INNOVATIVE TECHNOLOGIES OF THE DIGITAL ECONOMY AS A DIRECTION OF INVESTMENT IN THE DEVELOPMENT OF UKRAINE

ІННОВАЦІЙНІ ТЕХНОЛОГІЇ ЦИФРОВОЇ ЕКОНОМІКИ ЯК НАПРЯМОК ІНВЕСТУВАННЯ У РОЗВИТОК УКРАЇНИ

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Некрасова Л.А., Поліщук А.С. Інноваційні технології цифрової економіки як напрямок інвестування у розвиток України. Науково-методична стаття.

У статті розглянуто питання інноваційних фінансових технологій у контексті цифрової економіки. Проаналізовано провідний зарубіжний досвід інвестування у фінтех-компанії, доведено на основі аналізу статистичних даних динамічний розвиток фінансових технологій. Виявлено основні особливості фінтех-компаній. Розглянуто кількісні та якісні методи (метод дисконтованих грошових потоків, перший Чиказький метод та метод Беркуса) оцінки вартості компанії, які краще за інших здатні врахувати особливості фінтех-галузі. Доведено, що для зрілих фінтех-компаній оптимальним методом оцінки є метод дисконтованих грошових потоків та перший Чиказький метод. Також було проведено якісну оцінку українського фінтех-стартапу методом Беркуса.

Ключові слова: цифрова економіка, інновації, фінансові технології, Інтернет, методи оцінки вартості, інвестиції

Niekrasova L.A., Polishchuk A.S. Innovative Technologies of the Digital Economy as a Direction of Investment in the Development of Ukraine. Scientific and methodical article.

The article examines the issue of innovative financial technologies in the context of the digital economy. The leading foreign experience of investing in fintech companies was analyzed, and the dynamic development of financial technologies was proven based on the analysis of statistical data. The main features of fintech companies are revealed. Quantitative and qualitative methods (the method of discounted cash flows, the first Chicago method and the Berkus method) of company value estimation, which are better than others, are able to take into account the peculiarities of the fintech industry, are considered. It has been proven that the optimal valuation method for mature fintech companies is the discounted cash flow method and the first Chicago method. A qualitative assessment of the Ukrainian fintech startup was also carried out using the Berkus method.

Keywords: digital economy, innovations, financial technologies, Internet, cost estimation methods, investment

T he pervasion of the Internet into all spheres of life is a global trend today. The transformation of economic activity under the influence of the rapid development of online technologies led to the formation of the digital economy. Innovative technologies of the digital economy contribute to the opening of new opportunities – optimization of business processes, costs, open up new areas of attracting capital and promotion of business projects. One area in which the impact of technology has become particularly significant is finance. As a result of the integration of technology and finance, a new industry called fintech has emerged. Fintech helps to speed up and simplify money-related transactions, and also creates new opportunities.

In the field of financial technologies, radical changes are taking place at the current stage, which are associated with increasing the level of automation, openness and consumer orientation. The importance of this innovative sector is very great, as the global implementation of financial technologies grows by 15-20% annually. In addition, in the conditions of the spread of the coronavirus infection, quarantine and forced isolation, the relevance of the use of digital technologies in the financial sphere began to increase throughout the world.

Analysis of recent researches and publications

The work (Lee, D.K.C. et al, 2015) [1] shows that fintech companies are divided into 2 fundamentally different groups: start-ups and developing ones. Depending on which group a company belongs to, there are reasonable methods and approaches to determine the future profitability of a company. Methods for quantitative analysis of fintech companies are justified in the articles (Rothman & Tiran, 2020) [2] and (Kotova, 2014) [3]. The rationale for the qualitative method in fintech companies is described in (Berkus, 2012) [4].

The aim of the article. The purpose of this work is to analyze the leading foreign experience of investing in financial technologies of the digital economy, to identify the optimal method for evaluating fintech companies as an investment object, and to conduct a qualitative assessment of a Ukrainian fintech startup.

The main part

The term "Fintec" refers to the process of combining technology and finance, which leads to numerous innovations such as online banking, robo-advising, peer-to-peer lending, cryptocurrencies, and so on. The "financial technology market" refers to a rapidly growing market segment where existing and emerging technologies simplify and improve business processes, products and services in the financial sector [5]. The vast majority of fintech companies are located in the US or China due to the country's developed and open approach to innovation. In view of the openness of reporting information on the financial results of companies, the American company Square was chosen as an example of calculating the cost of a fintech company.

