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The use of the Internet of Things to ensure the smooth operation of network functions in fintech

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Abstract

IoT (Internet of Things) covers network-connected devices that can improve various aspects of our lives. Every second in the world, 127 new devices join the internet. According to some estimates, by 2025, there will be 64 billion such “smart” devices. This is a significant jump when compared with 2018 when there were 10 billion of them. IoT gadgets are such touch points that collect information about the environment. They share data through the cloud, where they are

analyzed to transform people's businesses and daily lives. In particular, technology has already penetrated deeply into the world of Finance. Today, there is no need to visit banks often. However, sometimes a visit is unavoidable. IoT is designed to help make it more convenient for customers. For example, queues are common for many financial institutions. IoT tools can quickly find the most suitable bank consultant. In this case, the customer enters their problem into the original equipment, then they are issued a ticket with information about the specialist, then the device notifies them when it is their turn. IoT allows bank managers to reduce the number of employees, and maintenance costs, and at the same time reduce the waiting time for the client. BMO Harris Bank has tested a "smart" branch, where instead of real employees – chatbots. In case of unexpected questions, chatbots contact a real consultant using video conferencing tools.

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Keywords

IoT, Internet of Things, fintech, finance, technology.

Introduction

Smart speakers allow you to use more convenient voice instructions. For example, in 2019, NatWest implemented a voice banking feature using Google Assistant. The feature was compatible with the Google Home smart speaker system and allowed customers to request account balances, recent transactions, and pending transactions [Alaraj, Abbod, 2016].

In addition, the Internet of things can improve the ATM service experience. In some places, they are equipped with a live video streaming option, which allows customers to communicate with cashiers if they need additional help [Aydin, Cavdar, 2015]. And Citibank has enabled a Bluetooth-based system with IoT beacons, which opens access to ATMs around the clock and seven days a week. IoT can also analyze how customers use ATMs in certain areas to reduce or increase their number [Cuipa et al., 2018].

Using internet-connected devices can change your financial habits [Dastkhan, 2021]. The Interact IoT platform teaches you not to exceed the credit card limit. So, if the user ignores the warning and continues to spend more than the limit, the device can send a shock wave to the wrist. In addition, the technology will be useful for banks that lend to the agricultural sector. For example, with the help of the Internet of things, managers can estimate the yield of crops and offer the farmer appropriate financial conditions. Such information helps to build a strong relationship between the farmer and the bank [Dozat, 2016].

Data collected by smart devices can also help the bank reduce the account balance or secure loan repayment. To do this, sensors are installed in borrowers ' warehouses to track raw materials and inventory [Infosys Limited…, 2017].

Amazon Go is one of the most popular examples of IoT use in fintech. The retailer implemented the concept of “shop without staff” thanks to this technology. Motion sensors, cameras, smart scales, as well as devices at the exit for scanning cards made it possible to fully automate the purchase process,

in which there is no place for queues at the checkout [Feixiong-Ma et al., 2020].

However, IoT has long changed the way people make payments. Wearable devices – bracelets, watches, rings – have replaced smartphones and traditional bank cards and significantly accelerated transactions. Not surprisingly, payment systems are investing in IoT [Fernández-Arias et al., 2018]. For example, with the help of an app developed by MasterCard, Samsung smart refrigerators not only control the temperature of food, but are also able to order food products. As you can see, IoT can transform many processes in business and everyday life. And given the dynamics of internet penetration and the increase in the number of smart devices, this is just the beginning.

Methodology

The banking services sector has undergone major changes. Online payments, mobile apps, and payments with electronic devices are becoming commonplace for bank users. Increased consumer demand for digital banking services has led to numerous technological advances in financial institutions.

Digital banking is the digitization of all levels of banking and customer service using digital technologies. Digital banking is carried out by both classic banks and digital banks. Digital banks rely on artificial intelligence to automate internal operations such as data processing, making the day-to-day work of employees much easier.

Digital banking will not only allow users to make remote transfers to their accounts, but also allow them to apply for loans faster and get access to personalized money management services.

Digital banking has emerged with increased consumer demands for more efficient ways to access bank records and perform financial transactions outside of the bank's branches. The transformation of digital banking services began with limited internet banking services before entering the digital-only market.

