Development of the Ukrainian Financial Market in the Context of Digitalisation

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Abstract: Digitalisation plays an important role in developing the financial market, ensuring speed, transparency, and stability and meeting consumer demands. The Ukrainian financial system is also implementing digital technologies, but it is amid an economic crisis caused by the war. The study aimed to determine the level of digitalisation in the Ukrainian financial market by analysing the dynamics of creation and specifics of financial technology companies (fintech companies). The methods of induction, deduction, analysis, synthesis, logical inference, statistical method of trend identification based on the trend line, and graphical method were used to achieve this goal. The study's results revealed an upward trend in the creation of fintech companies until 2019, followed by a decline due to the pandemic and the war in the country. The activities of fintech companies were dominated by providing technology and infrastructure, personal lending, and mobile wallets. In contrast, the number of companies providing blockchain technology has declined recently. The number of fintech companies in the advisory, analytical, and financial management sectors has increased. Trends in the dynamics of fintech companies over the past 7 years have shown a growing demand for technology and infrastructure, mobile wallets, personal lending, advisory services, and financial management, which indicates the rapid adoption of technology and the strategic digital transformation of the financial market. However, there were no new payment system upgrade companies, neobanks, or blockchain technologies, which limits the options available to users. On the negative side, there was a low level of cybercrime and fraud prevention, which threatened the security of financial transactions.

Keywords: fintech companies, technology and infrastructure, payment systems, lending, blockchain, financial management, cybercrime.

Introduction

The development of the financial market determines the economic success of a country and the favourable investment climate. The evolution of the financial market included the transition from manual financial transaction systems to automated ones, ensuring stability, transparency and speed of transactions. The 2008 crisis and the 2019 pandemic were important factors influencing the development of the financial market. These challenges led to a decline in trust in regulatory structures and traditional financial market players. In addition to stability, consumers demanded decentralisation, which was made possible by digitalisation [1].

Digitalisation has been rapidly introduced into all industries, including the financial sector. Despite the established and stable traditional approaches of financial institutions, banks and brokers have begun introducing digital technologies to respond to consumer demand for better service. Today, almost all financial transactions have alternative online platforms [2]. Among the methods used are automatic robotic systems, artificial intelligence,

Internet technologies, and blockchain [3]. However, the question remains whether such a widespread introduction of information technology in the financial market is safe.

The Ukrainian financial market is also actively adopting digital technologies, but numerous challenges, such as the economic crisis, full-scale invasion, and rising unemployment, affect its characteristics. In this context, we have conducted a study of the transformation of the financial market in the context of digitalisation based on an analysis of the activities of fintech companies.

Literature review

The evolution of the financial market has gone through a complex path from a manual system to the introduction of automated operations [1]. In the United States, the demand for financial services in the 1970s reached a level that exceeded the capacity of manual financial systems and became an incentive for the introduction of automated trading systems using electronic trading platforms. At the same time, the financial system was fragmented. The OTC financial market developed in the 1980s and 1990s, characterised by complexity, transparency, and stability. In contrast, in Europe, the use of technology was limited, and the financial market remained fragmented until the 1990s. In the 1990s, globalisation brought new challenges that required creating a unified platform for payments and other financial transactions. The Single European Payments Area initiative was created for euro payments in Europe. The Continuous Linked Settlement (CLS) system was created in the US to reduce settlement risks in the interbank international currency market [1].

The 2008 financial crisis was an important milestone in the development of the financial market. It reduced confidence in the financial system and prompted the development of decentralised financial mechanisms. In the US, a number of initiatives and laws were adopted to ensure market stability and resilience, bond market clearing, and consumer protection. The single capital market initiative was created in Europe to stabilise the situation [1].

Today, financial systems are reliable, transparent, and equipped with the latest technology, represented by clearing houses, stable and secure payment systems, capital markets, and regulatory frameworks [4]. Nevertheless, the 2008 crisis contributed to the development of decentralised mechanisms made possible by blockchain technology, which democratises business and makes payment transactions simple, secure and cheaper, as it does not require financial intermediary companies [5, 6].

The impact of the COVID-19 pandemic and severe lockdowns, which have opened up the requirements for remote payments, online communication and collaboration, has been a significant driver of digitalisation [7]. The COVID-19 pandemic has hurt stock markets, leading to financial losses or micro-industry bankruptcy, lower stock returns, and worsening investment prospects [8]. On the contrary, companies such as Amazon and Tescsent have increased their revenues during the pandemic [9].