A large number of unique fintech companies are created daily. Moreover, due to globalization and the Internet, which creates an ease of international communication, fintech companies are a global trend. According to statistics, approximately 30% of people in the world have access to traditional banking services. As of the end of 2018, 50% of the population has access to the Internet, and more than 56% of the population already use smartphones. The indicators continue to grow, therefore, the study of the fintech industry is extremely necessary, because fintech contributes to an increase in the volume of economic integration in the world and reduces inequality. Thus, this industry is currently attracting many investors. According to the KPMG FinTech Report, global investments in fintech companies in 2018 reached $148 billion across 2.196 transactions. The growth dynamics of investments in fintech companies from 2012 to 2021 can be seen in figure 1.
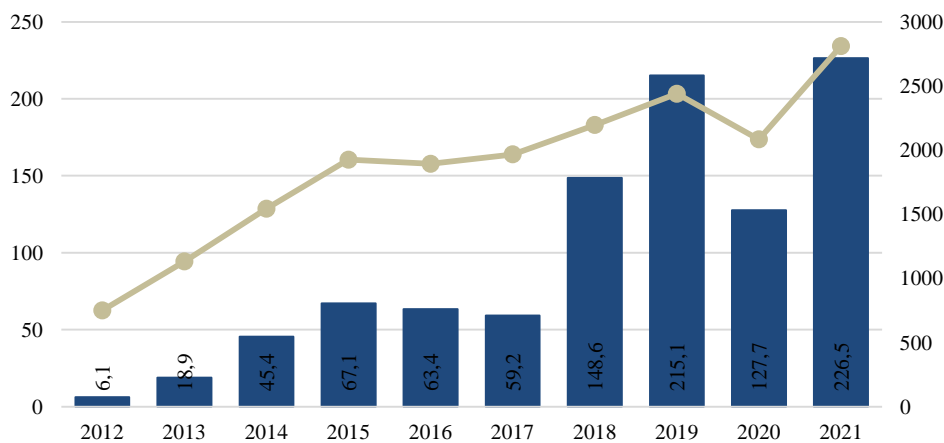

Figure 1. Investments in fintech companies and the number of transactions
Source: compiled by the authors on materials [6-7]

As can be seen from the chart, despite a temporary decrease in the number of investments in fintech companies in 2016 and 2017, the number of transactions continues to grow, and in 2018-2019 the volume of investments shows significant growth. 2020 sees a decline in investment and work due to the global crisis during the COVID-19 pandemic. However, already in 2021, the region was revived and continues to grow rapidly [6].

In order to present a complete picture of the development of the fintech industry, it is worth looking at the quantitative indicators of the age of fintech companies in the world. With the help of the CrunchBase platform, which contains information about public and private organizations, a database of fintech companies with the date of their creation was prepared. In total, information was received on 7.6 thousand operating fintech companies of various industries. In figure 2 presents the distribution of fintech companies by year of foundation. According to the data analysis, the average age of fintech companies created in the period from 2012 to 2021 is 4 years, the median is 5 years. Young companies, whose age is up to 5 years, occupy 60% of the total market of fintech companies, while mature companies make up less than 15% of the total number [6]. Stable growth in the number of fintech companies is observed during the entire period under study, however, the global pandemic of COVID-19 also affected the total number of companies in 2020 [7].

The main source of funding for fintech projects in the world is venture capital, its share in the total amount of funding is more than 70%. An analysis of the current state of the global market of financial technologies showed that the following sectors received the majority of investments: money transfers and payments - 20%, lending and banking technologies – 39%, financial planning – 10%, etc. Global trends in fintech include mobile financial services, financial and account management, money transfers, robot advisors, insurance technologies, crowdfunding, P2P lending, blockchain and cryptocurrencies. In Ukraine, the market of financial technologies is at the initial stage of formation. Today, more than 100 companies work in the field of financial technologies in Ukraine, most of which work in the field of payment/money transfer (38 companies), technology and

