USA turned into digital economy and their steps . Then we may look out bank innovatons in digital economy.

The United States' transition to a digital economy is a story of continuous evolution driven by a combination of technological advances, policy changes, cultural shifts, and a spirit of innovation. The journey began in the second half of the 20th century, with the advent of personal computers and the Internet, laying the foundations for a digitally connected society. Early adopters embraced the potential of these new technologies, leading to the development of online services and the emergence of early e-commerce platforms. The dot-com boom of the late 1990s, while booming, cemented the role of the Internet in business and commerce and paved the way for further digitization.

Table 2.1.1

Key Steps in the US Digital Transition

Year	Key Development	Impact
1969	The birth of the Internet (UCLA-Stanford connection)	Paved the way for global connectivity and information sharing.
1980s	Personal computers & software applications (spreadsheets, word processors)	Expanded computing power to homes and offices, empowering individuals and businesses.

Year	Key Development	Impact
1990s	Rise of the World Wide Web (WWW), browser development (Netscape, Internet Explorer)	Democratized access to information, driving growth in online services, e-commerce, and digital media.
2000s	Broadband, smartphones, mobile apps, social media (Facebook, Twitter)	Further accelerated digitization, transforming communication, information access, and transactions.
2010s	Cloud computing, big data, AI, e-commerce platforms (Amazon, eBay), disruptive services (Uber, Airbnb)	User in a new era of digital innovation, improving efficiency, personalizing customer experiences, and disrupting traditional industries.

Source: Compiled by the author based on information

These technological advances have been supported by a number of policy changes that have created an enabling environment for digital innovation and growth. The US government has invested in research and development, encouraged the adoption of broadband infrastructure, and introduced regulations to protect consumer privacy and promote competition. The shift to a digital economy has also reflected a cultural shift in the United States. A growing tech-savvy population has embraced digital tools and services, driving demand for online shopping, mobile banking, streaming entertainment and social media. A culture of entrepreneurship and innovation has flourished, leading to numerous startups and technology companies that have reshaped the industry and created new economic opportunities. The U.S. digital economy continues to grow rapidly thanks to advances in technologies such as 5G, the Internet of Things (IoT), blockchain, and artificial intelligence. The continued development of these technologies will further shape the landscape of the digital economy, creating new opportunities and challenges for businesses and consumers. The US's journey into the digital economy serves as a model for other countries looking to embrace technological advances and transform their economies.

As for the history of banking innovation and bank digitization, the United States has a long history of banking digitization. The digitization of banking in the United States is a history of gradual evolution driven by technological advances, changing customer needs, and regulatory changes. The journey began in the 1960s with the introduction of computers and automated teller machines (ATMs), marking the first steps towards digital banking. Although early ATMs provided basic services such as cash withdrawals, they were not widely used. The 1970s saw the growth of credit cards and the introduction of early electronic funds transfer (EFT) systems that allowed for electronic payments and transactions. The advent of personal computers in the 1980s, which became cheaper and more accessible, paved the way for home banking services. The first online banking platforms appeared, but access to the Internet was still limited. The Internet revolution of the 1990s changed the landscape dramatically. Banks have begun to have an online presence by offering services such as account management, bill payments and online statements. The dot-com boom of the late 1990s and early 2000s saw growth in Internet-based businesses, including online banking. While some early online banks failed, those that survived laid the foundation for future digital banking models. The early 2000s saw the adoption of broadband internet and the advent of smartphones, which fueled the further growth of online banking, making it more accessible and convenient for consumers. In the 2010s, the widespread adoption of smartphones and mobile applications transformed online banking. Mobile banking apps have become increasingly sophisticated, offering features such as mobile check deposit, contactless payments, and personalized financial information. This period saw the emergence of neobanks (digital first banks), which challenged traditional institutions by offering fee-free banking services, user-friendly interfaces and innovative financial products. Neobanks have captured a significant part of the market, especially among the younger demographic groups. Traditional banks have responded by investing heavily in their digital offerings, building their own mobile apps and partnering with fintech startups to access new technologies and services. Key technological drivers of this evolution include personal computers, the Internet,

broadband, smartphones and mobile applications, artificial intelligence (AI) and machine learning, and cloud computing. Digitization of banking in the US is an ongoing process. The industry continues to innovate, with new technologies, financial products and services constantly emerging. This evolution has changed the banking landscape, making it more accessible, convenient and customer-centric than ever before.

Today, nearly all banks in the U.S. have digital banking services for customers and are leveraging a variety of innovative technologies. The U.S. has emerged as a global leader in digital banking innovation, fueled by strong fintech ecosystems, a tech-savvy population, and a dynamic regulatory landscape. it has been. This has led to a wave of new products and services, changes in the way traditional banks operate, and a focus on using advanced technology to improve customer experience and increase financial inclusion.

American banks, both traditional and digital, have embraced a wide range of innovations, including:

1. Mobile-First Banking: The rise of smartphones has revolutionized banking. Mobile banking apps are now the primary interface for many Americans, offering a convenient and convenient way to manage their finances. Features like mobile check deposit, contactless payments, and real-time transaction notifications have become commonplace.

2. Fee-free banking: Digital banks, particularly neobanks, have disrupted the traditional fee-based banking model by offering free checking and savings accounts, attracting a large customer base, especially among the younger generation.

3. Personalized financial services: Digital banks use data analytics and AI to offer personalized financial products such as loans, investments and insurance based on personalized recommendations, spending habits and personal needs.

4. Innovative payment solutions: Digital banks have introduced a variety of payment options, including peer-to-peer (P2P) payment apps like Venmo and Zelle, contactless payments with mobile wallets like Apple Pay and Google Pay, and international money transfers with platforms. Like Revolut and Wise.

5. High-yield savings accounts: Digital banks like Ally Bank and Marcus by Goldman Sachs offer competitive interest rates on savings accounts, attracting customers looking to maximize their income.

6. Fintech Partnerships: Traditional banks are increasingly partnering with fintech startups to access innovative technologies and expand their offerings, resulting in a combination of traditional banking services with modern fintech solutions.

7. Open Banking: Open banking initiatives in the US allow customers to share their financial information with third-party applications, leading to the development of new financial tools and services such as budgeting software, personal financial advice and automated billing platforms. .

Table 2.1.2

Technologies Driving US Online Banking

Technology	Key Functionalities	Benefits for Online Banking
Artificial Intelligence (AI)	Personalized financial advice, chatbots, fraud detection systems, risk assessment tools	Enhanced customer experience, improved security, efficient risk management
Machine Learning (ML)	Data analysis, customer behavior prediction, identification of potential financial risks	Data-driven insights, personalized product offerings, proactive risk mitigation
Blockchain Technology	Improved transaction security, transparency, and efficiency in payments and other financial services	Enhanced trust, reduced costs, streamlined operations

Technology	Key Functionalities	Benefits for Online Banking
Cloud Computing	Scalable and secure storage and processing of data required to support digital banking services	Flexibility, cost-effectiveness, enhanced security, and scalability
Data Analytics	Learning about customer behavior, tailoring products, optimizing services	Personalized customer experiences, data-driven product development, improved service efficiency
Biometric Authentication	Fingerprint scanning, facial recognition	Enhanced security, increased convenience for online banking users

Source: Complied by the author

The rapid digitization of the US banking industry is changing the way people manage their finances. This has made financial services more accessible, affordable and accessible, fueling innovation and competition in the sector. The introduction of new technologies and the development of innovative financial products promise to further transform the digital banking landscape in the US.

Known for its technological advancements and consumer-driven markets, the United States is witnessing rapid changes in its banking system. With the rise of fintech startups and growing demand for convenient and personalized financial services, digital banking is reshaping the way Americans manage their money. No longer confined to traditional brick and mortar branches, banking is at our fingertips, with mobile apps offering a variety of services from account management and payments to investment and financial planning. This digital revolution is characterized by a focus on user-friendly interfaces, real-time transaction capabilities, and a personalized experience that enables consumers to take control of their finances more conveniently and efficiently. While this shift brings enormous opportunities for both consumers and banks, it also brings challenges. Ensuring cyber security and protecting sensitive customer data remain top concerns, while the need for financial inclusion for underserved populations requires careful attention.