The financial market offers all services in an online format: payments and transfers (mobile applications, e-wallets, peer-to-peer payments, business-to-business payments, digital money and virtual currency); savings and investment (mobile banking, mobile stock market, micro-deposits, blockchain stocks and bonds, mobile trading) lending and financing (online lending, e-invoicing and invoicing, microloans through mobile applications); risk management (digital, electronic, social insurance, online business insurance, regulatory and enabling technologies, smart contracts, crypto asset exchange) [10].

Today, digitalisation is being actively implemented in the financial industry, and new financial technologies are being singled out as a separate area of activity that is an important market player. Although digitalisation undoubtedly has a positive impact on the financial system and meets customer requirements for fast and secure payments, there are certain risks, such as fraud, cybercrime, and loss of personal data, which require constant updating of the technological infrastructure [11]. The technological infrastructure includes the following tools: artificial intelligence, an extensive database, the Internet of Things, automatic robotic systems, and blockchain technologies.

The Internet of Things is a key factor in the digital transformation of the financial system, as it expands transaction opportunities, creates conditions for secure payments and transfers, and enables mobile banking, virtual currency, and IT analytics with credit risk forecasting. Modern IoT applications have a high degree of protection against cybercrime, fraud, and identity theft [12, 13]. Artificial intelligence opens up new opportunities for communicating with customers through chatbots, automated identification of lending risks and bankruptcy, forecasting financial transactions based on behavioural analysis, and accounting. An important achievement of artificial intelligence is the effective counteraction to fraudulent schemes due to the efficiency of expert systems [14]. Blockchain technology allows for simple, transparent cross-transactions, digital customer identification, instant payments, risk analysis, and auditing

[15]. In financial management, blockchain technology helps, in particular, to overcome corruption risks [16]. The most common tool in the digital transformation of the financial market is automated robotic systems, which are widely used by stock brokers and banks, affecting the cost of services and customer satisfaction [17].

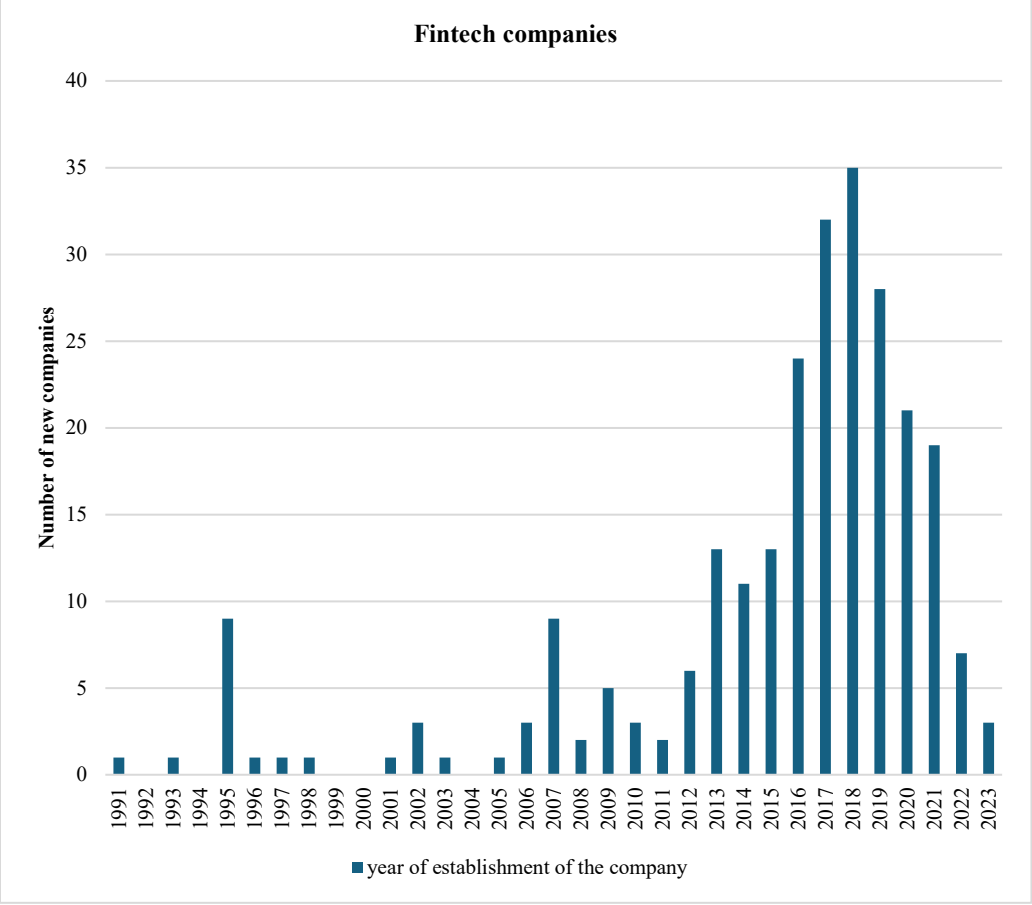
The study aimed to determine the level of digitalisation in the Ukrainian financial market based on an analysis of the dynamics of creation and specifics of the activities of financial technology companies (fintech companies).