The main directions of digitalization of banking services are:

– digitalization of banking;
– predominance of contactless payments;
– the emergence of non-traditional payment gadgets and tools (using instant messengers as a payment method; tokenization of payments; payment using the NFC function, smartphone, smart watch, fitness bracelet, ring, etc.);
– emergence and development of FinTech projects;
– building financial ecosystems;
– integration of banking systems and creation of unified information platforms;
– use of artificial intelligence (chatbots, robot administrators of the bank's operating room, etc.);
– increased cybersecurity requirements.

Results

China and India are the leaders in terms of fintech service penetration, accounting for 87%. South Africa is slightly behind with an indicator of 82%. Among developed countries, the highest penetration rates are observed in the Netherlands (73%) and the United Kingdom (71%) [Dastkhan, 2021].

The lowest penetration rates were found in the United States at 46%, Belgium and Luxembourg at 42%, and France at 35%. According to a report by McKinsey & Co, in May 2020 alone, the level of digital attraction in European countries increased to 20%, and the use of cash halved.

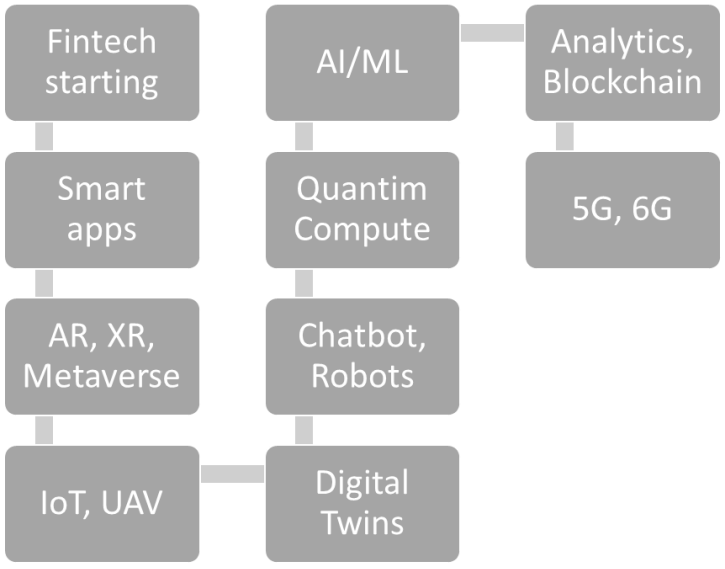

Figure 1 - Technologies which used by fintech in 2022

The fintech revolution is coming much faster than expected, and most of all it is changing the market landscape in developing countries, including Russia [Dozat, 2016].

According to KPMG's Semi-Annual Report the Pulse of Fintech [Cuipa et al., 2018], it is worth noting the following global trends:

– fintech companies quickly adapt to the conditions of turbulence, understanding the needs of consumers, become more aggressive in expanding their basic product and service line, moving from mono-to multi-offers;
– banking-as-a-service platforms accelerate the movement of fintech towards opening bank accounts;
– some fintech companies, taking advantage of the liberalization of regulatory requirements, obtain banking licenses by creating their banks;
– global regulators are reducing market entry barriers for fintech companies to weaken the level of monopoly of the traditional sector and increase market competition. The British regulator FCA, for example, was among the first to launch a pilot project to issue a limited "e-money license", which allowed fintech companies such as Revolut to introduce a payment transfer business through the so-called partner-chartered bank, which reduced the time to enter the market for the company. Another example is that the Asian regulator the HKMA announced details on issuing a license to a virtual bank;
– traditional players are increasingly introducing digital products to the market, but they have a low level of interaction Experience (UX);
– there is a low level of global fintech access to public capital markets and IPOs;
– strengthening of global regulation in the field of crypto assets and digital currencies, which is associated with the dynamic development of the cross-border payment market involving virtual assets, as well as the growing interest of central banks in the development of the CBDC market;
– providing fintech players with free access to digital platforms and products/ services in the context of a global pandemic (starting in March 2020), which creates a new consumer experience and skills.

Key trends of the fintech market in the global economy: mobile phone services, financial services

and social networks, Alternative Payments, new business models, marketplaces, artificial intelligence, digital identification and biometrics, open application programming interfaces (APIs), InsureTech, neobanks, blockchain [Alaraj, Abbod, 2016].