Navigating the evolving regulatory landscape, balancing innovation and responsible oversight is another key challenge. Despite these obstacles, the U.S. digital banking system continues to thrive thanks to a strong mix of consumer demand, technological advances, and ongoing competition between established institutions and innovative fintech companies. This dynamic landscape offers a glimpse into the future of banking, where technology promises to redefine how we interact with our finances, making financial services more accessible, personalized and user-friendly than ever before.

In 2023, several digital banks had a customer base exceeding 10 million in the United States. The company with the highest number of users was Chime, with a user base of 21.6 million. It was followed by Ally Bank, with 11 million customers as of December 2023. Robinhood ranked third, with 10.3 million customers, but Dave's customer base also reached the 10 million milestone.[5]

Here are some examples of banks that have been successfully established in the United States and are operating with innovative technologies:

1. Chime: Founded in 2013, Chime has become a leading force in digital banking with an emphasis on fee-free banking. Their mobile-first approach combined with features like early access to direct deposit, lump sum savings and automatic savings plans resonated with millions of users. Chime's success is due to its ability to meet the needs of the financially disadvantaged and provide a transparent and seamless banking experience. Chime is one of our favorite digital bank accounts and mobile payment apps. With over 14 million customers in the US, it is one of the top contenders among digital banks. I really like its Pay All feature. It's similar to Zelle, but much more secure and less prone to scammers and hackers. You can send money to any debit card or bank account for free, whether the recipient is a Chime member or not. In addition to sending money and making online and in-

[5] Number of customers at selected digital banks in the U.S. 2023 Statista Research Department, Jun 27, 2024

store payments, Chime offers free overdrafts, a high-yield savings account, free ATM withdrawals at 60,000 ATMs, and a free credit builder card.

2. Current: This mobile-first bank is aimed at a younger demographic with a focus on budgeting and financial literacy Current Spending Insights offers unique features like real-time spending analytics and a curated list of discounts and offers from local businesses. Their commitment to empowering users to effectively manage their money and make informed financial decisions has cemented their position as a favorite among younger generations.

Founded more than seven years ago, Current has seen real growth since the company began working with influencers on YouTube and other social media sites. With over 5 million customers, Current is one of the largest payment apps and one of the most popular digital bank accounts in the US. I've reviewed it extensively over the years and have found that while its focus is on the younger demographic, the account is actually pretty good and it's great at what it does. Now I recommend it for everyday use. For example, you know those pesky gas guzzlers when you fill up your car. The stream will delete them instantly and allow you to spend all the money again. Not only that, but you can save some money with one of the biggest APY interest rates of all the banks. If you're not so good with money and lose track of your spending, Current has one of the best money tracking and management tools out there, as well as spending right on the app's home page.

3. Revolut: Although headquartered in the UK, Revolut has successfully entered the US market with its innovative financial services. [6]Their platform combines traditional banking features with travel-friendly solutions such as multi-currency accounts, international money transfers at competitive exchange rates and a virtual card for online purchases. Revolut's success stems from its global reach and ability to meet the needs of a diverse, tech-savvy customer base. Britain's Revolut

[6] Revolut Is Yet to Apply for a US Banking License Formally: Report, 18/09/2023 by Arnab Shome

has caused quite a stir on this side of the Atlantic as well. It is also one of the pioneers when it comes to metal debit cards. For a relatively high monthly fee of $16.99, you get a lot of benefits. Whether they absorb these monthly costs is largely up to you. In addition to getting a great metal card, you'll get the most out of this account if you're a frequent traveler, as the benefits apply mostly to domestic and international travel. To show for it, you get free lounge access, lost or damaged baggage protection, trip delay protection, trip cancellation and layover protection, and basic accidental medical insurance.

4. Ally Bank, founded in 2009, is a digitally native bank that operates exclusively online and through mobile apps. It caters to a tech-savvy and value-conscious customer base, focusing on offering competitive interest rates, transparent fees, and a customer-centric approach. Ally Bank's mobile app is its primary platform, designed for intuitive navigation and user-friendly features. Ally Bank emphasizes transparency in its pricing, clearly outlining fees and providing detailed information about its financial products. Ally Bank prioritizes customer service, providing 24/7 support through phone, email, and live chat. Ally Bank offers a range of educational resources, tools, and calculators to help customers manage their finances effectively. Ally Bank consistently receives high marks for customer satisfaction in surveys and ratings, demonstrating its commitment to a positive customer experience.

These are just a few of the many successful digital banks operating in the US. Their emergence represents a major shift in the banking industry as the demand for convenient, convenient and technologically advanced financial services increases. These institutions are setting a new standard in customer experience, innovation and affordability, challenging traditional banking models and shaping the future of finance.

Challenges:

Maintaining Legacy Systems: Traditional banks face challenges in integrating new technologies into existing systems, requiring significant investment and modernization efforts.

Evolving Customer Expectations: Customers are increasingly demanding personalized experiences, seamless digital integration, and 24/7 access, pushing banks to innovate and adapt quickly.

Data Privacy & Security: The growing reliance on digital banking services necessitates robust data security measures and compliance with evolving regulations to maintain customer trust.

Bridging the Digital Divide: Banks must address the digital divide by providing accessible services and supporting initiatives that promote financial literacy and technology skills in underserved communities.

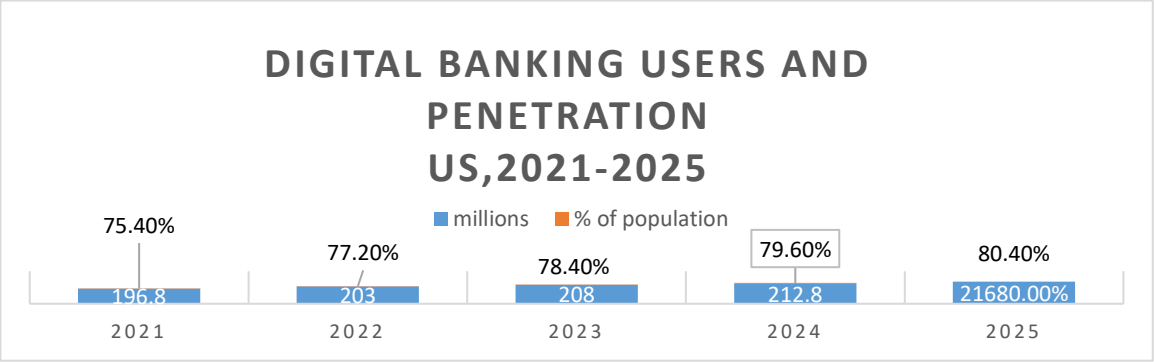
Strategies for Success:

- Agile Development: Embrace agile development methodologies to enable rapid innovation and respond quickly to changing customer needs.
- Collaborative Partnerships: Partner with fintech companies and technology providers to leverage expertise and accelerate digital transformation.
- Customer Experience Focus: Prioritize customer experience by designing user-friendly platforms, providing personalized services, and offering exceptional customer support.
- Data-Driven Insights: Leverage data analytics to understand customer behavior, predict trends, and tailor products and services accordingly.
- Financial Literacy Initiatives: Develop programs and partnerships that promote financial literacy and education for underserved populations.
- Cybersecurity Investment: Invest heavily in cybersecurity infrastructure, implementing multi-layered security measures to protect customer data and ensure the integrity of digital banking systems.

