

Digital Banking. Information Technologies in the Banking System

Mirzoyan Lilit G.

PhD Student at the Chair of Managerial Accounting and Audit
at Armenian State University of Economics (Yerevan, RA)

lilit_mirzoyan_1997@mail.ru

UDC: 004:336.71; EDN: NJGGSM

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Թվային բանկինգ. Տեղեկատվական տեխնոլոգիաները բանկային համակարգում

Միրզոյան Լիլիթ Գ.

Հայաստանի պետական տնտեսագիտական համալսարանի
կառավարչական հաշվառման և աուդիտի ամբիոնի ասպիրանտ (Երևան, ՀՀ)

lilit_mirzoyan_1997@mail.ru

Ամփոփագիր. Նորարարությունների դարաշրջանում բոլոր չափերի և ձևերի բանկերի համար առաջնային հրամայականն է հասկանալ խոշոր տեխնոլոգիական ներխուժման «սպառնալիքը», իրականացնել սեփական հնարավորությունների և շուկայի ուժեղ կողմերի օբյեկտիվ գնահատում, ինչպես նաև ցանկացած տեխնոլոգիական նորարարությանը արագ արձագանքման պլան մշակել, եթե ցանկանում են պահպանել իրենց դիրքերը ֆինանսական ծառայությունների ոլորտում: Պատահական չէ, որ ավանդական բանկային համակարգին անհանգստանում են առկա տեխնիկական սահմանափակումները: Սրա մասին է վկայում այն հանգամանքը, որ 2019-2021 թվականներին այդ բանկերի շուրջ 65%-ը վերանայել և շարունակում է վերանայել գործող հիմնական բանկային հարթակները: Հիմք ընդունելով այս ամենը և հաշվի առնելով բանկային ոլորտում օրեցօր սրվող մրցակցությունը՝ «թվային բանկինգը» լավագույնն է, որ կարող էր պատահել մարդկության հետ: Տեղեկատվական տեխնոլոգիաների ակտիվ կիրառումը բանկային ծառայությունների մատուցման գործընթացը ոչ միայն հարմարավետ է դարձրել, այլև թույլ է տվել հոգալ շրջակա միջավայրի մասին: Թվային բանկային հեղափոխությունը խորապիսիվ հայացք է այն բանի, թե ինչպես է ֆինանսական և տեղեկատվական տեխնոլոգիաների կիրառումը հանգեցրել բանկային համակարգի ողջունելի փոփոխությունների՝ ճկունություն բերելով ֆինանսական ոլորտին: **Հանգուցաբառեր՝** թվային բանկ, տեղեկատվական և ֆինանսական տեխնոլոգիաներ, նեո բանկեր, բոթ ռիսկեր, ֆինանսական էկոհամակարգ, «Y» սերունդ, բետա բանկեր

Цифровой банк. Информационные технологии в банковской системе

Мирзоян Лилит Г.

Аспирант кафедры управленческого учёта и аудита
Армянского государственного экономического университета (Ереван, РА)

lilit_mirzoyan_1997@mail.ru

Аннотация. В век инноваций для банков любого размера первичным императивом является понимание «угрозы» крупного технологического вторжения, построение объективной оценки своих возможностей, сильных сторон рынка и разработка плана быстрого реагирования на любые технологические инновации, если они хотят сохранить их положение в секторе финансовых услуг. Не случайно традиционная банковская система обеспокоена существующими техническими ограничениями. Об этом свидетельствует тот факт, что в 2019-2021 годах около 65% этих банков будут пересматривать и продолжают пересматривать существующие основные банковские платформы. Исходя из всего этого, учитывая возрастающую конкуренцию в банковской сфере, «цифровой банк» - это лучшее, что могло произойти с человечеством. Активное использование ИТ не только сделало процесс предоставления банковских услуг более удобным, но и позволило позаботиться об окружающей среде. Последние быстрее обслуживают своих клиентов с помощью современных технологических новинок, так как они более эффективны.

Ключевые слова: цифровой банк, информационные и финансовые технологии, нео банки, бот риски, финансовая экосистема, поколение Y, бета банки

There is a legendary proverb that emphasizes that a journey of a thousand miles begins with a single step [3, p. 35]. In this case, the first step is highlighting the concept of digital banking by introducing the idea of chatbots or bots.

