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2. ECONOMICS AND ADMINISTRATION

FINTECH: TRENDS AND PROSPECT OF DEVELOPMENT IN THE TRANSITION TO A TOUCHLESS ECONOMY

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Abstract. *The aim of the research is to explore the main features of the development of the fintech industry at the global level and in Ukraine. The basic interpretation of the concept of "fintech" is observed, as well as the strengths and weaknesses of innovative financial technologies, the main opportunities and potential threats from implementation are identified. The main areas of fintech development (payment, investment, credit, insurance, regulatory and advisory services) are identified. Promising technological approaches (machine learning, predictive analytics, distributed technologies, cryptography, mobile access), as well as their quality attributes, are analyzed. The features and topical problems of Fintech development at the global level and in Ukraine are investigated. It is shown that in Ukraine the fintech industry is still at the stage of development and has a number of problems with the law base, as well as with the reluctance of large players in the financial market to integrate large-scale innovations.*

Keywords: *touchless economy, fintech, finance, innovation, innovative economy, start-up, online payments, artificial intelligence.*

I. INTRODUCTION

In recent years, the global trend of transition from a traditional to a touchless economy has become increasingly noticeable. In the context of the COVID-19 pandemic this trend very quickly became the leading one. Many enterprises were forced to switch to remote operation. This also applies to the sphere of finance. However, even before the COVID-19 pandemic more and more innovative technological online solutions appeared in the field of finance, which are actively using modern advances in the development of IT technologies. Such innovative solutions in the financial sector are usually summarized by the concept of Fintech. Fintech has existed for quite a long time, but every year the pace of its development not only does not stop, but is accelerating. In the near future the almost complete transformation of the traditional financial industry into an innovative one is predicted by introducing Fintech. Thus, we set ourselves the goal of analyzing the main features of the development and implementation of Fintech, as well as identifying their key global and all-Ukrainian trends.

II. LITERATURE ANALYSIS

Fintech topic is very popular nowadays, that's why a lot of researchers pay attention to it. Bernardo Nicoletti discusses the prospects for the development and improvement of Fintech technologies in his book «The future of Fintech». Particular

emphasis is placed on the classification of different Fintech industries: Insurtech, Regtech, etc. The book also provides a basic overview of some Fintech technologies.

Fintech evolution is reviewed by Douglas Arner, Janos Barberis, Ross Buckley (The Evolution of FinTech: A New Post-Crisis Paradigm?). A feature of this work is a parallel overview of the development of Fintech in different countries of the world: from America to China.

The main Fintech strategies are reviewed by Vasant Dhar and Roger Stein (FinTech platforms and strategy). The main Fintech platforms are considered; their key features are highlighted.

In Ukraine, many economists are also researching the current situation of Fintech. The main features of Fintech development in modern conditions are explored by Natalia Yurchuk. In his works, he considers global trends and their reflection in Ukraine.

Despite the impressive amount of scientific papers on the topic of Fintech, some aspects of the analysis of promising technologies and their quality attributes, as well as the analysis and comparison of global and all-Ukrainian trends remain insufficiently studied.

III. OBJECT, SUBJECT, AND METHODS OF RESEARCH

The aim of the research is to define the main features and prospects of the development of the fintech industry at the global level and in Ukraine**.**

The object of research is the process of formation and implementation of modern fintech technologies in the transition to a touchless economy.

The subjects of the research are theoretical, methodological, organizational and practical aspects of fintech-industry development.

The research methods: during the research, the following general scientific and special methods of research were used: analysis and synthesis, abstraction, induction and deduction, systematic approach to the evaluation of economic phenomena and processes, methods of comparison, concretization, analogies, grouping, sampling and observation, SWOT-analysis.

IV. RESULTS

4.1. General Fintech concept

In the context of the COVID-19 pandemic *the touchless economy* has acquired particular relevance. By touchless economy we mean *an economy that is based on the distance between an agent and a counterparty of economic relations, mainly with the help of IT technologies* [1]. The touchless economy covers all branches of the traditional economy, it only changes the organizational and technical basis for the implementation of economic relations in life.

Finance can be understood as *a set of economic relations arising from the formation, distribution and use of centralized and decentralized monetary funds* [2]. If we interpret economy as a system of economic relations, then from an abstract-logical point of view finance can be understood as a subset of the economy. A basic subset, because money (a measure of the material display of finance) is the basis of a modern

developed economy. From here it is possible to make a logical transition from a touchless economy to touchless finance, the technical basis of which is *financial technology* (Fintech) [2]. It is Fintech that we will consider in the future.