Materials and methods

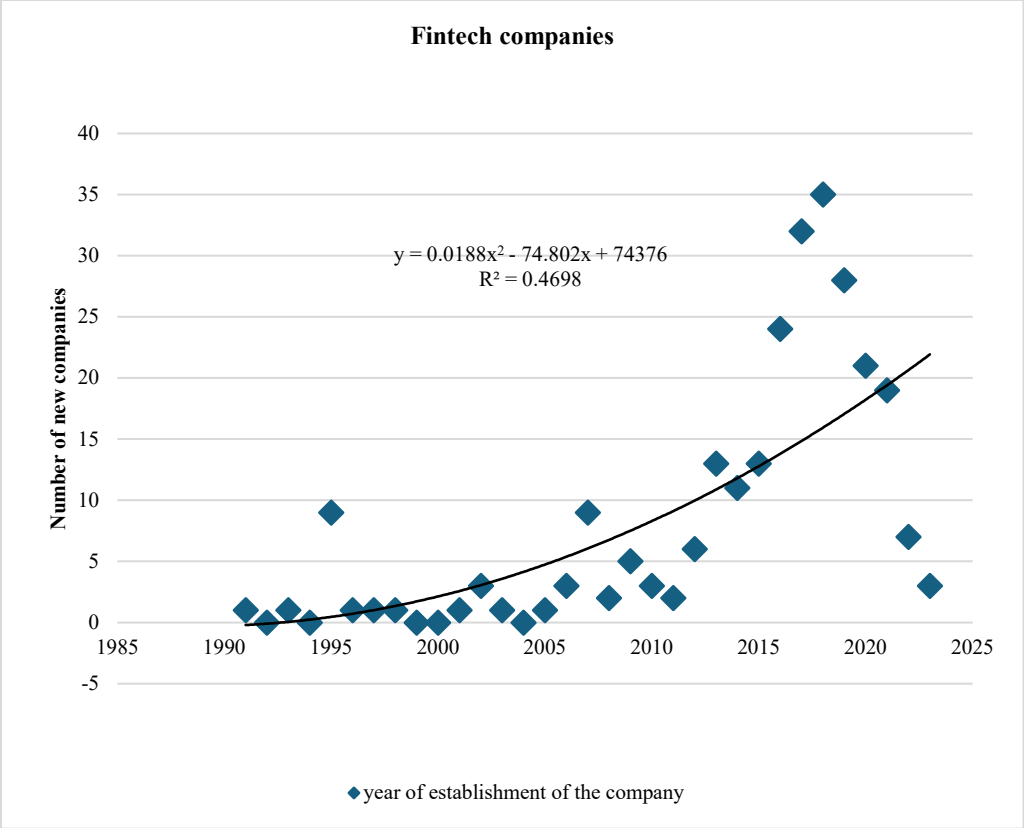
The study used the methods of induction, deduction, analysis, synthesis, and logical inference. Trends were analysed by building a trend line with a probability, and the results are presented as graphs. Statistical calculations were performed in Microsoft Excel. The analysis of fintech companies was conducted based on the Catalogue of fintech companies in Ukraine 2023 and 2024 [18, 19], Fintech in Ukraine: overview and issues [20], Mulyk [21], and identified the specifics of their activities. The results obtained were compared with the data from the current literature.

Results

To determine the role of digitalisation in building Ukraine's financial market, we analysed the dynamics of the creation of financial technology (Fintech) companies from 1991 to 2024. A trend line was drawn to determine the trend in creating Fintech companies. The results are presented as graphs in Figures 1a and 1b.