The US boasts a sophisticated digital banking landscape, but financial exclusion persists, particularly affecting low-income communities, minorities, and individuals with limited financial literacy. Digital banking offers a powerful tool to address this challenge.Traditional banking practices often create barriers, including high minimum balances, limited branch access, and complex financial products, which exclude underserved populations. Digital banking provides solutions by eliminating minimum balances, offering mobile-first services, and simplifying products for easier understanding and management. Several programs and initiatives specifically target underserved communities. Community Development Financial Institutions (CDFIs) provide accessible services, "second chance banking" programs support individuals with poor credit, financial literacy programs educate about financial management, and mobile banking partnerships offer tailored solutions. Digital banking has the potential to significantly improve financial inclusion by breaking down traditional barriers and offering accessible, user-friendly services, ultimately contributing to a more equitable financial system.

2.2 Analysis of digital banking users United States over a period of time.

Banking plays a critical role in most US households, allowing Americans to manage their money, make purchases and save for the future. But as technology continues to evolve, so do our banking habits and our expectations of financial institutions.



Picture 2.2.1. Digital Banking users and Penetration[7]

The chart above shows the number of digital banking users in the US between 2021 and 2025. According to it, we can see that there is only growth in these given years. The number of digital bank users in 2021 was 196.8 million, that is, 75.4% of the population of the USA. By 2024, this amount will be 212.8 million. This table also predicts for 2025, and according to it, after 1 year, digital banking users in the USA will be 216.8% million, making up 80.4% of the US population.

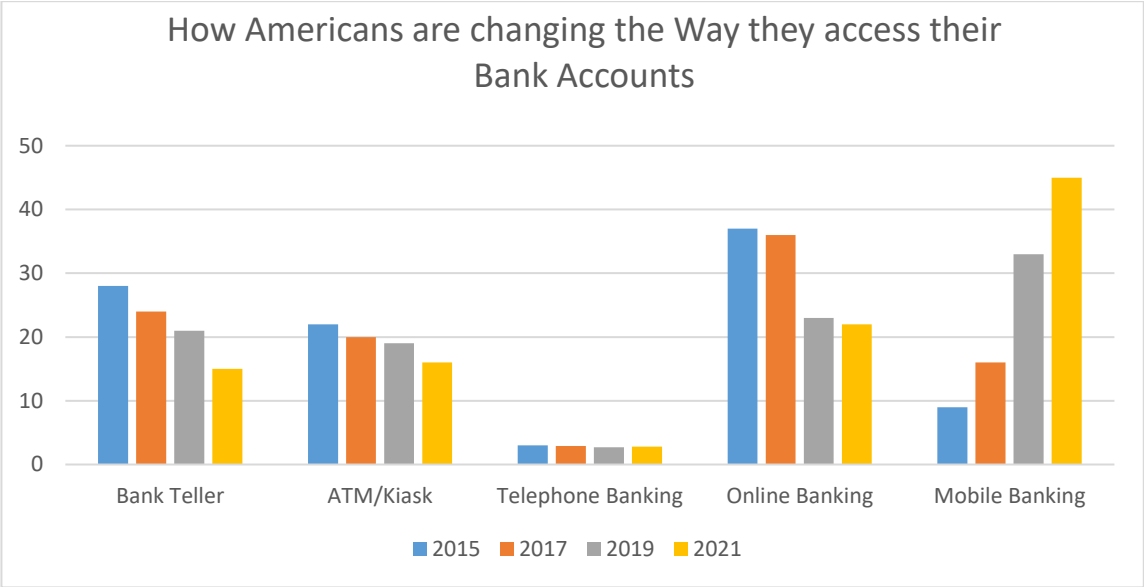
The tides have turned and the majority of Americans are now banking digitally. As of 2022, 78% of US adults will prefer to bank via a mobile app or website. Only 29% of Americans prefer to bank in person. Despite the widespread use of credit cards, consumers prefer to pay for purchases with debit cards. According to our survey, 57% of Americans use debit cards as their primary payment method.

In 2019, the FDIC Household Survey asked unbanked households how they primarily access their bank accounts over a 12-month period. Answers include visiting a bank teller, using an ATM or bank kiosk, calling the bank, using a mobile banking app, using a web browser, and using other methods.

As of 2019, human-centric banking solutions have declined across the board. The use of bank tellers was 21 percent, while the use of telephone banking was only 2.4 percent. Mobile banking usage has grown steadily from 9.5 percent in 2015 to

[7] Source: http://www.emarketer.com/ .US Digital Banking Users and Penetration, 2021-2025 (millions and % of population) August 1, 2021

34 percent in 2019. Online banking usage was 22.8 percent in 2019, but has declined since 2015 due to the growth of mobile banking. In addition, ATM and kiosk operations decreased slightly.



Picture 2.2.2. Primary Method Used To Access Bank Account[8]

The table above shows the percentage of 5 different types of banking services and their customers in America between 2017 and 2021. The number of customers at Bank Teller in 2017 was almost 30% of the population. But later, users began to prefer other types of banking services, and by 2021, the number of users was only 15%. This trend has also been observed among ATM users and has only seen a decline in the given years. For these given years, telephone banking has shown the lowest percentage and has not seen any change over the years and is around 3 or 4 percent. As for online banking, it reaches its peak in the first 2 years and shows almost 40%. But in the next 2 years, a decrease was observed and by 2021 it was 22%. In 2015, only 10% of people preferred mobile banking, but this figure has seen an increase in the following years and will be around 45% by 2021. From this indicator, we can know that in recent years, people in the USA often use mobile banking.The US digital banking market is estimated to be worth $4.3 billion in 2021.

[8]https://www.forbes.com/advisor/banking/banking-trends-and-statistics/

However, as of 2022, the US digital banking market is estimated to be worth an estimated $5.2 billion – a 21% year-over-year increase.[9]

A national survey by the American Bankers Association found that in the past 12 months, 45 percent of bank customers used apps on a smartphone or other mobile device as their top option for managing their bank accounts, compared to 27 percent who used traditional bank accounts. used the online banking service through a computer. (laptop or desktop).

As can be seen from this table, the percentage of users of banking services using the phone is the highest compared to the rest. Email showed the lowest amount, making up only 2.

The following digital banks received the most funding in 2023.

Table 2.2.1.

Top digital banks of America by total funding

Digital banks	**Total funding**
Nubank	$4,1B
SoFi	$3B
Chime	$2,3B
Revolut	$1,7B
N26	$1,7B
Monzo	$1,1B
Varo Bank	$992,4M
Atom	$732M
Starling	**$710,3M**

[9] Global Online Banking Market Report by Banking Type, Software Type, Service Type, and Region 2024-2032 April 2024, Region: Global, IMARC Group,ID: 5769089 https://www.researchandmarkets.com/report/online-banking

Current	$404,4M

Source: **Louis Thompsett: Top 10 digital banks by total funding.September 06, 2023** [10]

Ally Bank, a leading digital bank in the United States, provides valuable insights into the development of Uzbekistan's online banking sector. Founded in 1992 as GMAC Bank, a subsidiary of General Motors Acceptance Corporation (GMAC), it was renamed Ally Bank in 2009 and sees itself as an independent financial institution focused on online and mobile banking. aimed to show. In 2011, Ally Bank became the first fully online, national bank in the US, further cementing its digital-first approach. It acquired online brokerage firm Trade King in 2015, expanded its product offerings to include investment services, and launched a mobile app for the Apple Watch in 2018, making it even more convenient for its clients. Ally Bank created free banking by eliminating monthly service fees, overdraft fees and minimum balance requirements, attracting customers seeking a more transparent and affordable banking experience. They are known for offering competitive interest rates on savings accounts, making them an attractive option for customers looking to maximize their returns. Ally Bank operates entirely online and through its mobile app, giving customers 24/7 access to their accounts and financial services. Operating without a physical branch network, Ally Bank lowers overall costs and enables competitive pricing and interest rates. They offer comprehensive customer support via phone, email and live chat, expanding their offerings beyond traditional banking to include loans, mortgages, credit cards, investment products and auto financing. Ally Bank has invested heavily in the development of its mobile app, providing customers with a convenient and feature-rich platform to manage their finances on the go. They use data analytics to learn about customer behavior and offer personalized financial advice, recommendations and product recommendations. AI-based chatbots provide quick and efficient customer support, answer common