In a narrow sense Fintech is innovative IT technologies used by modern financial institutions in order to move to a digital touchless economy. But in a broader sense, which we will use in the future, Fintech is a whole branch of an innovative economy based on the active use of innovative technologies (Fintech in a narrow sense). Fintech includes both recently founded startups, the main goal of which is to offer an innovative product, and traditional financial institutions (banks, intermediaries, etc.) that integrate innovative technologies into operating activities in order to maintain their own market segment.

Fintech is a very popular and widespread trend of the modern world. In the second half of 2020 alone, more than $ 25 billion was invested in the Fintech industry [3]. At the same time, the largest share of investments is traditionally concentrated among the countries of North and South America. Europe is in second place. The Asia-Pacific region is also considered potential.

Fintech has advantages and disadvantages, that are systematized using SWOT analysis matrix (table 1).

Table 1. SWOT-analysis of Fintech*

Strengths	Weaknesses
- Offer your own unique product; - reduction of enterprise costs (personnel, office rent, etc.); - compliance with the current requirements of the contactless economy; - simplified scaling of the enterprise to foreign markets.	- Insufficient level of government support; - the threat of critical system failures due to imperfect technologies; - negative impact on the basic mechanisms of the traditional economy (monetary policy and the like).
Opportunities	Threats
- Development of a competitive environment in the financial services market; - promoting scientific and technological progress; - reducing the risks of fraud (in the case of high-quality technologies).	- Increased risks of unemployment; - instability of the economy due to changes in the traditional way of life; - loss of customers due to bankruptcy of banks that could not withstand competition.

Source: it is formed by the author.

4.2. Basic principles of building technical Fintech-solutions

First of all, we should consider what the main groups of Fintech solutions are currently offered on the financial services market. Based on the analysis [4-5], we can distinguish the following groups of such solutions: payment services, investment services, credit services, insurance services, automatic regulation. Let's consider these groups in more details:

1) *Payment services.*

Under the traditional structure of the economy, in particular the financial sphere, payment and transfer services were carried out through banking and intermediary institutions. Now it is possible to make payments and transfers only using specialized

sites or mobile applications. At the same time, many different types of payment services have appeared: online transfer and payment services, P2P and B2B currency exchange, cloud cash registers, smart terminals, and more.

2) *Investment services.*

In the field of investment, a variety of exchanges (commodity, stock, freight, etc.) have become widespread. Well known NYSE, NASDAQ, JPX, SSE, Euronext. But the realities of the development of the touchless economy require a transition from offline to online. The active introduction of Fintech into the investment field has led to the emergence of online investment banks, online capital markets. At the same time, Fintech in the investment field has a number of problems: a high threshold for entering the industry, high requirements for the technical component, the need to integrate the mathematical apparatus of risk forecasting, the prerogative of focusing on the international level.

3) *Credit services.*

Lending services are popular both in developed countries (USA) and among developing countries (post-Soviet countries). The only exceptions are perhaps countries with a developed system of social guarantees (Scandinavian model). The main size of loans in the traditional economy is provided by banking institutions. At the same time, some segments of consumers (in Ukraine first of all generation Z and people over 45-50 years old) remain poorly covered. Therefore, the main direction of Fintech development in this industry is to reach low-service consumer segments, as well as fair competition in popular segments. The advantages of Fintech solutions from the point of view of clients are preferential conditions and a simplified procedure for obtaining loans. At the same time, the most pressing problem of online credit services is to ensure the proper level of trust among potential customers. A potential way out of the situation is a mutually beneficial tandem with reliable banks.

4) *Insurance services.*

Fintech in the field of insurance services (Insurtech) has its own characteristics. Unlike the previous Fintech industries reviewed, most Insurtech enterprises do not directly provide insurance signing and underwriting services, but offer innovative technical solutions for risk assessment and decision-making for traditional insurance companies or offer online services for evaluating and comparing offers from various institutions that provide insurance services. The main focus of the activities of Insurtech enterprises is not on the search for effective ways to digitalize the organizational and legal features of the business foundations, but on the development of innovative, mathematically sound algorithms that are useful for the daily work of insurance institutions. That is why Insurtech enterprises are the least demanding on the legal attributes of the ecosystem, but very demanding on the innovation component.