1a

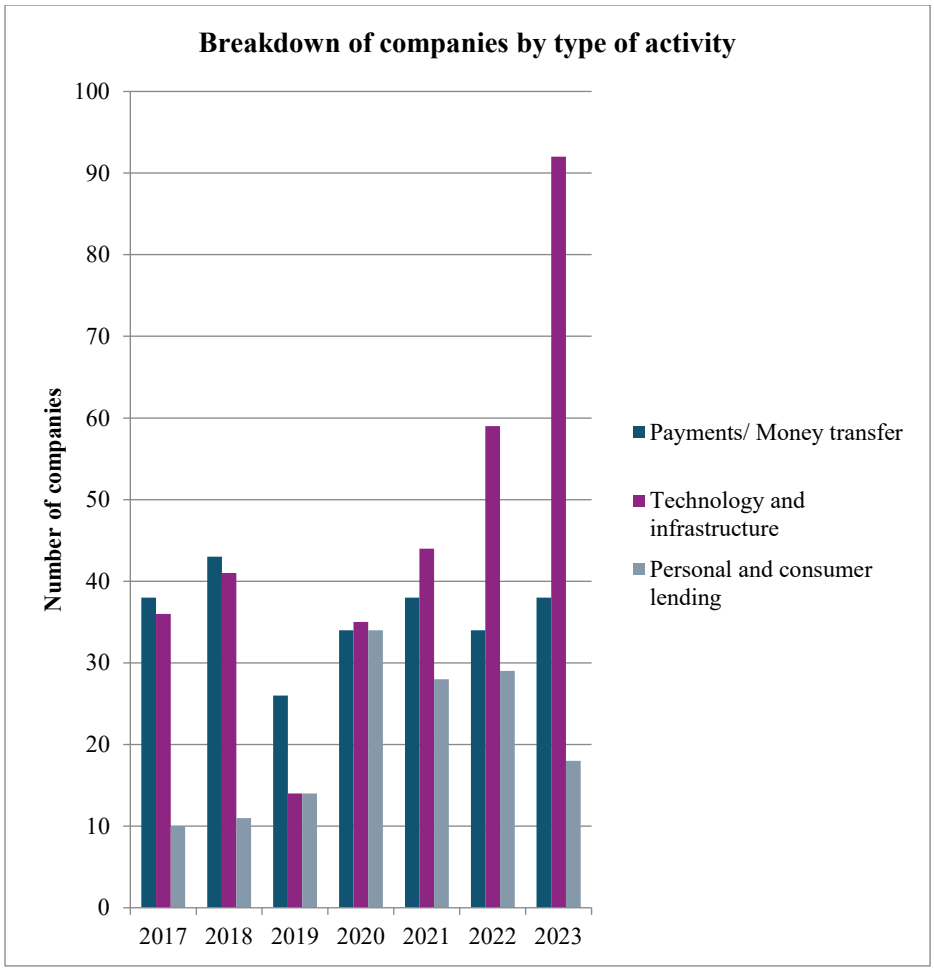


1b

Figure 1. The dynamics of founding new Fintech companies (a), the trend of founding companies based on the trend line (b)
Source: created by the author based on [18, 19, 20, 21]