[10] Top 10 digital banks by total funding.By Louis Thompsett.September 06, 2023 https://fintechmagazine.com/top10/top-10-digital-banks-by-total-funding

questions and solve problems. Ally Bank prioritizes security and uses advanced encryption and authentication technologies to protect customer information and transactions. Ally Bank's success demonstrates the viability of a digital-first banking model that significantly reduces overhead and attracts customers seeking convenience and affordability. Their emphasis on user-friendly interfaces, 24/7 customer support and personalized financial services underscores the importance of prioritizing customer experience in digital banking. Ally Bank's expansion into new product categories demonstrates the importance of continuously innovating and developing a variety of financial products to meet changing customer needs. Their adoption of advanced technologies such as artificial intelligence, data analytics and mobile-first design demonstrates the power of technology to improve efficiency, personalize services and improve customer satisfaction in online banking. By studying the successful model of Ally Bank, Uzbekistan can gain valuable insights into the development of its online banking sector. Prioritizing user-friendly mobile apps and online platforms as key entry points for banking services, offering no-fee or low-fee banking options and attractive interest rates on savings accounts to attract customers, investing in robust technology infrastructure including AI, data analytics, and security features, support advanced online banking services, provide 24/7 customer support, personalized financial advice and prioritize customer experience by offering innovative products tailored to specific customer needs, and Leveraging the potential of digital banking channels is an important step towards reaching the underprivileged population by providing convenient and affordable financial services. By learning these key lessons from Ally Bank and other successful digital banks, Uzbekistan can create a thriving online banking sector that increases financial inclusion, encourages innovation, and provides convenient and convenient financial services to its citizens.

One of the advantages of not having physical branches is that the bank can pass these savings on to customers in the form of lower fees. This is due to the Ally Bank Spending Account, the only checking product offered by the bank.

Customers pay $0 in monthly fees and there is no minimum deposit to open an account. Ally also doesn't charge overdraft fees.

Customers are provided with free standard checks, debit card and payment service. Account holders using an Allpoint ATM will never face any fees. Go beyond our ATM network of 43,000+ ATMs and Ally will pay you up to $10 per reporting period.

With no physical branches, customers must rely on technology to fund their accounts. You can set up direct payroll, and Ally's eCheck Deposit feature lets you deposit paper checks using your cell phone camera. Ally also supports Zelle, a peer-to-peer payment platform that lets you send or receive money from friends and family.

If you're more old-fashioned, you can mail your savings using postage-paid envelopes.Ally Bank 0.10% Annual Return (APY) on checking accounts with a minimum daily balance of less than $15,000 and 0.25% APY on accounts with a minimum daily balance of $15,000 or more will pay The latter is higher than some of its competitors, but not as high as the best accounts.For example, the Capital One 360 Checking account pays 0.10% APY for all balance levels, while the Wells Fargo Premier Checking pays 0.01% APY.[11]

Ally Bank Payments

Ally likes to say on its website that its fees are a "short story." Not much. The Bank charges no monthly account maintenance fees and charges no fees for overdrafts, standard or expedited ACH (Automated Clearing House) payments, incoming wire transfers (both domestic and foreign), low daily balances, or cashier's checks.

[11]Mitch Strohm.Ally Bank Review 2024 https://www.forbes.com/advisor/banking/ally-bank-review/#:~:text=Ally%20Bank%20is%20a%20full-service,dating%20back%20to%20the%201920s

But Ally customers pay these fees:

- $20 for outgoing domestic money transfer (Outgoing international money transfers are not allowed.)
- $15 for expedited shipping
- $25 per hour if you need an "extensive study" of your account's transaction history.

Ally Bank ranks third in JD Power's 2024 U.S. Direct Banking Satisfaction Survey, behind Charles Schwab Bank and Capital One.

My conclusion for this chapter is analyzing current state and systematic situation of digital banking, focusing on the United States as a case study. Examining successful digital banking systems implemented in the US, analyzing their key features and impact on the banking landscape. The chapter utilized econometric analysis to quantify and track the growth of digital banking users in the US over time. Ally Bank of America serves as a concrete example, showcasing the evolution of its digital banking strategy and the associated user trends. By combining qualitative and quantitative approaches, this chapter aims to provide a comprehensive understanding of the digital banking phenomenon in the US, highlighting both its successes and challenges.

CHAPTER III. THE EXPERIENCE OF WORLD BANKS IN THE DEVELOPMENT OF THE DIGITAL BANKING SYSTEM OF UZBEKISTAN

3.1. Adopted regulatory legal documents on development of digitization and bank innovations in Uzbekistan

According to Global CIO, digitization of Uzbekistan started about 10 years ago. In 2012, the government of the republic approved the "Comprehensive program for the development of the national information and communication system". Implementation of the document is intended for 2013-2020.

According to the Statistics Agency, the number of telecommunications and IT companies has increased by 1.8 times over the last five years. At the beginning of 2023, more than 12 thousand ICT companies are operating in our country. More than 100,000 people are employed in the industry. By the end of 2022, the volume of ICT services increased by 125.5% and amounted to 22.9 trillion soums, of which 4.2 trillion soums are programming services provided by Uzbek companies and specialists. In the first quarter of 2023, the total income of the IT sector of Uzbekistan amounted to 2.38 trillion soums, which is almost four times more than in the same period of 2022. Export of digital services increased to 57.2 million dollars. According to IT Park, the net income was more than 90 percent of the revenue or 2.158 trillion soums.

Table 3.1.1

Early digitalization process of Uzbekistan

Year	Event	Impact
2013	Launch of Unified Interactive State Services Portal	Established a central platform for government services, initiating the digitalization process.
2016	Launch of OneID System on my.gov.uz portal	Enabled user identification and facilitated access to government and commercial services.

Year	Event	Impact
2017	Approval of Action Strategy for five priority areas of development in 2017-2021	Included digitalization as a key focus area, outlining strategic goals for development.
2020	Adoption of "Digital Uzbekistan - 2030" strategy	Established a comprehensive roadmap for digital transformation with over 220 priority projects aimed at improving "Electronic Government" system, developing IT sector, and establishing IT parks.
Recent Developments (2020-2022)	**International Digitalization Ratings**	**Significant improvement in rankings**
2020-Present	GovTech Quality Index	Rose 37 places, joining group "a" of 198 leading countries in terms of digital transformation.
2022	UN e-Government Survey	Rose 18 places, entering the "high/very high level of development" group of countries.
2020-Present	Government Artificial Intelligence Readiness Index	Rose from 158th to 79th place in four years.

Source: Compiled by author based on Internet sources

This table summarizes the key milestones in Uzbekistan's digital transformation journey, highlighting the impactful initiatives and their contribution to the country's rising international rankings in digitalization.

In recent years, important steps have been taken in Uzbekistan to digitize the economy and support banking innovations. This process was supported by the adoption of various legal documents aimed at creating a favorable environment for the development of digital transformation and financial technologies. Below are some key regulations and initiatives:

In the 2020-2025 banking system reform strategy of the Republic of Uzbekistan, signed by our President on May 12, 2020, [12]priority tasks such as creating the necessary conditions for the widespread introduction of modern information and communication technologies and automating business processes have been defined. expansion of commercial banking and remote banking services.

In the process of corporate transformation of commercial banks in the field of introduction of modern information and communication technologies, the following measures are planned:

- expanding the number and scope of remote banking services, including contactless payments;
- widespread use of scoring, remote identification and credit conveyor systems;
- strengthening the information security of bank information and systems;
- wide introduction of new concepts and technologies to the banking sector (fintech, digital banking).