5) *Automatic regulation.*

Like Insurtech Regtech's automatic control technologies focus on mathematical models rather than organizational and law features. But Regtech's range of services is much wider than that of Insurtech. Regtech are applicable from checking the correctness of filling out reports to identifying fraudulent schemes. The difficulty of developing Regtech solutions is extremely high. That is why the competition in the Regtech market among Fintech enterprises is one of the lowest. But at the same time,

most experts point out Regtech as the most promising industry based on the active integration of artificial intelligence.

The wide variability of possible areas of activity of the Fintech company, however, does not exclude the most general requirements for the proposed technical solutions. These requirements should be called *quality attributes*. Based on the analysis of the literature [6-7], we can offer the following most relevant attributes of the quality of Fintech technical solutions:

✓ **Reliability.** All Fintech technical applications work in one way or another in finance. This is why system reliability plays a key role. The developed software must exclude the possibility of a critical failure that leads to the loss of user data. This attribute also applies to protection against fraudsters, which is especially important in the modern era of widespread cybercrimes.

✓ **Innovativeness.** Innovation is the engine of progress. The Fintech concept itself is based entirely on the innovative component of an enterprise (startup). A non-innovative, repetitive software product will lead to the collapse of the company (startup), as it will simply not be competitive.

✓ **Customer focus.** In our time there has not yet been a final shift in the mentality of the population of most countries of the world exclusively to online means of providing financial services; traditional offline companies are still popular. And only the focus of a technical solution on the needs of the client, taking into account his desires and requirements can lead to a positive result. In addition, customer focus can be interpreted as an element of a competitive strategy not only between online and offline enterprises, but also between both Fintech companies.

✓ **Scalability.** The most effective work of Fintech companies is achieved at the international level, but not every startup has enough start-up capital for such a scale of action. That is why most of the future "unicorns" started at the local level. But if you do not provide for the possibility of a significant expansion of activities both at the organizational and legal (taking into account the specific legislative framework of each individual country) and at the technical (high load on the system) levels, the start-up company will deliberately limit its potential profit.

✓ **Adaptability.** Fintech market is not stable. Both internal and external influences on the company, changes in the ecosystem are possible. In order to take into account possible impacts, technologies should be developed that, if necessary, can be adapted to new business conditions without significant losses.

✓ **Simplicity.** Of course, any Fintech technical solution cannot be too simple, as it takes into account complex, mathematically sound interaction algorithms. Nevertheless, the developed software product must provide for support and therefore not be too confusing and monolithic. The developed software code should be clear and understandable, preferably documented.

We have listed the main quality attributes relevant to Fintech technical solutions. Now let's consider the main technological approaches used, their advantages and disadvantages:

1) Artificial intelligence, big data.

One of the main trends of the future is the active integration of artificial intelligence into all spheres of human life. In the field of Fintech artificial intelligence

is most often implemented in the form of machine learning or predictive analytics (the latter two areas sometimes overlap) [8].

Machine learning is the ability of an algorithm to develop approaches to decision-making in the course of its work (based on the analysis of a certain array of initial data). The main principle of modern machine learning is modeling the work of the human brain. Among such models the most used are *neural networks*. Moreover, the more complex and ambiguous the initial problem, the more complex and confusing neural networks are required, often with many separate layers. For such neural networks the array of initial data for training should be rather cumbersome.

The opportunities for using neural networks in Fintech: identifying fraudsters based on certain patterns of their behavior, assessing insurance risks based on a clear system of initial numerical parameters, developing regulatory and consulting conclusions about the operation of an enterprise.

The advantages of using machine learning: there is no need for complex mathematical models, the ability to solve non-trivial analytical problems.

The disadvantages of using machine learning: the need for a significant array of initial data, high hardware requirements for large neural networks.

The second area of AI that is actively involved in Fintech is predictive analytics. Development of forecasts is a very urgent problem for almost all Fintech industries. It should be noted that forecasting can be carried out in two ways: using machine learning, based on the developed mathematical models. We will not comment on the first way, as it has already been discussed above. As for the second way, its key advantages and disadvantages are as follows:

The advantages of predictive analytics based on the developed mathematical models: clear determinism of the result, ease of developing the appropriate software, the availability of initial data is not so significant, low hardware requirements.

The disadvantages of predictive analytics based on the developed mathematical models: the process of developing a mathematical model is often quite complicated, neglect of some important features of the real situation due to abstraction.

2) Distributed technologies.

Distributed technologies have arisen in response to the frequent problem of overloading the servers of Fintech institutions. The problem is especially relevant for international companies. In such cases thousands of clients can be served simultaneously. But service points, unlike traditional financial institutions, are not many but one [9].