infrastructure (36 companies), and mobile wallets (22 companies). According to the information provided in the Ukrainian Fintech catalog 2019, about 70% of fintech companies work without attracting money from third-party investors, of which 61% rely exclusively on their own funds, another 9% – attract money from friends and relatives, 30% use external investments, mainly private investors and angel investments [8].
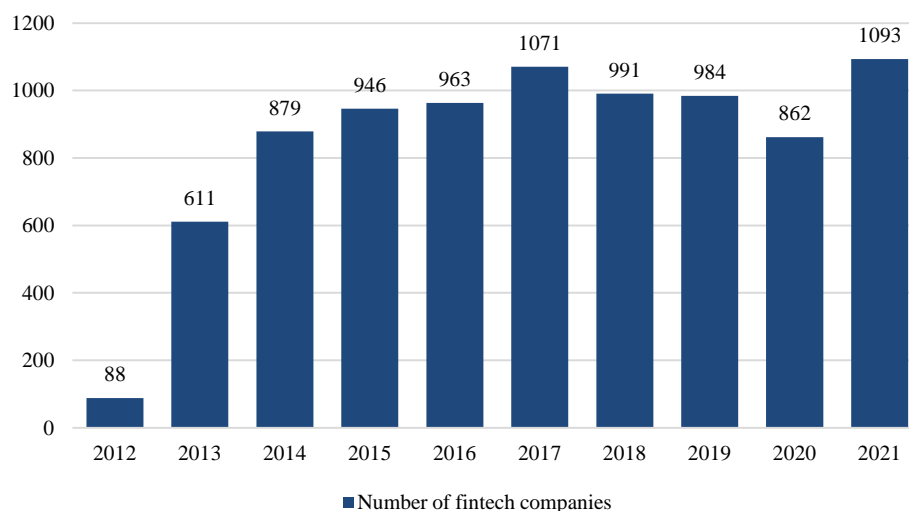

Figure 2. Distribution of fintech companies by year of foundation
Source: compiled by the authors on materials [6, 7]

The crisis situation in the innovative sphere of the Ukrainian economy is caused primarily by the lack of it innovative investment model of market strategy enterprises in the management of innovative activities. According to researchers, the main goal of innovation strategy in Ukraine is to prevent the disintegration of the scientific and innovative sphere and to create prerequisites for the rapid and effective introduction of technical and technological innovations in all spheres of the economy activities, ensuring structural and technological prerequisites at the enterprise level [9].

Valuation of companies is a widely researched issue. Of the many ways to assess the value of companies, those that are best able to take into account the peculiarities of the fintech industry were chosen (table 1).

When analyzing articles by various authors, special attention was paid to methods for evaluating innovative, young and fast-growing companies [2-4].

Table 1. Methodology for evaluating fintech companies

Method name	The essence of the methodology	Formula
Discounted cash flow method	The components of the method are cash flows, which can be defined as a series of expected periodic cash flows from the business. The value of a company using this method is calculated by discounting the company's capital at a discount rate equal to the cost of raising equity, and then adding the market value of the debt to the resulting value.	Cost of own capital= $$= \sum_{t=1}^{t=n1} \frac{FCFE_t}{(1+r_{e1})^t} + $$ $$+ \sum_{t=n1+1}^{t=n2} \frac{FCFE_t}{(1+r_{e2})^t} + $$ $$+ \frac{TV_{n2}}{(1+r_{e3})^{n2}},$$
First Chicago Method	This method involves the calculation of a financial forecast for each of the three scenarios for the company's development: success (optimistic scenario); survival (realistic scenario), failure (pessimistic scenario). The value of the firm under each scenario is calculated using the discounted cash flow method. The last step is an expert assessment of the probabilities of occurrence of each of the scenarios and the summation of the weighted average cost of all scenarios according to the formula.	Value= $\alpha*V_1+\beta*V_2+\gamma*V_3$, $\alpha+\beta+\gamma=1$, where: α, β, γ – the estimated probabilities of each of the scenarios, V_1, V_2, V_3 – estimated discounted cash flows for the three scenarios.
The Berkus method	Dave Berkus proposed the concept of firm valuation, in which the creator must answer one question, will the company achieve $20 million in revenue after 5 years of operation. If the answer is yes, each of the following characteristics must be assessed in the range from $0 to $500.000.	Charasteristics: idea, prototype, qualified management team, strategic communications, product promotion

Source: compiled by the authors on materials [2-4]

This paper considers such approaches to valuation of developed fintech companies as cash flow discounting methods and the first Chicago method. But quantitative methods are not suitable for evaluating start-up fintech companies, because these companies have no financial reporting, that is why the Berkus qualitative method was chosen to evaluate a Ukrainian fintech start-up company Zeely.