Digital banking has been defined as: the application of technology to every banking activity, process and program - thereby making the customer's experience simple, easy and convenient

and in the process eliminating the need to be at a physical location [12].

A bot is a computer program that interacts with users employing artificial intelligence (AI) “via normal sounding conversations with the objective of answering questions and providing recommendations”. With this state-of-the-art technology, software developers create innovative systems that simulate human conversations to make users believe that they are talking to actual humans [2, p. 57].

To understand this concept, it is helpful to focus on the idea of digital banking and its categories, the advantages of digital banking, using bots in the banking industry, the reasons for implementing bots in digital banks, the concept of bot risk, and bot examples in the digital banking sector.

The COVID-19 pandemic has increased the urgency around digital banking transformation in financial services. The mission of digital banking

transformation is not easy. However, it provides immense opportunities for increased internal efficiencies and improved marketplace competitiveness – as both fintech organizations and big tech players continue to encroach on traditional banking strongholds. The challenge is that the process of digital banking transformation touches many areas of the organization, requiring prioritization of investments. The process also requires ongoing engagement and potential reorganization, because there is not a static endpoint.

Digital Banking Report revealed an overarching awareness and enthusiasm around the process of digital banking transformation. 75% of organizations worldwide cite it as a top three priority for 2020 and into 2021. This was followed by “improving the customer experience” (51% mentioned as a top three priority) and “cost management” (47%).