Presidential Decree No. PD-5953, issued on July 29, 2020. "On the Strategy for the Development of the Digital Economy in Uzbekistan in 2020-2030".[13]

.A long-term strategy for the development of the digital economy, which sets clear goals and objectives for digital transformation until 2030, was established. Investments in IT infrastructure, digital literacy programs, and the integration of digital technologies in the banking sector were encouraged.

Law No. ORQ-547 (2019)[14]

[12] Decree of the President of the Republic of Uzbekistan No. PF-5992 of 12.05.2020.https://lex.uz/ru/docs/4811037
[13] https://lex.uz/docs/4486125
[14] https://lex.uz/docs/

"About payments and payment systems". Regulates payment systems, establishes the legal framework for digital payments, e-money and mobile banking. Helped develop a secure and efficient digital payments ecosystem.

Presidential Decree No. PQ-3832 (2018)[15]

"On measures to improve the banking system of the Republic of Uzbekistan" is aimed at modernizing the banking system by introducing advanced technologies and improving the regulatory and legal framework. Encouraged banks to adopt digital banking solutions and enhance technological capabilities.

Presidential Decree No. PD-3709 (2018)[16]

"On additional measures for the transition to the digital economy"

Regulations of the Central Bank on remote banking services. Provides instructions on providing online and mobile banking services. Security and consumer protection has been ensured in digital banking operations.

Regulation of the Central Bank on cyber security in the banking sector. It sets standards for cyber security measures that banks must implement to protect against digital threats. Improved security framework for digital banking transactions.

Law No. ORQ-598 (2020)[17]

"About E-Commerce".[18]Establishes the legal framework for e-commerce that facilitates online transactions and digital payments. It has facilitated the growth of e-commerce and related digital payment systems.

Presidential Decree No. PD-6099 (2020)[19]

"On measures to further develop the national payment system". It is aimed at developing the national payment system, improving digital and contactless

[15] https://lex.uz/docs/
[16] https://lex.uz/docs/
[17] https://lex.uz/docs/4486125
[18] Based on OECD data
[19] https://lex.uz/docs/4486125

payments. The infrastructure for digital banking and payment services has been strengthened.

Presidential Decree No. PQ-4422 (2019)[20]

"On measures for the development of financial technologies and digital financial services". [21]It aims to stimulate the development of financial technologies and digital financial services. The growth of fintech startups and the introduction of innovative financial products were supported.

• President's Resolution No. PF-6093 dated May 18, 2021 "On measures to accelerate the digitization of the economy and social sphere"

• President's Decision No. PF-6183 of November 10, 2021 "On additional measures to accelerate the digitization of the economy and social sphere"

• President's Resolution No. PQ-5023 dated January 28, 2022 "On measures to further increase the financial literacy of the population and develop digital financial services".

• President's Decision No. PQ-5137 of April 14, 2022 "On Measures for the Development of Digital Payments".

• Law of the Republic of Uzbekistan dated May 28, 2021 ORQ-742 "On Digital Banking".[22]

Together, these regulatory documents are aimed at the modernization of the financial sector of Uzbekistan, the development of digital banking and the development of a strong digital economy. They cover various aspects, from creating legal frameworks for digital payments and cyber security to encouraging fintech [23]innovation and improving IT infrastructure. Through these efforts, Uzbekistan is

[20] https://lex.uz/docs
[21] https://lex.uz/docs
[22] https://lex.uz/docs

making significant progress in integrating digital technologies into its economy and banking sector.

3.2. Analysis of case studies of banks that have successfully implemented digital innovations in Uzbekistan .

While the Uzbek banking sector has traditionally been dominated by traditional, branch-based models, recent years have seen a surge in digital transformation efforts. The increasing adoption of smartphones and internet access among the Uzbek population has fueled demand for digital banking services.The Uzbek government has actively promoted digital financial inclusion and supported initiatives for a cashless society, fostering a favorable environment for digital banking innovation. The emergence of new fintech players and the growing popularity of digital payment platforms have created competitive pressure on traditional banks to innovate and adapt.

Today, 22 million people in Uzbekistan use remote banking services, which is more than half of the country's population. With the adoption of the Law of the Republic of Uzbekistan "On Payments and Payment Systems", [24]the service infrastructure of payment system operators operating in our country has increased dramatically. [25]In addition, 28 payment organizations specializing in providing digital financial services were registered. In order to develop contactless payments, the HUMO retail payment system was created, which fully meets international standards, and this, in turn, created a competitive environment in the field of bank cards. The share of online payments in the country is growing really fast - in 2022 alone, twice as much money was transferred through payment services as compared to a year ago.

Uzbekistan is gradually moving to the online banking system. After signing the Decree of the President of the Republic of Uzbekistan "On measures to

[24] The President of the Republic of Uzbekistan, Shavkat Mirziyoyev, signed, on 1 November 2019, the Law of the Republic of Uzbekistan No. ZRU-578 of 1 November 2019 on Payments and Payment Systems ('the Law'). https://lex.uz/uz/docs/5527922

fundamentally improve the activities of the Central Bank of the Republic of Uzbekistan", the establishment of "digital" banks and banking units specializing in retail banking services in the banking system and customer service using innovative banking technologies tasked with further expanding the display quality.

Accordingly, "Anorbank" and "TBC bank" were registered as digital banks for the first time in Uzbekistan in 2020.

Also, the number of technological start-ups and IT companies that contribute to the growth of the digital economy in Uzbekistan is increasing. In order to develop the IT sector, separate institutes and directions focused on this sector have been opened. the number of students studying in the field of IT has exceeded 6000. Banks are one of the main sectors in the digitization of the economy. In the early 2000s, the first online banking system was launched in Uzbekistan as part of large-scale efforts for financial modernization. and until now this system is developing. Uzbekistan's online banking system works like other countries. Especially the Covid-19 pandemic has made a great contribution to the development of remote banking services.

As of December 1, 2021, the number of users of remote banking services has exceeded 20 million. The number of ATMs in the republic increased by 10% compared to the level of 2020. [26]In 2021, 12,814 ATMs will be installed in our country. In addition, there are more than 26.5 million bank cards in circulation, which is 500,000 more than last year. Uzbekistan started to develop digital banking in 2018. The goal is to make all banking services remote - both entrepreneurs and residents should be able to receive them by phone or the Internet. The COVID-19 pandemic has significantly accelerated the shift to remote banking. In 2020, the number of ATMs increased by 33%, and the number of bank cards increased by

[26]Number of ATMs in Uzbekistan increased by 10%23.12.2021
https://kun.uz/en/news/2021/12/23/number-of-atms-in-uzbekistan-increased-by-10#:~:text=As%20of%20December%201%2C%202021%2C,December%201%20of%20last%20year

27%. In addition, fully digital banks (TBC UZ, Anorbank) have appeared, and traditional banks have expanded their online service offerings. In October 2021, the Central Bank allowed banks to identify customers remotely. This allowed customers to use remote services even in previously unserved banks.

Let's see what conveniences this system brings to the population:

• remote access to clients' accounts;

• able to manage their funds at home or on the road through their smartphones;

• remote money transfers;

• get an online loan;

• Enables enhanced security features such as transaction alerts for added peace of mind.

The commercial bank "Anor Bank" in Uzbekistan is actively applying digital transformation with the aim of becoming a leading player in the developing digital economy of the country. Although specific details about their internal systems and technologies are not publicly available, we can analyze their publicly announced initiatives and general trends in Uzbek digital banking to provide insights for your thesis:

Anor Bank's digital strategy is likely to focus on improving customer experience, expanding reach and improving operational efficiency. They can invest in a robust online and mobile banking platform that offers features such as account management, mobile payments, bill payments and potentially personalized financial services such as loan applications or investment recommendations. Their online platform likely includes security features such as advanced encryption and multi-factor authentication to protect customer data.

The bank uses data analytics to tailor customer behavior and services, offers 24/7 customer support across multiple channels, and is exploring AI-powered

chatbots for faster and more efficient support can be Their digital strategy is likely to emphasize reaching the underserved population by providing affordable and convenient financial services through digital channels.