The most promising solution to the described problem is the division of hardware power into several physical nodes. First of all, this applies to databases, as well as their management systems (MySQL, PostgreSQL, Oracle). In this case the priority is not to overcome physical constraints, but to develop interfaces for the interaction of individual physical nodes, as well as the basic principles of managing a distributed system. It should be noted that the problem of managing distributed systems is nontrivial and requires clear algorithms for responding to such abnormal situations as: failure of one physical node, access to irrelevant (overwritten) data, etc.

The opportunities for using distributed technologies in Fintech: international payment systems, large online capital markets, online banks.

The advantages of distributed technologies: reduced costs for expensive hardware, overcoming physical hardware limitations of high-load systems.

The disadvantages of distributed technologies: a number of problems of managing distributed systems, a resource-intensive process of developing appropriate software.

3) Cryptography.

In the context of the transfer of the traditional economy to the IT space, the problems of ensuring confidentiality, data integrity, authentication and authorization are becoming increasingly important. For these purposes, cryptography is used [8].

Cryptography in Fintech plays an exceptional role, since it is the attribute of reliability, one of the foundations of which is cryptography, that is key to all processes related to monetary funds. The most promising area of modern cryptography is biometrics, which is based on the physiological and anatomical characteristics of an individual.

The opportunities for using cryptography in Fintech: everywhere, for all processes related to the transfer of funds or with the identification of a person.

The advantages of using cryptography in Fintech: fairly easy development of the appropriate software, effective provision of system reliability.

The disadvantages of using cryptography in Fintech: complex mathematical justification of cryptography algorithms is required; development errors can entail significant losses to the company.

4) Mobile access.

More and more people are using mobile technologies. This is not just about smartphones. Techno giants such as Samsung and Apple offer a wide variety of application technologies, from smart watches to smart TVs (Apple TVs). In the future the emergence and development of technologies directly placed on the human body is predicted. In such conditions it becomes vital for Fintech companies to provide online representation not only in the form of a website, but also in the format of various applications (so far only for smartphones). Moreover, there are examples of successful Fintech startups that have completely abandoned full-fledged web representation (Atom Bank). Therefore, the issue of organizing mobile access to their services for Fintech startups is very relevant [9].

The opportunities for using mobile access in Fintech: everywhere, to reach a large segment of potential customers who are more comfortable using mobile technologies.

The advantages of using mobile access in Fintech: significant expansion of the customer segment, standardization of mobile software development processes.

The disadvantages of using mobile access in Fintech: requires a creative approach, cumbersome software development process, hardware limitations of mobile devices.

The listed technological approaches have their advantages and disadvantages. They are systematized and presented in table 2.

Table 2. Comparative characteristics of the main technological approaches in Fintech*

	Machine learning	Predictive analytics	Distributed technologies	Cryptography	Mobile access
Universality	–	+	–	+	+
Development of mathematical model	–	+	–	+	–
High hardware limits	+	–	+	–	+
Solution of non-trivial problems	+	+	–	+	–
Complexity of software development	+	–	+	–	+
Expansion of the customer segment	–	–	+	+	+

Source: it is formed by the author.

4.3. Global trends in Fintech development

At the end of 2020, there were over 500 unicorn companies in the world. 70 of them belong to Fintech. And every year the number of Fintech startups that have crossed the $ 1 billion mark only continues to grow. Let's look at the most successful Fintech startups [10], among them:

1) Stripe (≈ $ 36 billion).

Stripe is a business software API for accepting and processing online payments. This startup was founded in 2011 in the United States and in a few years was able to bypass its main competitor PayPal. A distinctive feature of Stripe is a user-friendly, clear interface; easy payment procedure. It should be noted that Stripe remains at the startup level at the moment and does not take any action to register an IPO [10].

The main advantages of Stripe:
- user-friendly and intuitive interface;
- easy payment procedure;
- low commission for international payments.

The main disadvantages of Stripe are:
- high commission for return of payments;
- focus only on the commercial segment;
- limited distribution (only in 32 countries, Ukraine and CIS countries are not included here);
- non-trivial procedure for implementing Stripe code.

2) Paytm (≈ $ 16 billion).

Paytm is an Indian startup whose main idea is to develop a user's digital wallet. But the main difference from competitors is that Paytm provides not only one-time money transfers (payments), but also many additional functions, such as paying for utilities, food delivery, and so on. Paytm works in most cities in India. It should be noted that the company One97 Communications, which developed Paytm, is

considering options for entering the international market (for example, some similar plans have already been implemented in relation to Japan) [10].