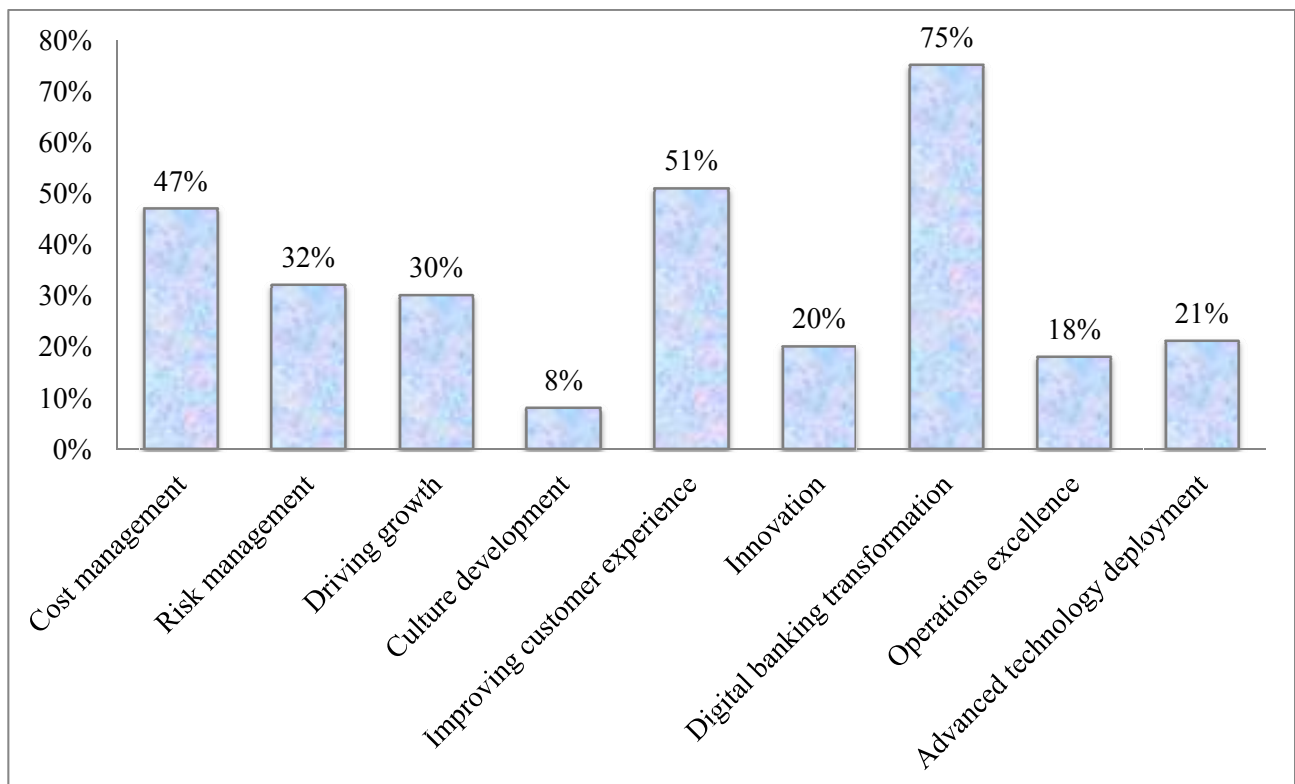


Figure 1. *Top banking priorities (2020-2021) [14]*

On the surface these top priorities appear to be aligned with future banking needs. However, there still are several disconnects within the priority ranking, since three of the lowest priorities mentioned are instrumental to achieving digital transformation success. Only 21% of the respondents cited “deploying advanced technology” as a priority, with “operational excellence” (20% mention) and “culture development” (8% mention) rounding

out the bottom three priorities. The lack of focus on technology, operations and culture will ultimately derail most digital banking transformation efforts.

The term “digital bank” is a polysemy concept (i.e., with multiple coexistence meanings and definitions), and there are several types of digital banks. Consequently, the innovation of digital banks and the different types offered gives customers many advantages.

Digital banks can be classified into four categories.



Figure 2. Four categories of digital banks

1. **New banks:** These are full-service digital banks with banking licenses. Examples of these banks are: Revolut (England), Monzo (England), N26 (Germany), Starling Bank (England). It is estimated that there are 100 new banks in operation globally today.
2. **Neo banks:** These are financial service providers without banking licenses that have partnered with conventional, brick-and-mortar banks⁶ to render online banking services. Neo banks' customers are required to have accounts opened with the corresponding conventional bank to access digital-banking services. A global report on neobanks from Business Insider Intelligence estimates that there were 39 million neobank users as of the end of 2019. Examples of neo banks are: Moven (USA), WeBank (Italy), Lunarway (Denmark), Yolt (The Netherlands).
3. **Beta banks:** These are subsidiaries or joint ventures of conventional banks, providing online banking services through their parent companies' banking licenses. Examples of beta banks include: Simple (a partnership between BBVA and Bancorp), AiBank (a joint venture between Baidu and China's CITIC Bank Corporation).
4. **Nonbanks:** These are organizations that have no business relationship with conventional banks or banking licenses to regulate and support them. Nevertheless, they provide digital banking services to customers. An example of a nonbank is Monese, which is a company operating under an electronic money license.

Advantages of Digital Banking

By removing the need to visit a bank's physical location, digital banks drive financial customers to the Internet. This advantage is one of the main innovations of digital banking. Additional advantages of digital banking⁷ under the umbrella of financial technology (fintech) include [11].

- Around-the-clock banking hours: With fintech, customers have online access to their accounts 24 hours a day, seven days a week, 365 days a year. They no longer need

to stand in lines to conduct banking transactions. This capability creates an improved service experience for customers.

- Reduced operating costs: The digitalization, automation and streamlining of internal processes in the banking sector result in a significant reduction of banking operating costs. This is the key component of digital banking: generating added value for financial customers in terms of achieving lower administrative fees and creating innovative financial services using fintech.
- Rapid, attractive and simple onboarding processe: Opening an account and conducting day-to-day transactions with digital banks are relatively easy. Using a computer or mobile device, customers can upload scanned copies of required legal documents such as passports, driver's licenses, employment letters and any other documentation required to open a digital banking account. In addition, they can use AI via interactions with conversational bots to guide them through the entire process.

Safety of digital banking

There are some people out there who are still suspicious of the safety of digital-only banks, lamenting the loss of physical bank branches and questioning the digitization of such important financial services.

However, the reality could not be more different. Digital banks have always made security one of their main priorities and as such, have adopted much more innovative and technologically secure protocols than many traditional banks.