General trends in Uzbek digital banking show increasing attention to:

Central Bank Initiatives: The Central Bank of Uzbekistan is actively promoting digitization in the banking sector, encouraging banks to adopt new technologies, develop innovative financial products, and increase financial inclusion.

Mobile payment systems: Mobile payment systems such as Click, Payme and UZCARD are becoming increasingly popular in Uzbekistan, providing consumers with convenient and convenient ways to make payments and transfer money.

Growth of e-commerce: The growth of e-commerce in Uzbekistan is increasing the demand for online payment solutions, creating opportunities for banks to integrate with e-commerce platforms and ensure secure payment processing.

Fintech Innovation: Uzbek fintech startups are emerging, developing innovative financial solutions for specific needs such as microcredit, insurance and wealth management, and developing cooperation between banks and fintech companies.

Table 3.2.1

Anorbank Mobile App Features & Results

Feature	Description
i. Easy registration with Face ID via NFC	Streamlined account setup using facial recognition and Near Field Communication
ii. Convenient interface	User-friendly and intuitive design for easy navigation
iii. Smart transfer	Automated and simplified money transfers

Feature	Description
iv. Ordering and delivery of cards	Easy card ordering and delivery
v. Currency exchange operations	Convenient foreign exchange transactions
vi. Payments for services	Effortless payment for various services
vii. Processing loans	Convenient loan application and management
viii. Opening and managing deposits	Easy access to deposit accounts
ix. Manage security through Life ID	Enhanced security through biometric identification
x. Block cards	Immediate card blocking for security
xi. Transfers between accounts and cards	Seamless transfers between accounts and cards
xii. Information and statements on cards and account numbers	Easy access to account information and statements
xiii. Car payments	Simplified car loan payments

Source: compiled by author based on Anorbank official site

More than 200 organizations transferred their monthly salaries with a total of 20 billion soums through Anorbank and achieved several other achievements. Thus, to date, almost all banks in our country provide remote services through the mobile banking system. In the table below, Uzbekistan the number of users of remote service banks is given.

Table 3.2.2

From systems providing remote banking services number of users as of November 1, 2023.

№	Bank	Legal entities and individual entrepreneurs	Individuals	Overall
1	Milliy bank	97 296	1 614 472	1 711 768
2	O‘zbekiston sanoat-qurilish banki	72 183	5 993 998	6 066 181
3	Agrobank	197 533	5 378 755	5 576 288
4	Ipoteka-bank	164 079	2 793 710	2 957 789

5	Mikrokreditbank	69 436	980 080	1 049 516
6	Xalq banki	117 911	3 904 633	4 022 544
7	Garant bank	6 853	93 383	100 236
8	Biznesni rivojlantirish banki	29 407	256 665	286 072
9	Turonbank	47 590	456 346	503 936
10	Hamkorbank	123 737	1 551 297	1 675 034
11	Asaka bank	36 586	906 140	942 726
12	Ipak Yo‘li banki	60 119	2 126 982	2 187 101
13	Ziraat bank Uzbekistan	4 370	55 051	59 421
14	Trastbank	48 039	146 376	194 415
15	Aloqabank	62 638	1 481 822	1 544 460
16	KDB Bank O‘zbekiston	16 406	27 869	44 275
17	Soderot bank Toshkent	357	2 400	2 757
18	Universal bank	11 961	142 644	154 605
19	Kapitalbank	35 391	1 212 057	1 247 448
20	Octobank	2 714	66 217	68 931
21	Davr-bank	26 088	193 682	219 770
22	Invest Finance bank	17 731	386 832	404 563
23	Asia Alliance bank	20 025	627 921	647 946
24	Orient Finans bank	29 552	521 333	550 885
25	Madad Invest bank	1 104	2 611	3 715
26	AVO bank	109	405	514
27	Poytaxt bank	1 090	10 491	11 581
28	Tenge bank	2 221	629 822	632 043
29	TBC bank	0	1 721 587	1 721 587
30	ANOR bank	23 230	3 524 261	3 547 491
31	UZUM bank	0	1 440 000	1 440 000
Overall		**1 325 756**	**38 249 842**	**39 575 598**

Source: Compiled by the author based on Central Bank data .https://cbu.uz/uz/statistics/paysistem/1512282/

From this data we can see that the total number of users of remote services is 39,575,598, of which 1,325,756 are legal entities, and 38,249,842 are individuals. Industrial

Construction Bank of Uzbekistan provides the most remote services. we can see that it is the leading bank. AVO bank has the lowest index with 514 clients.

3.3. The Future of Digital Banking in Uzbekistan: Lessons from the US and adoption in Uzbekistan's bank sphere.

The rapid evolution of the global financial landscape has seen the rise of online banking, which has revolutionized the way individuals and businesses interact with financial institutions. Although the United States is a pioneer in this field and has developed complex digital banking systems, the question arises: can these models be effectively applied to other countries, especially a developing country like Uzbekistan?

This section will examine the possibilities and problems of adapting the US online banking structure to the specific conditions of Uzbekistan. It explores the benefits, pitfalls, and necessary adjustments for successful implementation, contributing to a broader understanding of the intersection of technology, regulation, and cultural context in shaping the nation's financial landscape.

Uzbekistan has made significant strides in digital banking, becoming a leader in the Central Asian region. The widespread adoption of mobile banking, coupled with the government's push for digitalization, has created a conducive environment for innovation.

Positive Aspects:

- Mobile banking is widely used, with a majority of the population owning smartphones.
- Start-ups and established institutions are offering innovative financial services, particularly in microfinance and payment solutions.
- Regulatory reforms and initiatives are promoting digital financial inclusion.

Areas for Further Development:

- While mobile penetration is high, financial literacy remains a challenge, hindering full adoption of digital banking services.
- Fragmented systems and lack of standardized APIs hinder seamless data exchange and cross-border transactions.
- As reliance on digital banking grows, robust cybersecurity measures are crucial to protect against fraud and data breaches.
- While urban areas see rapid digitalization, rural communities often lack reliable internet connectivity and financial infrastructure.

Table 3.3.1.

SWOT Analysis of Uzbekistan's Digital Banking System

Category	Factors
Strengths	* Government Support for Digital Finance * Growing Digital Literacy * Young and Tech-Savvy Population * Potential for Innovation * Emerging Fintech Landscape
Weaknesses	* Limited Infrastructure (Internet Access) * Cybersecurity Concerns * Lack of Trust in Digital Banking * Limited Financial Literacy * Outdated Technology in Some Institutions
Opportunities	* Expanding Financial Inclusion * Developing New Digital Products & Services * Partnerships with Fintech Companies * Improved Efficiency & Cost-Effectiveness * Data Analytics and Personalized Services
Threats	* Economic Volatility * Regulatory Uncertainty * Competition from International Players * Cybersecurity Attacks * Dependence on Technology

Source: Compiled by author based on information

US online banking model: main features and benefits

The US online banking model is characterized by a focus on customer experience, technological innovation and product diversification. Famous examples like Ally Bank show the strengths of this approach. Branchless banking reduces additional costs, provides competitive prices and high interest rates, which is an important advantage in a developing economy like Uzbekistan. These institutions prioritize user-friendly interfaces, 24/7 accessibility and personalized financial services that appeal to younger generations accustomed to digital convenience. The US model also demonstrates the power of technology, using AI-powered chatbots, data analytics and mobile-first design to streamline operations, personalize services and improve customer satisfaction. This approach to banking can contribute to financial inclusion by making financial services accessible to a wider range of individuals and communities.

Adaptation of US digital banking structure to the Uzbek context: opportunities and problems

While the US model offers valuable lessons, applying it to Uzbekistan requires careful consideration of the country's unique environment and existing infrastructure. **Important challenges include**:

Road map for Uzbekistan

To overcome these difficulties and successfully implement the US online banking model in Uzbekistan, a clearly defined approach is necessary:

Start with pilot programs targeting specific populations or geographic areas to assess opportunities and gather valuable data. This iterative approach allows for adaptation and improvement based on user feedback and market conditions.