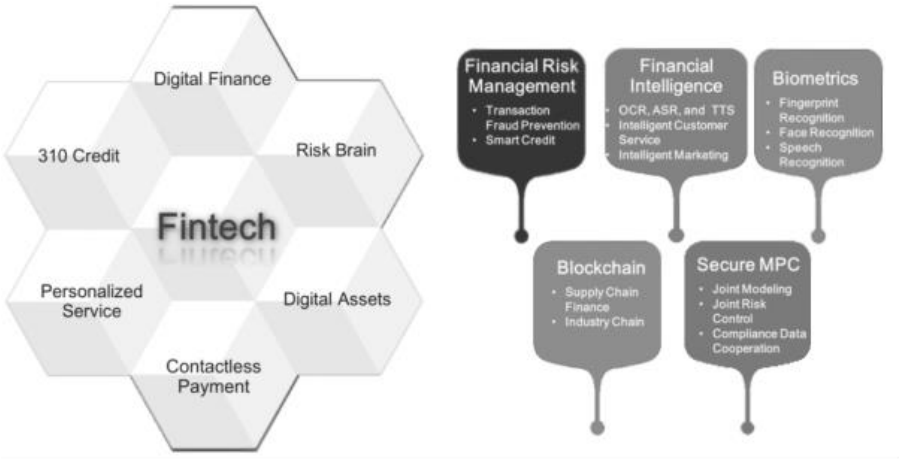

Figure 2 - Fintech technologies

The Global fintech market, according to the catalog, has more than 100 fintech companies, the vast majority of which are payment service providers, and online lending and infrastructure solutions are also developed. Among large fintech companies, there is a fully mobile bank without any physical branches, and new players are emerging in this niche [Aydin, Cavdar, 2015].

Summarizing the results of the presented research, it should be noted that one of the key factors in the development of the global financial market is the active introduction of fintechnologies in the service process. The analysis of the main trends of fintech made it possible to determine that the availability of smartphones and mobile internet, the growing dissatisfaction with traditional banking services and the loss of public distrust of the banking system are important drivers of its development. Also, the fintech market provides the necessary service and opportunities to earn money without leaving the office (home).

In modern banking, the most popular ones are mobile banking, internet banking, "zone 24", Electronic Balance, POS terminals, QR banking, smart gas station, Send money and photo booth.

Internet banking offers services that are provided on the bank's website. Subsequently, he inspired mobile banking, which allows you to perform various banking operations using a mobile application. Online banks that do not have physical branches, but exist only on the internet, have also begun to appear.

Discussions

Today, digital banking increasingly demonstrates its advantages over traditional financial services, namely: improving the efficiency of banks and improving the level of service, saving time and effort for customers and staff of the bank; the possibility of Round-the-clock service, including holidays; careful control over banking operations; convenience and speed of payments.

Today, due to digital banking, banks can provide almost the entire range of services remotely. For example, customers have the ability to:

– get a loan secured by a deposit in real time, increase the credit limit on the card at any time (within the credit line agreed with the bank), issue a guarantee deposit;
– submit the necessary package for obtaining an e-license online and transferring foreign currency funds abroad;
– integrate the Securities custodian's investment accounts into online banking for the ability to buy or sell securities from a single platform (Government bonds, shares), get leverage from the bank if necessary;
– implement online insurance of all possible risks-from financial to property – on a single internet platform;
– communicate in real-time with a personal banker or investment analyst (via both messages, calls, and video conferences);
– get non-financial services, etc. [Fernández-Arias et al., 2018].

Demand for digital banking has undoubtedly grown at an unbeatable pace as the IoT (Internet of Things) world empowers consumers and forces businesses to move towards digitalization to maintain competitiveness in financial services. Numerous industry verticals benefit from the monetary benefits generated by digital technologies, including retail, marketing, and education, although not as widely as the banking segment.

The development of digitalization of banking services is also supported at the state level. Thus, the strategy for the development of the financial sector of Europe until 2025 defines the strategic direction of "innovative development", the purpose of which is:

– development of an open architecture of the financial market and oversight;
– ensuring the development of the FinTech market, digital technologies, and regulatory platforms;
– development of the digital economy [Aydin, Cavdar, 2015].

So, digital banking is gaining more and more popularity every year. Each time there are new payment methods, such as Wireless Payment via smartphone using the NFC function. This will contribute to high competition in the banking services market and improve the quality of customer service in general.

Digitalization of the financial sector is an integral feature of the development of the modern world economy. For financial market participants to be successful and competitive, it is necessary to keep up with global trends in the introduction of advanced technologies and be "digital". The fulfillment of this task determines the transformation of traditional business models to meet the challenges of the modern world. Credit institutions, insurance companies, and other institutional investors are making significant changes in improving their operations under the influence of digital technologies.