The most high tech methods of in-app and payment authentication are often sought after by digital banks and they provide them to customers via partners such as Veriff. This includes practices such as:

- identity verification,
- facial recognition,
- fingerprint scanning,
- voice recognition.

When it comes to regulatory banking bodies, most digital banks are usually covered by the Financial Conduct Authority (FCA) and/or the

Financial Services Compensation Scheme (FSCS), which adds another level of security, bringing added peace of mind to already happy customers [16].

Using Bots in the Banking Industry

When clients have banking queries related to their personal or business accounts at conventional banks, they typically have to go into the bank or call the bank's customer support center. This scenario can be very time consuming, especially if it is necessary every time a question arises.⁸ A faster, more efficient way to address these situations is to interact with banking bots. When using banking bots, customers can directly chat with the bots and quickly get the answers to their questions.

According to Y Media Labs, there are six motives for banks to implement bots [13].

1. Automated fraud-prevention processes and procedures: Fraud prevention is a critical success factor (CSF) for any bank's operational strategy. Bots substantially contribute to automating fraud prevention processes and procedures.
2. 24/7 customer service: Once bots are set up, they can operate without any human interference. Therefore, they become the new ongoing automated tool for customer service at the bank.
3. Relevant content pushed to end users and tested user engagement: Bots can become competitive business weapons because they are able to push strategic information to particular and defined users to propel engagement with the banking brand in terms of innovative solutions. Likewise, bots can test the interest level of new business models, applications, processes, products and services.
4. Brand consistency: A noteworthy attribute of bots is the adoption of "one-three-imageprojections approach" (one voice, one message and one tone). Bots are able to ensure homogeneous branding consistency for banking institutions.
5. Personalization strategies: Y Media Labs defines personalization as the: Overall digital strategy that leverages key data points about a customer to present relevant offers, products and services to a target audience when customers need or want to engage in a new purchase. In that sense, personalization is a strategic tool used to generate incremental revenue for the bank.
6. Enhanced user experience: Because bots have the capability to run well during peak times and low-volume times, they are able to provide a greater user experience due to

their quick response time and stable performance.

Reasons for Implementing Bots in Digital Banks

A report titled How Financial Chatbots Are Transforming Digital Banking determined that digital banks should implement bot technology because of the following reasons [13].

- Improving customer financial health: Bots can advise customers on the day-to-day convolutions of cash management, enabling customers to make better spending decisions and improve their overall financial health.
- Unlocking the value of data: Based on customer conversations with bots and actual banking transactions performed by those customers, digital banks can create financial profiles by identifying customer patterns and behaviors and unlocking the value of those data. Marketing teams can leverage this operational data to generate strategic information and introduce new business models, applications, processes, products and services.
- Provisioning of an all-in-one banking solution: Because many customers hold financial products such as bank accounts, credit cards, cryptocurrencies (e.g., Bitcoin, Litecoin, Ethereum, Dai, Monero), PayPal accounts, Google Wallet accounts and Skrill accounts, many digital banks are required to use bots to aggregate the financial information coming from different sources and platforms. This requirement is known as the all-in-one banking solution.
- Attracting digital natives: Attracting and retaining digital banking customers is one of the key missions of bots in the digital banking landscape. Examples of such customers are younger generations who grew up using popular messaging platforms such as Twitter, Facebook, Skype and WhatsApp. The goal is to get the attention of millennial or "Generation Y" customers, who were born between 1981 and 1996 and are comfortable with mobile devices, the Internet and social networks. This younger generation of consumers will earn banks a large market share.
- Maximizing engagement: A bot's environment can be a powerful mechanism for maximizing dynamic engagement through "human-bothuman" conversations.