The analysis of Square. 1. Discount method. The company has a short history. According to the financial statements presented in Appendix 3, it can be seen that over the 10 years of its existence, the company has not managed to reach the level of positive net profit1. However, by the end of 2018, the value began to approach zero more and more. At the same time, the company's revenue growth rate is increasing annually and reaches 41% in 2018, which tells us that the company is in a stage of rapid growth. It is expected that the growth rate will increase and then begin to decline to the level of economic growth. Accordingly, to calculate the value of Square, build a forecast for 12 years, assuming that after 22 years of its existence (2030), the company will enter the stage of stable growth. In the first step, the expected growth rate will increase from 52% in 2019 to 56% in 2020, and then gradually decrease to 3.7% by 2030. To calculate the terminal value of the company, the growth rate of a stable fintech company engaged in electronic payments is used, equal to 2% [10]. The cash flow discount rates will differ across the three stages as the company's risk decreases over time. The results of calculating the company's value using the discounted cash flow method are presented in tables 2 and 3, in US dollars:

Table 2. Discount rate for Square

Index	Growth	Slowdown in growth	Stability
WACC	12.0%	11.4%	7.1%
Re	21.8%	20.6%	10.7%
Beta	3.20	3.00	1.35
Rd	5.5%		
E/V	43.7%		
D/V	56.3%		
Corporate tax	21%		

Source: compiled by the authors on materials [10]

Table 3. Value of Square by DCF

Period number	1	2	3	4	5	6	7-10	11	12	Stable growth
Projected revenue growth rate	52%	56%	47%	43%	35%	32%	26.4% -10%	6%	4%	2%
FCFF	742	(127)	(50)	101	405	842	7866	3361	3299	91593
Reduced FCFF	662	(101)	(36)	65	236	440	3069	1022	900	24984
Square's value in millions of dollars										$ 31240

Source: compiled by the authors on materials [10]

The first Chicago Method. Since the company is relatively young and historically has not yet begun to turn a profit, but its revenue is growing rapidly, the probability of an optimistic scenario was estimated at 80%, realistic at 15%, and pessimistic at 5%. Table 4 contains scenario projections.

Calculation results in tables 5 and 6.

Table 4. Calculating the value of Square by the first Chicago method

Projected growth rate	Optimistic	Realistic	Pessimistic
1	2	3	4
2019	52%	42%	25%
2020	56%	47%	30%
2021	47%	35%	18%
2022	43%	30%	16%
2023	35%	24%	12%
2024	32%	21%	10%
2025	26%	17%	7%
2026	21%	13%	5%
2027	16%	14%	4%
2028	10%	8%	3%
2029	6%	4%	2%
2030	4%	3%	2%
Post-forecast period	2%	2%	1%

1	2	3	4
Discounted Cash Flows			
FCFF 2019	662	684	718
FCFF 2020	(101)	(73)	(31)
FCFF 2021	(36)	(1)	35
FCFF 2022	65	87	83
FCFF 2023	236	201	138
FCFF 2024	440	316	186
FCFF 2025	703	441	227
FCFF 2026	662	387	187
FCFF 2027	789	418	187
FCFF 2028	915	472	189
FCFF 2029	1 022	517	195
FCFF 2030	900	446	165
FCFF in the post-forecast period	24984	12228	3680
Company value	31240	16121	5959
Scenario probabilities	80%	15%	5%
Total value of Square	$27 708		

Source: compiled by the authors on materials [10]

Table 5. Results of Square's valuation using the first Chicago method

Scenarios	Optimistic	Realistic	Pessimistic
Company value	31240	16121	5959
Scenario probabilities	80%	15%	5%
The total cost	$27708		

Source: compiled by the authors on materials [10]

Table 6. Summary of obtained results in billion U.S. dollars

Method	Result
DCF	31.2
The first Chicago method	27.7
Net value	31.94

Source: compiled by the authors on materials [10]

Thus, the most accurate assessment of the company was obtained using the discounted cash flow method, because when using the first Chicago method, there is a subjective component in the assessment of experts, which can affect the results.