Develop products and services specifically designed to meet the unique needs and preferences of Uzbek customers. Understanding local financial behavior and tailoring solutions accordingly is critical.

Partnerships and Collaboration: Leveraging the expertise of Fintech companies and other stakeholders is key. Partnerships can facilitate technology integration, improve payment system interoperability, and improve customer experience.

America's banks are at the forefront of implementing innovative technologies to improve customer experience, improve efficiency and increase financial inclusion. While some technologies may not be directly transferable to Uzbekistan due to infrastructure or regulatory differences, others have great potential for adaptation. Below, get acquainted with the main technologies and their possible application in Uzbekistan:

Artificial Intelligence (AI) and Machine Learning: In the US, AI-powered chatbots are revolutionizing customer support, handling routine queries and solving problems quickly. Machine learning algorithms are used for fraud detection, credit scoring and personalized financial recommendations. Artificial intelligence chatbots in Uzbekistan can provide 24/7 support in Uzbek, Russian and English languages, which can answer various queries. Machine learning can be used to develop more accurate credit scoring models, improving access to credit for individuals and businesses.

Biometric Authentication: Facial recognition, fingerprint scanning, and voice authentication are used in the U.S. for secure access and transaction authorization, increasing security and convenience. In Uzbekistan, biometric authentication improves security and prevents fraud in digital banking. However, privacy and data security issues must be carefully considered.

Open Banking: US open banking regulations allow customers to share their financial information with third-party applications, fostering a more interconnected and personalized financial ecosystem. Introducing open banking regulations in Uzbekistan can stimulate innovation by allowing fintech companies to develop new financial services and expand consumer and business opportunities.

Blockchain technology: The US is exploring blockchain for secure and transparent cross-border payments, digital identity management and supply chain financing. In Uzbekistan, blockchain can improve the efficiency and security of cross-border payments, especially for its growing trade ties. It can also facilitate the secure operation of digital identity systems and simplify financial transactions.

Cloud computing: Cloud-based platforms allow American banks to operate more flexibly, expand services and reduce infrastructure costs. In Uzbekistan, cloud computing is crucial for banks, allowing them access to advanced technologies and infrastructure without significant investment.

Mobile-First Banking: Mobile apps are the primary interface for many American banks, offering a range of features from account management to payments. The mobile-first approach is especially relevant in Uzbekistan, where smartphones are widespread. Developing user-friendly mobile banking apps with intuitive features can significantly improve customer experience.

Data analytics: Banks of America use data analytics to understand customer behavior, predict financial needs, and develop personalized product offerings. In Uzbekistan, data analytics can help banks tailor products and services to specific customer segments, increase financial inclusion, and improve customer satisfaction.

Although these technologies have great potential, it is important to consider the unique context of Uzbekistan. Regulatory, infrastructure, and cultural factors must be carefully considered when adapting these technologies. A successful transition to a digital banking ecosystem requires a phased approach, starting with pilot projects and phased implementation.

The introduction of digital banking in Uzbekistan creates unique opportunities and challenges that require a thorough understanding of the country's unique context. While digital banking holds great promise for increasing financial inclusion, improving efficiency and improving customer experience, a number of challenges need to be addressed for its successful implementation and widespread adoption.

One of the main challenges is underdeveloped internet infrastructure, which hinders seamless adoption of digital banking services, especially in rural areas. Patchy Internet access and unreliable connections are a serious obstacle for those outside major urban centers. In addition, a significant portion of the population lacks the necessary digital literacy skills to effectively use online banking platforms. This knowledge gap not only limits access, but also creates vulnerabilities against online fraud.

Building trust in digital banking systems is another way. Many potential users have concerns about data privacy and security, particularly when it comes to online transactions. Strong regulatory frameworks, robust cybersecurity measures, and transparent communication about data protection practices are critical to building trust and encouraging broad adoption.

The regulatory environment for online banking in Uzbekistan is still being developed. Clear regulations on **data privacy, cybersecurity, consumer protection** and licensing for digital financial service providers are essential to create a stable and trustworthy environment that attracts investment and encourages innovation.

Another challenge is the integration of existing payment systems with online banking platforms. Ensuring seamless interoperability between different payment systems is critical to a seamless user experience and encourages wider adoption.

Bridging the digital divide and providing financial services to disadvantaged populations, especially in rural areas, requires targeted initiatives and tailored solutions. Digital banking solutions must be designed to meet the unique needs of these communities, taking into account factors such as technology access, literacy levels, and cultural preferences.

Ways of overcoming Digital Banking Barriers in Uzbekistan:

1. Closing the digital divide:

Expanding Internet Access: Invest in fiber optic expansion to connect rural communities, encourage partnerships with telecommunications companies, and support community-driven Internet initiatives.

Making data accessible: Offer affordable data plans tailored for digital banking users to reduce cost barriers.

2. Strengthen digital literacy:

Nationwide Training: Implement free or subsidized training programs for basic computer skills, online security and digital banking with a focus on rural areas.

Collaborating with education: Integrating digital literacy into school curricula and offering training in community centers.

User-friendly platforms: Develop intuitive online banking interfaces with clear instructions and language options.

Dedicated support: Offer personalized customer service channels to help users.

3. Building trust and confidence:

Strong privacy policies: Implement strong policies that protect user data and ensure transparency in data collection and use.

Invest in security: Use advanced cybersecurity measures such as multi-factor authentication, encryption and fraud detection.

Open communication: Clearly communicate data protection policies and security practices to build trust.

Collaborative Initiatives: Work with NGOs and consumer groups to address user concerns and develop confidence-building programs.

4. Regulation of the regulatory landscape:

Clear Regulations: Developing comprehensive regulations for online banking, including data privacy, cyber security, consumer protection and licensing.

Encourage innovation: Create a regulatory testing environment to experiment with new digital banking products.

Promoting Financial Inclusion: Developing policies that make financial services accessible to underserved populations.

5. Creating a seamless payment ecosystem:

Interoperability standards: establishing standards for seamless integration of payment systems and online banking platforms.

Single Payment Gateways: Development of a national payment gateway connecting all major payment systems.

Encouraging collaboration: fostering collaboration between financial institutions, payment providers and technology companies.

6. Reaching Out to Underserved Communities:

Tailored solutions: Developing digital banking solutions tailored to the needs of rural communities, taking into account their unique circumstances.

Local Partnerships: Partner with NGOs, community groups, and microfinance institutions to provide outreach and financial education to underserved populations.

Mobile-first approach: Use mobile technology to offer convenient and convenient banking services.

Financial Literacy Programs: Implementation of programs to empower individuals in rural areas to effectively access digital banking tools.

By implementing these solutions, Uzbekistan can bridge the digital divide, strengthen trust in online banking, and create an environment that supports financial inclusion and empowers citizens to participate in the digital economy.

Despite these challenges, the future of digital banking in Uzbekistan holds great promise. The government recognizes the importance of digitization and has launched various initiatives to improve digital infrastructure and promote financial inclusion. Continued investment in infrastructure development, digital literacy programs and regulatory frameworks will be critical to developing a vibrant digital banking ecosystem.

The emergence of Uzbek fintech startups that develop innovative financial solutions tailored to specific needs is adding more dynamism to the sector. Cooperation between banks and fintech companies can accelerate the adoption of innovative technologies and solve specific problems faced by the banking sector.

It is important to inform the public about the benefits, security features and ease of use of digital banking. Raising awareness about the benefits of online banking will help dispel existing misconceptions and encourage wider adoption.

A hybrid approach combining digital channels with traditional banking services may be a pragmatic short-term strategy. This allows banks to reach a wider customer base while simultaneously investing in and developing their digital capabilities.