Analyzing the digitalization of the financial sphere as an evolutionary stage in the development of modern society, it is necessary to consider the main stages of its formation. At the same time, it should be emphasized that the basis of this process is the active implementation of the achievements of the financial technology industry (hereinafter referred to as fintech) in financial relations [Foes, 2017].

Fintech is the dynamic development of a segment at the intersection of the financial services and technology sectors, in which technology startups and new market participants apply innovative approaches to products and services currently provided by the traditional financial services sector. Digitalization is rapidly developing, breaking the usual order of things in the traditional value chain [Metawa et al., 2021].

Fintech companies using the latest technologies and new business lines are reshaping the picture of competition, blurring the established boundaries among players in the financial services sector.

The Fintech Ecosystem includes elements such as startups, technology companies, financial institutions, and infrastructure players [Alaraj, Abbod, 2016].

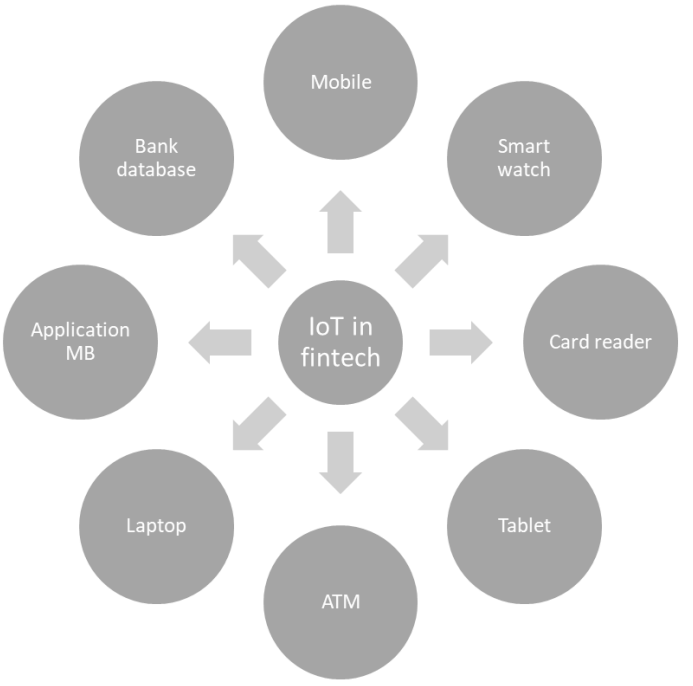

Figure 3 - IoT in fintech mobile banking

The analysis of the subjects of the financial market of Europe showed: the largest volume of assets of banks (as reliable financial institutions with a wide range of financial services, professional intermediaries, dealers, etc.), low volume of assets had the organizers of financial trading, brokerage offices, depositories, asset management companies, as institutions that provide services to participants in the stock market of a country that is not sufficiently developed and needs integration into the world space [Aydin, Cavdar, 2015].

The largest volumes of banks ' assets accounted for loans and Securities, and there were no insurance reserves, which is due to banking policy. Financial companies, in particular credit companies and investment funds, had no monetary gold assets, insurance reserves, and the largest volumes of shares and loans, which corresponded to the nomenclature of their main products. Insurance companies had the highest amounts of cash, deposits, and no monetary gold assets, or derivatives, which is due to their activities. Stock exchanges, brokerage offices, depositories, and asset management companies had the largest amounts of cash, deposits, and securities, there are no assets of monetary gold, insurance reserves, or loans, which revealed the concentration of their professional activities in the stock market [ibid.].

The introduction of digital technologies requires a radical change in business strategies in all sectors of the economy. The high efficiency of applying innovative solutions forces the financial sector to transform both to strengthen its position in the market and to increase the level of interaction with customers and market participants.

The most noticeable trend is the digitalization of the European banking sector. Credit institutions seek to transform into high-tech financial corporations that meet the following requirements:

– providing customers with a comprehensive set of services within the ecosystem of Fintech;
– increasing the transparency of information, which helps to eliminate mediation in the financial market;
– continuous improvement of implemented digital solutions to ensure real-time operation and security, etc.

The change in the traditional business model is implemented through the transformation of a significant part of Information Technologies, which concentrate all areas of the bank's activities. This process includes:

1. Development of a digital strategy based on the business vision and its mission, considering the need for constant adjustments (high speed of digital innovations, changes in legislation, etc.).