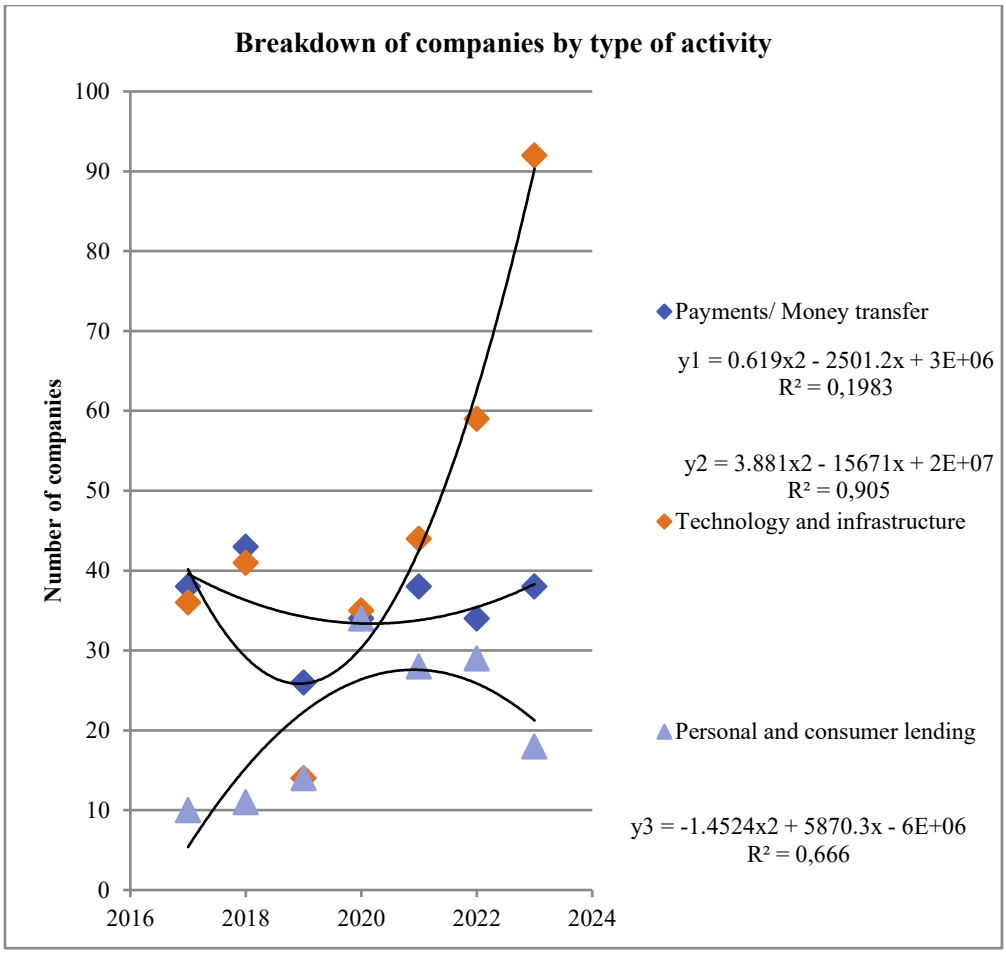
As can be seen from the graph, the trend is described by a polynomial dependence graph with a moderate probability of $R^2 = 0.4698$ of growth. The highest growth rates for companies providing digital technology services were observed in 2017–2021, mainly due to the increased use of remote technologies and consumer demands for mobility in financial services. The pandemic also drove the increase in digitalisation in the financial sector, but the Ukrainian market did not see many new companies enter after the pandemic. This was due to a decrease in the activity of some types of businesses due to the introduction of quarantine restrictions. Another aspect was the large number of Fintech companies in 2018, totalling 229, which could provide the volume of online services that grew in demand due to lockdowns. Instead, after the full-scale invasion began, the number of new Fintech companies in Ukraine dropped sharply, due to increased risks for the market in times of war and a decline in demand for financial technology due to decreased business activity due to the security situation. It is worth noting, however, that the total number of fintech companies in 2023–2024 exceeds the exact figures for 2017–2019. Moreover, despite the risks associated with the war, the value of the market grew from $1 billion to $1.2 billion between 2022 and 2023.

To determine the nature of the financial market and the digital technologies that shape it, we have identified changes in the activities of fintech companies over the past seven years. Technology and infrastructure, payment systems and transfers, and personal loans accounted for the largest share of activity. Figures 2a and 2b show the dynamics of changes in the number of companies engaged in these types of services as a graph.


Breakdown of companies by type of activity
Number of companies
100
90
80
70
60
50
40
30
20
10
0
2017
2018
2019
2020
2021
2022
2023
Payments/ Money transfer
Technology and infrastructure
Personal and consumer lending