Qualitative evaluation of a fintech company using the Berkus method. On the example of the Ukrainian fintech company Zeely, the application of the Berkus method will be considered. This is a growth marketing app that increases business income for entrepreneurs. The information needed for the evaluation was obtained from the startup website [11]. As part of the Berkus method, it is assumed that after 5 years of operation, Zeely will be able to achieve a revenue of $20 million. Next, the quality characteristics of the company were assessed. The first characteristic evaluated is the idea. Similar platforms already exist, however, they often require a higher fee, unlike the startup in question. The next characteristic is the prototype, indicating the presence of unique, well-developed technologies. It is the process of automating the process of creating a sales-oriented website, sales funnels, automatic launch of Facebook and Google online advertising, integration with a CRM system and analytics in just a few clicks that is unique.

The third characteristic involves the assessment of the company's management team. The CEO & Founder has experience in startups and spent 3 years at Google building and improving company websites. However, the rest of the team of co-founders of the project do not have experience in working with similar projects because they are students at Ukrainian universities. Regarding strategic connections, the company's CEO & Founder is a founder/employee of other fintech companies, which greatly reduces market risk due to the company's management's awareness of the industry, as well as the assumed presence of the necessary connections. The last characteristic evaluates how well the company promotes its services and whether the company has started its activities. To date, Zeely is just starting to gain a customer base with the help of the possibility of registering on the site. Internet sources were analyzed for company information and advertising, and only social networks and a website were found. Accordingly, this characteristic receives a low rating. The evaluation results are presented in the table 7 in US dollars:

Table 7. Berkus Valuation of Zeely

Zeely qualitative evaluation	Value
1. Idea	$400000
2. Prototype	$400000
3. Qualified management team	$100000
4. Strategic connections	$150000
5. Promoting a product or launching an activity	$100000
Zeely company value	$1150000

Source: authors' own development

The total cost of the company according to the Berkus method is estimated at 1.150 million US dollars. The method includes some characteristics of fintech companies and is able to evaluate them, however, because of the 2.5 million limit, however, it may not reflect the real value of fintech startups.

Conclusions

Within this framework, the concept of a fintech company was revealed, trends in the development of the industry were analyzed, forecasts were made for the development of the industry as a whole. In the empirical part of the work, a quantitative analysis was carried out using the discounted cash flow method and the first Chicago method for developed fintech companies, while the Berkus method was used to evaluate start-up fintech companies without financial results. Based on the calculations made and comparisons with the market value, the relevance of these research methods was confirmed. Since the popularity of fintech companies is growing at a noticeable pace, and universal methods for valuing such companies still do not exist, this may be a prerequisite for further research on the issue. It is likely that over the years, when more mature fintech companies appear on the market, it will be possible to build more accurate valuation models that, in addition to assumptions and theory, will be based on average historical data.

Abstract

Innovative technologies of the digital economy contribute to the opening of new opportunities - optimization of business processes, costs, open up new areas of attracting capital and promotion of business projects. As a result of the integration of technology and finance, a new industry called fintech has emerged. The importance of this innovative sector is very great, as the global implementation of financial technologies grows by 15-20% annually.

The purpose of this work is to analyze the leading foreign experience of investing in financial technologies of the digital economy, to identify the optimal method for evaluating fintech companies as an investment object, and to conduct a qualitative assessment of a Ukrainian fintech startup.

Within this framework, the concept of a fintech company was revealed, trends in the development of the industry were analyzed, forecasts were made for the development of the industry as a whole. The vast majority of fintech companies are located in the US or China due to the country's developed and open approach to innovation. Fintech contributes to an increase in the volume of economic integration in the world and reduces inequality. Thus, this industry is currently attracting many investors. In Ukraine, the market of financial technologies is at the initial stage of formation.

In the empirical part of the work, a quantitative analysis was carried out using the discounted cash flow method and the first Chicago method for developed fintech companies. Thus, the most accurate assessment of the company was obtained using the discounted cash flow method, because when using the first Chicago method, there is a subjective component in the assessment of experts, which can affect the results. The Berkus method was used to evaluate Ukrainian start-up fintech companies without financial results. Based on the calculations made and comparisons with the market value, the relevance of these research methods was confirmed.

Since the popularity of fintech companies is growing at a noticeable pace, and universal methods for valuing such companies still do not exist, this may be a prerequisite for further research on the issue.

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