2. Creating an IT system architecture or IT landscape. This stage involves the development of sets of software, computing and telecommunications tools built in a specific configuration and ensuring the operation of operational processes for business units;

3. Development of IT solutions and their commissioning.

A positive trend in recent years is the activation of domestic commercial banks and corporations in the innovation sector – in the form of support for incubation programs and accelerators, and investment in startups. According to a study by Mastercard, about 87% of representatives of the banking sector are ready to partner with fintech startups.

The creation of new acceleration programs in Europe will reduce the costs of fintech startups and encourage initial funding [Metawa et al., 2021].

Future cooperation between domestic commercial banks and fintech companies can have various options for interaction-from simple use of fintech startup services to the full–fledged technological partnership, investment in the implementation of new systems, or purchase of already implemented projects [Feixiong-Ma et al., 2020]. At the same time, the partnership between commercial banks and fintech companies can successfully develop in the field of Payment Services, Big Data, Artificial Intelligence, Cybersecurity, Business Process Automation, P2P and P2B lending.

Commercial banks have recently shown a keen interest in the P2P and P2B lending market, where they can mutually cooperate with electronic credit platforms or create their similar platforms.

At the same time, for commercial banks that participate in the promotion of P2P and P2B platforms, there is no risk of liquidity and non-repayment of loans, and therefore there is no need to form reserves. In addition, thanks to cooperation with fintech companies commercial banks get access to an additional customer base and can provide them with additional and related banking services. Electronic credit platforms, for their part, gain access to a significant amount of banking resources. The participation of commercial banks in these credit projects increases confidence in them on the part of participants in the money credit market.

The development of P2P and P2B credit platforms operating with the participation of banks is constrained by the following factors: it does not fall under the law "on banks and banking activities" and is not regulated by the NBU; there is no legislative regulation of the liability of intermediaries, therefore, the rights of the person who is a leader in this scheme are not protected; deposits are also not guaranteed by the DGF, which increases the risk of loss of funds; P2P lending operations are not subject to reporting to central banks, and therefore the regulator cannot monitor, analyze and regulate these operations [Dozat, 2016].

Conclusion

According to banking statistics, digital transformation measures have a positive impact on the financial situation of credit institutions, and significant investments are recouped by achieving a combination of goals. At the same time, we should mention the growing competition in the banking industry, where key players are actively developing new areas of digitalization. In these circumstances, credit institutions are required to allocate resources (financial, human, material) for the sustainable achievement of Strategic and tactical goals that arise under the influence of changing environmental factors.

Technology services are drivers and tools for changing your business strategy and achieving positive financial results. The activity of a credit institution in this direction will allow it to reach a qualitatively new level and become more attractive to the client, and inaction can lead to ousting the player from the market.

It should be noted that digital transformation carries not only potential opportunities and benefits, but also significant risks and threats. To eliminate them, it is necessary to harmonize the regulatory framework in the field of financial technology regulation, especially in terms of cybersecurity and data storage. It is important to emphasize that the sustainable development of the financial sector requires innovative drivers of economic growth as a whole.

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Использование Интернета вещей для обеспечения бесперебойной работы сетевых функций в сфере финансовых технологий

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Аннотация

IoT (Интернет вещей) охватывает подключенные к сети устройства, которые могут улучшить различные аспекты нашей жизни. Каждую секунду в мире к интернету подключаются 127 новых устройств. По некоторым оценкам, к 2025 году таких «умных» устройств будет 64 миллиарда. Это значительный скачок по сравнению с 2018 годом, когда их было 10 миллиардов. IoT-гаджеты это такие устройства, подключенные к сети, которые собирают информацию об окружающей среде. Они обмениваются данными через облако, где те анализируются. В частности, технологии уже глубоко проникли в мир финансов. Сегодня нет необходимости часто посещать банки. Однако иногда посещения не избежать. Интернет вещей призван сделать его более удобным для клиентов. Например, очереди характерны для многих финансовых учреждений. Возможности Интернета вещей позволяют быстро найти наиболее подходящего банковского консультанта. В этом случае клиент сообщает о проблеме черех устройство, затем ему выдается талон с информацией о специалисте, после чего устройство оповещает о наступлении его очереди. IoT позволяет менеджерам банка

сократить количество сотрудников и затраты на обслуживание, а заодно сократить время ожидания клиента. BMO Harris Bank протестировал «умное» отделение, где вместо реальных сотрудников работают чат-боты. В случае возникновения неожиданных вопросов чат-боты связываются с реальным консультантом с помощью средств видеоконференцсвязи.

Для цитирования в научных исследованиях

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Ключевые слова

IoT, Интернет вещей, финтех, финансы, технологии.

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