Introducing the Concept of Bot Risk Based on the Project Management Institute's (PMI's) definition of risk, "bot risk" is "an uncertain event or condition that, if it occurs, creates a threat or

opportunity for a bot endeavor” [8]. Bot risk is a subset of fintech risk and can be assessed using the fintech risk management phases and processes. Examples of bot risk include [5]:

- **Inaccurate responses:** If bots have incomplete rules or scripts, they may provide inaccurate responses to users.
- **Vulnerability:** When bots are vulnerable, attackers can take advantage of bots’ weaknesses, which could cause a loss of sensitive data and information. This kind of scenario includes hacking, phishing and other cyberattacks.
- **Lack of experience:** This occurs when end users have limited or no experience using bots. Consequently, this situation precludes end users from having smooth dialogs with the bots.
- **Lack of required regulatory compliance:** In this case, governments’ financial regulators dictate bots’ user interaction guidelines to safeguard consumers from disguising behavior and guarantee transparency of operations. Therefore, bots are required to comply with government mandates embedded in their internal rules or scripts. If bots do not comply with government regulations, the organization may be misleading users’ options, subliminally forcing user actions and advising users to select unnecessary products and services.
- **Degradation of network performance:** Humanbot-human sessions may fully use the network bandwidth. Therefore, a detailed analysis of network capacity and size should be considered before bot implementation.
- **Lack of governance structures and procedures:** A lack of structure and procedure can result in low operational efficiency, which can lead to investment losses.

Bot Examples in the Digital Banking Sector

There are many state-of-the-art bots that have been developed for digital banking. For example RASA is an “open-source machine learning framework for building AI assistants and chatbots” [10]. RASA can interact with application programming interfaces (APIs), conversational flow, database systems and interactive learning environments with reinforcement neural network [6]. It has main 2 components, RASA NLU and RASA CORE.

- RASA NLU is the interpreter which processes the user input and identifies the intents and extracts the entities from it.

- RASA CORE receives the output from the RASA NLU (which a dictionary specifies the intents entities and other information) and based on these details, the RASA Core part selects the appropriate reply and sends it back to the user as the bot reply.

For example, you say "Hello" to the bot. Rasa NLU will understand the input's intent as a greeting and Rasa Core will tell the bot to reply with a greeting. The reply back would be a greeting if you train your bot for it or it might be anything else as well.

In fact, RASA was used to build the chatbot of N26 [9].

Monzo Chat answers most user questions quickly because it can send automated messages; however, in some cases, the Monzo Chat can also suggest help articles to assist end users with their queries. If it is necessary, Monzo Chat can also direct end users to talk to the customer operations team. Monzo Chat is equipped with the later tools and techniques of AI. Right now, almost 2.5 million people are using Monzo, and around 250 000 people are joining every month [7]. Monzo Chat uses machine learning to see what your question is about and suggest some help articles to point you in the right direction. In some cases it will even show you what you can do to fix your problem straight away, like getting a PIN reminder in the app.

RITA (Revolut’s Intelligent Troubleshooting Assistant) is a powerful AI-based chatbot that can comprehend normal human language and gets more clever over time as it learns from other conversations with Revolut’s clients. During a pilot, Rita resolved 20% of 7500 customer queries a day, earning a customer satisfaction score of 4.3 out of 5.

Revolut says that Rita will become more sophisticated over time, providing a more personalised service. It will be able to answer questions about how much users have spent on specific areas such as transport as well as non-financial information like whether a flight is on schedule [4].

Conclusion

A basic knowledge of digital banking and bots is needed to answer the question of when to bot and when not to bot. It is clear that digital banking can be improved by using bots for innovative solutions offered to customers. This allows customers to enjoy the benefits of having someone (the bot) available 24/7 to respond to questions and provide recommendations accordingly. As a result, bots have become the new labor workforce of digital banking. Because fintech is behind this new breed of banks, bot technology can also be used to support internal digital banking management and control processes and procedures such as fintech risk

management and fintech governance. Furthermore, using the risk assessment model from the risk management framework will help identify new bot risk areas in addition to lack of governance structures and procedures, inaccurate responses, lack of experience, vulnerability, lack of required regulatory compliance, and degradation of network performance.

The accelerating digital transformation gives banks an opportunity to be more relevant to customers and drive profitability. But things are moving so quickly, it's no longer possible for institutions to internally develop and manage all of the products, capabilities and services needed to compete.

Collaborating with partners through platform-based ecosystems has emerged as an effective way for banks to leverage customer trust and bolster product and service offerings to improve customer experiences, deepen relationships and drive revenue growth. At the same time, shifting non-core functions to third-party specialists can enhance efficiency.

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