The main advantages of Paytm:
- user-friendly and intuitive interface;
- low commission;
- many additional options necessary for the user;
- almost complete coverage of the target country (India).

The main disadvantages of Paytm:
- restriction by local market segments;
- some promising areas of everyday life remain uncovered.

3) Chime ($\approx$ $ 14,5 billion).

Chime is an American innovative online bank that operates without its physical branches, exclusively online. Chime's main technical platform is a mobile application, but it is also possible to work through the website. All operations offered by the bank are performed through them [11].

Chime offers many beneficial features to its customers. One of them is overdraft, for which Chime does not charge commission. Chime issues Visa debit cards to its customers. Customer accounts are insured through Chime's partners Bancorp Bank and Stride Bank.

The main advantages of Chime:
- no commission for many client transactions;
- convenient permanent mobile access;
- reliability is ensured through partnerships with large banks.

The main disadvantages of Chime:
- poor work of the support service;
- low (practically absent) interest per annum on savings accounts;
- no banking license.

4) Klarna ($\approx$ $ 10,65 billion).

Klarna is a Swedish startup that provides businesses with a payment gateway to accept payments from customers. A feature of this startup is that even if the client chooses the installment plan, the seller receives the full amount immediately, from Klarna. As for the risks of non-payment by the client, Klarna assumes them [11].

The main advantages of Klarna:
- support for an effective model of payment for goods;
- does not require the buyer's credit history;
- works with many sellers both in Sweden itself and all over the world;
- a system of easily integrated modules and plugins;
- effective work of the support service.

The main disadvantages of Klarna:
- small amounts of financing;
- impossibility of premature loan repayment.

The results of the analysis allow us to assert that the most general global trends in Fintech development are as follows:
- active cooperation between the innovative and traditional sectors of the financial market;

- widespread introduction of new technologies by financial institutions;
- extremely high competition in all Fintech industries;
- a large share of the innovative component.

Now that we have reviewed some of the world's most successful startups in the Fintech industry, let's analyze the situation in Ukraine.

4.4. Ukrainian realities of Fintech development

In Ukraine the Fintech industry, like many other innovative areas, is still only developing. However, some large Fintech players such as Monobank are already represented on the Ukrainian market. It should be noted that the Ukrainian Fintech market has its own characteristic features that distinguish it from the global market. We systematized the main similarities and differences in Fintech development in Ukraine and abroad (table 3).

Table 3. Common and different in the development of Fintech in Ukraine and abroad*

	Ukraine	World
Common	- The most popular group of Fintech solutions is online payments; - additional services are provided (payment of utilities, etc.); - entering the global level is being considered; - search and analysis of market segments not covered by the traditional sphere of finance.	
Different	- The main source of funding is personal savings; - the main way of business monetization is commission for sold goods and services; - ignorance by traditional financial institutions of the solutions offered by Fintech; - low level of cooperation between traditional and Fintech spheres; - new companies are often founded by already experienced market players; - the most pressing problem is the low base.	- The main source of funding is investments; - the main way of business monetization is transaction fees; - the interest of traditional financial institutions in the offered Fintech solutions; - high level of cooperation between traditional and Fintech spheres; - new companies are often founded by innovators; - the most pressing problem is high competition.

Source: it is formed by the author based on [12-13]

The examples of the most successful Fintech startups in Ukraine are:
1) Monobank.

Monobank is a fast growing online bank that only provides its services through a mobile application. Monobank was created by the Ukrainian entrepreneurial group FintechBand, founded by former PrivatBank employees. During its 4 years of existence, Monobank has been developing very rapidly, at the end of 2020 it has more than 3 million customers. The main reason for this rapid development is the many advantages over other banks [14].

The main advantages of Monobank:
- simple registration, quick receipt of a bank card;
- user-friendly, intuitive interface design;

- many operations are carried out without commission (card replenishment, utility bills, mobile top-up, etc.);

- high interest on cashback, deposit;

- effective work of the support service through a variety of instant messengers.

The main disadvantages of Monobank:

- does not have its own banking license, operates under the license of Universal Bank;

- lack of a developed ATM network;

- dependence of stability on the reliability of Universal Bank.

2) Tachcard.

Tachcard is a Ukrainian Fintech solution for electronic payments and transfers. The basic payment mechanism is QR codes. Tachcard implements a mechanism in which the seller creates special QR codes for his products, when scanning which the buyer only has to fill in the card details or (if payment is made from the Tachcard application) select one of the attached cards. Effective use of QR codes avoids dependence on a particular bank or mobile application. In addition, the use of Tachcard is beneficial for small businesses that do not install POS terminals [14].