2a

Next page



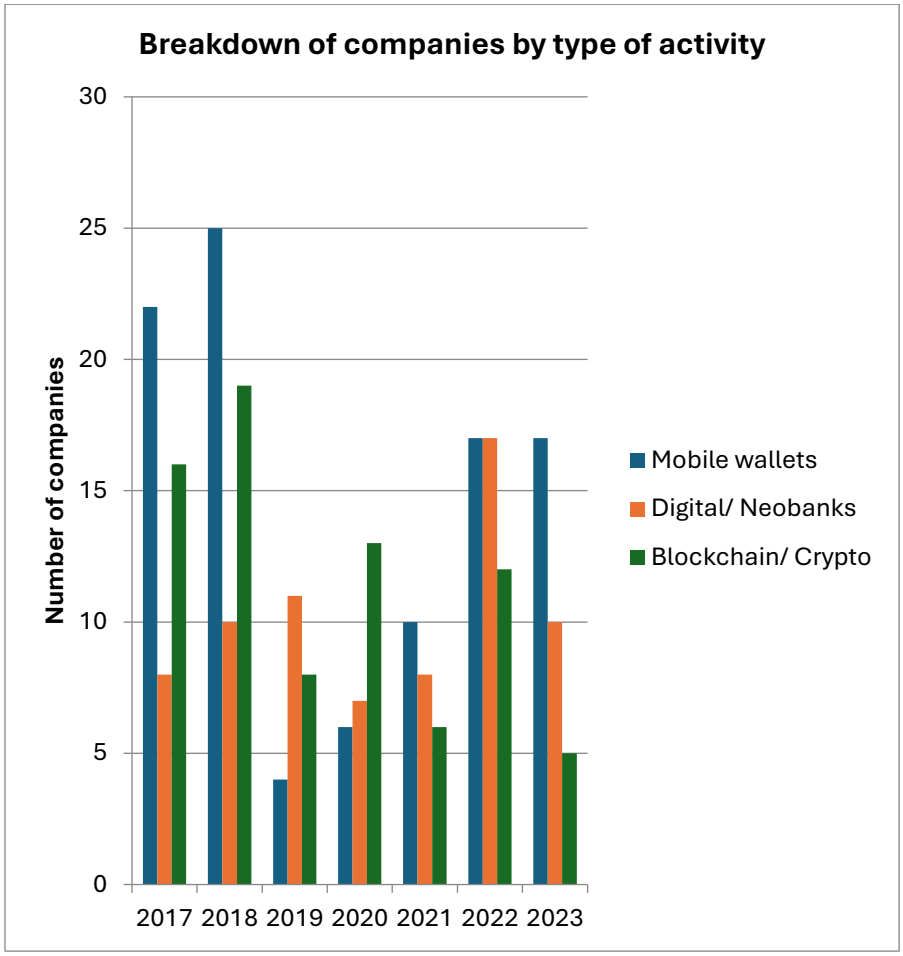
2b

Figure 2. Dynamics of changes in the type of activity of companies in 2017–2023 (a). Trend lines for payment systems (y1), technology and infrastructure (y2), and personal loans (y3)
Source: created by the author based on [18, 19, 20, 21]

As can be seen from the graph, most companies provide technological support and infrastructure services; the trend for this type of service was described by an exponential relationship (y2) with a high probability of further growth R^2 = 0.905. This trend indicates an increase in investment in the development of financial technologies and a growing demand for their implementation among financial market participants. In contrast, activities related to payment systems and transfers (y1) did not change significantly during this period, and there is a low probability R^2 = 0.198 of growth in this type of activity among fintech companies. This trend can be explained by the sufficient development of payment systems that meet the needs of the market, entrepreneurs, and consumers and do not require additional investments. Instead, we observed an increase in companies providing personal loans. The trend for this type of activity was characterised by a polynomial dependence with a moderate probability of decline R^2 = 0.666 in recent years. The growth in demand for personal loans, which often take the form of microloans, indicates the population's low level of financial security. This explains the peak growth of companies that provide them during the pandemic when the unemployment rate suddenly increased. In recent years, despite martial law, the number of personal loan companies has been declining. At the same time, business lending companies' dynamics have remained virtually unchanged over the past 7 years. However, in 2023, there was an episode of growth in business lending among fintech companies, which is explained by the activity of grants and government programmes that help restore business and provide favourable lending conditions.

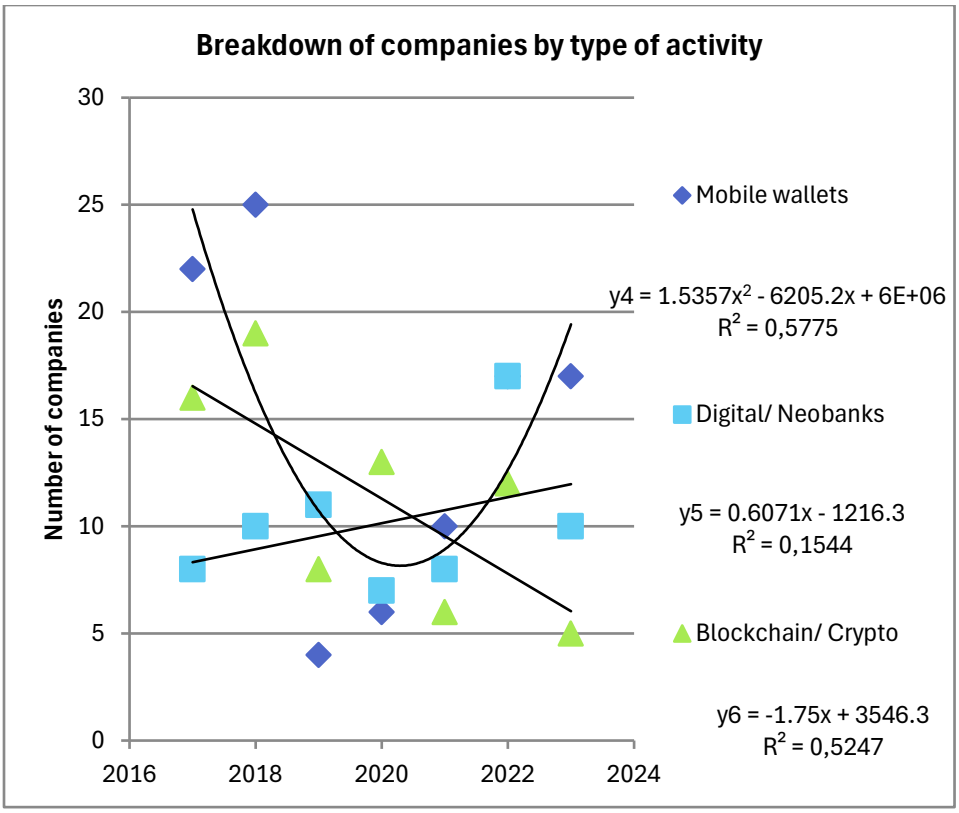
The dynamics of changes in fintech companies' activities in mobile banking, wallets and blockchain technologies are shown in Figures 3a and 3b. As can be seen from the graphs, the share of companies engaged in the development of