In general, the future of digital banking in Uzbekistan depends on government support, private sector innovation and public awareness. By addressing the challenges and opportunities presented by digitization, Uzbekistan can create a more inclusive, efficient and technologically advanced financial sector that benefits its citizens and contributes to the country's economic development.

According to forecasts, by 2024, the net interest income in this market will be USD 101.70 million.Going forward, net interest income is expected to continue to expand at a compound annual growth rate (CAGR 2024-2029) of 10.64%.This growth trajectory is expected to lead to a market size of USD 168.60 million by 2029.Comparing the global landscape, it is notable that China has the highest net interest income.Net interest income in China alone is expected to reach $463.0

billion in 2024. Uzbekistan's digital banking sector is experiencing rapid growth. a young tech-savvy population and government support for digitization initiatives.[27]

Conclusion on Chapter III. In this chapter, the writer examined the global landscape of digital banking innovation and explores its applicability to Uzbekistan. She analyzed case studies of banks that have successfully implemented digital innovations, drawing lessons from international best practices. The chapter then delved into the potential of adapting the US online banking structure to the specific context of Uzbekistan, considering its feasibility and challenges. Finally, it discussed the future prospects and problems of digital banking in Uzbekistan, identifying opportunities for development and growth while acknowledging the hurdles that need to be addressed. This chapter provided a comprehensive analysis of the current state and future potential of digital banking in Uzbekistan, drawing upon international experience and offering valuable insights for policymakers, financial institutions, and stakeholders. To sum up, the difference between the type of remote service of Uzbek and US banks is quite big. The USA, China, Denmark, the Netherlands, and Sweden have the highest indicators among the countries that are transitioning to digitization conditions, unfortunately, Uzbekistan showed a very low indicator. Remote services of American banks are used all over the world. This country has fully transitioned to a digital economy, and its residents are fully using remote services. In Uzbekistan, this system is being implemented slowly. However, our President Sh. M. Mirziyoyev is paying great attention to the digitization of this digital economy and banking sectors.

[27] https://www.statista.com/outlook/fmo/banking/worldwide

CONCLUSION

The digital revolution has profoundly impacted every facet of human life, and the financial services industry is no exception. Banking, once rooted in brick-and-mortar institutions and manual processes, is undergoing a rapid transformation driven by technological innovation. This monograph explores the dynamic landscape of banking innovation within the digital economy, examining both the theoretical framework and practical application through the lens of two distinct cases: the United States and Uzbekistan.

The journey reveals the complexities of navigating this evolving frontier, where technological advancements, regulatory frameworks, and cultural nuances intertwine to shape the future of financial services. The United States, with its mature digital banking ecosystem, offers valuable insights into the successful integration of technology within a favorable regulatory environment and a digitally-savvy consumer base. Conversely, Uzbekistan presents a unique case study, illustrating the challenges and opportunities of embracing digitization within a developing economy. This comparative approach allows for a deeper understanding of the factors that influence banking innovation, highlighting both the successes and challenges faced in different contexts.

In the United States, a robust digital banking ecosystem has emerged, fueled by a combination of technological prowess, a favorable regulatory environment, and a consumer base that readily embraces digital solutions. A US case study demonstrates how innovations such as artificial intelligence, open banking, and mobile-first banking have transformed the customer experience, improved efficiency, and encouraged financial inclusion. Artificial intelligence has enabled personalized financial advice, chatbots for customer support, sophisticated fraud detection systems, and robust risk assessment tools. Open banking has facilitated seamless integration with third-party applications, granting customers greater

control over their financial data. Mobile-first banking has revolutionized access to financial services, making them accessible anytime, anywhere.

Uzbekistan, while actively embracing digitization, faces significant challenges in its transition to a digital banking landscape. Infrastructure limitations, including limited internet access and unreliable connectivity, hinder progress. Digital literacy gaps pose another barrier, as a significant portion of the population lacks the necessary skills to utilize digital banking services. The evolving regulatory environment also presents challenges for fintech companies and traditional banks seeking to innovate. Despite these obstacles, Uzbekistan holds immense potential. Its young and digitally engaged population creates a strong demand for digital financial services. Government initiatives aimed at supporting digital transformation, including the development of a national digital identity system, are fostering a conducive environment for innovation. A growing fintech ecosystem is emerging, with startups developing innovative solutions for financial services.

This comparative analysis highlights several key insights:

Successful innovation in the banking sector requires a deep understanding of market needs, adaptation to changing consumer behavior, and the building of trust through responsible practices. Simply adopting new technologies is not enough; financial institutions must understand their customers' needs and concerns and tailor their offerings accordingly.

Digital banking solutions must be tailored to the specific context of each country. Cultural preferences, regulatory landscapes, and infrastructure realities all play a vital role in determining the success of any digital banking initiative. A one-size-fits-all approach is unlikely to succeed.

Developing a thriving digital banking ecosystem often requires collaboration between banks, fintech companies, regulators, and other stakeholders. This

collaborative approach encourages innovation, promotes financial inclusion, and ensures the responsible development of digital financial services.

This monograph underscores the importance of embracing innovation in navigating the complexities of the digital economy. It emphasizes the need for a holistic approach that considers not only technological advancements but also the regulatory framework, cultural factors, and the imperative for promoting financial inclusion. As the digital landscape continues to evolve, insights from this benchmarking study can help policymakers, financial institutions, and technology innovators shape a more equitable, efficient, and accessible financial future.

The bank's innovation journey is far from over, and its success will depend on a continued commitment to understanding consumer needs, embracing responsible innovation, and adapting to the ever-changing landscape of the digital economy. This monograph provides a starting point for understanding banking innovation in the context of the United States and Uzbekistan, and serves as a foundation for further research and exploration of the dynamic world of digital finance. The future of banking is undoubtedly digital, and the journey of innovation continues.

Recommendations with mechanism of realization:

1. Closing the digital divide:

Expanding Internet Access: Invest in fiber optic expansion to connect rural communities, encourage partnerships with telecommunications companies, and support community-driven Internet initiatives.

Making data accessible: Offer affordable data plans tailored for digital banking users to reduce cost barriers.

2. Strengthen digital literacy:

Nationwide Training: Implement free or subsidized training programs for basic computer skills, online security and digital banking with a focus on rural areas.

Collaborating with education: Integrating digital literacy into school curricula and offering training in community centers.

User-friendly platforms: Develop intuitive online banking interfaces with clear instructions and language options.

Dedicated support: Offer personalized customer service channels to help users.

3. Building trust and confidence:

Strong privacy policies: Implement strong policies that protect user data and ensure transparency in data collection and use.

Invest in security: Use advanced cybersecurity measures such as multi-factor authentication, encryption and fraud detection.

Open communication: Clearly communicate data protection policies and security practices to build trust.

Collaborative Initiatives: Work with NGOs and consumer groups to address user concerns and develop confidence-building programs.

4. Regulation of the regulatory landscape:

Clear Regulations: Developing comprehensive regulations for online banking, including data privacy, cyber security, consumer protection and licensing.

Encourage innovation: Create a regulatory testing environment to experiment with new digital banking products.

Promoting Financial Inclusion: Developing policies that make financial services accessible to underserved populations.

5. Creating a seamless payment ecosystem:

Interoperability standards: establishing standards for seamless integration of payment systems and online banking platforms.

Single Payment Gateways: Development of a national payment gateway connecting all major payment systems.

Encouraging collaboration: fostering collaboration between financial institutions, payment providers and technology companies.

6. Reaching Out to Underserved Communities:

Tailored solutions: Developing digital banking solutions tailored to the needs of rural communities, taking into account their unique circumstances.

Local Partnerships: Partner with NGOs, community groups, and microfinance institutions to provide outreach and financial education to underserved populations.

Mobile-first approach: Use mobile technology to offer convenient and convenient banking services.

Financial Literacy Programs: Implementation of programs to empower individuals in rural areas to effectively access digital banking tools.

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