The main advantages of Tachcard:

- convenient, intuitive interface;

- independence from specific issuing banks and mobile applications;

- effective solution for small businesses;

- fast support service.

The main disadvantages of Tachcard:

- the developed application can sometimes fail;

- waste of time on entering card data (payment not through the application);

- in some cases, a large transfer fee.

The examples considered allow us to assert that the most successful Ukrainian Fintech startups adhere in their development not to all-Ukrainian, but to global trends, which confirms their effectiveness. We can argue that the promising ways of Fintech development in Ukraine are as follows:

- adaptation of the national financial legal framework to the new realities of the contactless economy, the recognition of cryptocurrency;

- offering new technologies for data analysis and risk assessment;

- promoting cooperation between the innovative and traditional sectors of the financial market;

- transition to commission for transactional transfers;

- development of a system for investing in Fintech startups.

V. CONCLUSIONS

This research is devoted to the definition of the main features of the modern development of Fintech. Based on the results of the investigation, the following conclusions were formed:

1. Fintech is a modern, fast-growing innovative industry. In a narrow sense Fintech refers to all IT solutions applicable in the financial market. In a broad sense Fintech is understood as the entire financial industry based on these IT solutions. The

main services provided by modern Fintech enterprises are: payment, investment, credit, insurance, regulation and consulting. Payment and credit services remain the most popular.

2. Fintech is based on modern technologies. The main attributes of the quality of these technologies are: reliability, innovativeness, customer focus, scalability, adaptability, simplicity. Promising technological approaches are: AI & big data, distributed technologies, cryptography, mobile access.

3. In the most developed countries of the world, there are many Fintech startups almost every month. Some of them are worth more than $ 1 billion. Global Fintech development trends are: strong competition, cooperation (in many cases active integration) with the traditional sector, facilitating infrastructure and government support in developed countries.

4. In Ukraine Fintech is still developing. Nevertheless, there are a number of online solutions that can operate successfully even on a global level, such as: Monobank, Tachcard and others. However, first of all, it is necessary to update the law base and overcome the reluctance of many large players in the financial market to introduce revolutionary innovations.

VI. REFERENCES

1. Tymkiv, A. O. (2020). The digital economy and the touchless economy: opportunities for an inclusive society. *International scientific journal «Internauka». Economic sciences, 90(10)*, 19–24.

2. Puschmann, T. (2017). Fintech. *Business & Information Systems Engineering, 59*, 69–76.

3. Philippon, T. (2016). The fintech opportunity (No. w22476). *National Bureau of Economic Research*.

4. Chishti, S., & Barberis, J. (2016). The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries. *Alpina Publisher*.

5. Kiyutsevskaya, A. M. (2019). Fintech: Current trends and challenges for monetary policy. *Voprosy Ekonomiki, 4*, 137–151.

6. Goldstein, I., Jiang, W., & Karolyi, A. (2019). To FinTech and Beyound. *The Review of Financial Studies, 32(5)*, 1647–1661.

7. Mackenzie, A. (2015). The FinTech revolution. *London Business School Review, 26(3)*, 50–53.

8. Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. *Science, 6245(349)*, 255–260.

9. Lee, M. R., Yen, D. C., & Hurlburt, G. F. (2018). Financial technologies and applications. *IT Professional, 20(2)*, 27–33.

10. Abu Amuna, Y. M., Abu-Naser, S. S., Al Shobaki, M. J., & Abu Mostafa, Y. A. (2019). Fintech: creative innovation for entrepreneurs. *International Journal of Academic Accounting, Finance & Management Research, 3(3)*, 8–15.

11. Truong, T. (2016). How FinTech Industry is changing the world. *Centria-ammattikorkeakoulu*.

12. Semenog, A. Yu., & Tsyrulyk, S. V. (2018). The Tendencies in the Development of Fintech Services in Both the GLobal and the National Financial Services Markets. *Business Inform, 489(10)*, 327–334.

13. Gavrilko, T. O., & Antonova, R. (2020). Fintech: Foreign Experience and Development Features in Ukraine. *Uzhorod National University Herald. International Economic Relations And World Economy, 29*, 17–22.

14. Kulysh, G. P., & Romanovska, L. V. (2019). Fintech as a Modern Challenge of Financial Services. *Black sea economic studies, 39(2)*, 116–120.