mobile wallets is described by a polynomial relationship (y4). It has been trending upwards in recent years, with a moderate probability of further growth $R^2 = 0.5775$. Moreover, the most significant number of mobile wallet companies was identified in 2017–2018, followed by a sharp decline in 2019–2020.



3a

Next page



3b

Figure 3. Dynamics of changes in the type of activity of fintech companies in 2017–2023 (a). Trend lines for mobile wallets (y4), digital and neobanks (y5), and blockchain/cryptocurrency technologies (y6)
Source: created by the author based on [18, 19, 20, 21]

At the same time, the number of companies engaged in developing digital and neo-banks remained unchanged, indicating that the market is sufficiently supplied with neo-banks and their satisfactory performance. As for blockchain technology, the dynamics of companies representing it were highest in 2018, followed by a downward trend (y6) with a moderate probability of further decline $R^2 = 0.524$. This trend indicates a low level of cryptocurrency use in the Ukrainian financial market and a low level of investment in blockchain technology.

In addition to payment transactions, fintech companies are engaged in consulting, analytics, cybercrime, fraud, and financial management. Figure 4 shows data on the dynamics of companies engaged in this type of activity. The graph shows the trend line and trend definition.

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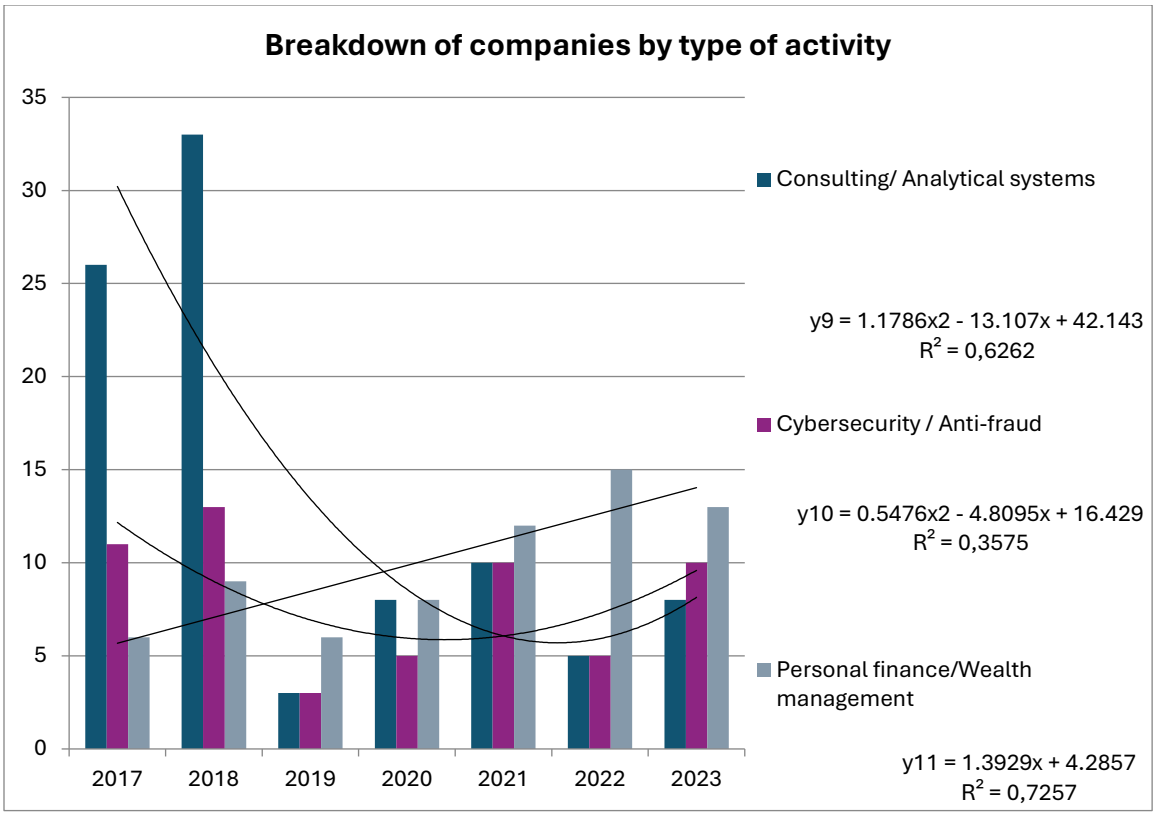

Figure 4. Dynamics of consulting (y9), cybercrime and fraud (y10), and financial management (y11) activities of fintech companies in the period from 2017 to 2021
Source: created by the author based on [18, 19, 20, 21]

As can be seen from the graph, consulting and analytical activities are described by a polynomial relationship with an upward trend with a probability of $R^2 = 0.6262$. This trend indicates the automation of analytical processes in the financial sector, which avoids errors and increases the efficiency of analytical operations. Financial management is also characterised by an upward trend described by a linear relationship with a probability of further growth of $R^2 = 0.7257$. The fight against cybercrime is described by a polynomial dependence with a low probability of further growth $R^2 = 0.3575$. The low demand for cybercrime protection technologies indicates that the financial market is poorly protected from external risks associated with fraud and hacker attacks.

Discussion

Our research has shown an increase in the number of new financial technology companies in Ukraine, especially before 2019. Still, this trend has been downward since the onset of the COVID-19 pandemic and the full-scale invasion. A similar relationship was observed in the global market, which increased fintech companies and market value have characterised over the past 20 years. Still, for Europe, the pandemic period caused the value of the online financial market to fall from $23.2 billion to $22.6 billion, which is explained by a decrease in demand due to restrictions on business activity [22]. On the contrary, the US online financial market received 43% higher profits during the pandemic year compared to the previous one. The activities that prevailed among fintech companies included technology and infrastructure development and personal lending. Demand for technology and infrastructure development indicates the active implementation of digitalisation in the financial system. In contrast, the growth of personal lending companies, especially during the COVID-19 pandemic, indicates economic instability, including unemployment. Nevertheless, for banks, personal lending accounts for a significant portion of their profits, positively impacting the financial market [23].

The study results revealed a stable level of fintech companies implementing digital payment systems and neo-banks, which may indicate that existing companies in the market are meeting users' needs. However, the cooperation of banks

with fintech companies can provide electronic transactions with cybersecurity mechanisms while maintaining the best financial services [24].

We found a low level of use of blockchain technology in the financial market, which indicates a low level of use of cryptocurrencies and other benefits of blockchain technology. Although blockchain technology is sophisticated and multifunctional, it has several disadvantages, such as the low level of security of some resources; for example, the use of AscendEx hot wallets resulted in the theft of cryptocurrency equivalent to $77.7 million [25]. Another problem is the security of personal data and decentralisation, which may pose a threat of creating low-quality smart contracts and energy costs [26].

There is a growing trend towards fintech companies in consulting, management, and financial management, which improves the technological efficiency of internal and external audits, forecasts credit and bankruptcy risks, and improves the quality of consumers. At the same time, it is important to understand that the success of the digital transformation of the market depends on the functions of management, analysis, and forecasting [27]. Although, in practice, the effectiveness of digitalisation may not be immediately apparent in a small company, strategic financial management planning has a positive impact on long-term results [16].

Conclusion

Based on the analysis of the evolution of fintech companies, we identified an upward trend in their creation in Ukraine from 1991 to 2018, but after 2019, the level of new fintech companies began to decline, which was due to the COVID-19 pandemic and the decline in economic activity and the introduction of martial law. Among the types of activities, we identified many fintech companies engaged in technology and infrastructure development, which indicates a positive trend in introducing the latest technologies into the financial system. Personal lending and mobile wallets were also a growing trend in fintech. Meanwhile, the number of companies providing payment systems and blockchain technologies remained unchanged or showed a moderate downward trend. In the area of consulting, analytical services, and financial management, we have identified an upward trend in the number of fintech companies, which indicates a high level of audit, forecasting, risk assessment, and customer service, and is of strategic importance for the digital transformation of financial transactions. On the negative side, we noted the low level of cybercrime and fraud prevention, which threatens the security of financial transactions.

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