DOI: 10.55643/fcaptp.5.58.2024.4505

FINTECH, TECHFIN AND CRYPTO CURRENCY: RULED GAME OR FREE SURF?

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Received: 30/07/2024
Accepted: 06/10/2024
Published: 31/10/2024

ABSTRACT

The development of financial technologies fundamentally changes the face of the financial market, the speed of execution of financial transactions, and opportunities for attracting new customers. The growing role of digital assets (forecast 2024 AUM USD 80.08 billion, the number of users in the digital payment market will grow to 4805.00 million people by 2028) opens up a whole range of issues that arise before the regulatory authorities of different countries, and which need to be regulated, following the rules of the open free market on the one hand, and protecting both entire financial systems and individual users from possible risks arising from the development of new financial technologies. The main goal of the presented research is the analysis and systematization of existing approaches that are used to regulate the activities of economic entities such as FinTech and TechFin, including in the field of circulation of cryptocurrencies as an element of the financial technology market, as well as the substantiation of opportunities and threats for the traditional financial market, which arise as a result of the active development of FinTech and TechFin companies. As a result of a comparative analysis of the characteristics of FinTech and TechFin companies, it was established that these players in the financial market are differentiated by such features as access to capital, access to technology, access to databases, availability and the possibility of using technological infrastructure. It has been established that the absence or low level of harmonization of regulatory norms regarding the provision of financial services can limit competition, provoke unscrupulous behaviour in the market, and negatively affect consumers of financial services. It has been proven that it is the harmonization of regulatory requirements and their differentiation according to established distinctive features that will contribute to preserving the integrity of financial markets and financial inclusion.

Keywords: FinTech, TechFin, cryptocurrency, financial market, regulation, virtual assets

JEL Classification: G2, G3, G16

INTRODUCTION

The development of financial technologies fundamentally changes the face of the financial market, the speed of execution of financial transactions, and opportunities for attracting new customers (Edeh et al., 2022; Koval et al., 2023). According to statistical and forecast data (Statista, 2024), it is expected that in 2024 digital assets will be the largest market with AUM (Assets under management) amounting to USD 80.08 billion, and the expected growth of revenues from digital assets in 2025 will reach +17.38%. At the same time, the number of users in the digital payments market will grow to 4,805.00 million users by 2028. In this aspect, along with traditional financial institutions and FinTech companies, high-tech companies that are not financial institutions but provide financial services, organizing electronic payment systems, financial asset management, etc., are another significant player. At the same time, the latter ones are mostly not subject to traditional regulatory restrictions and measures operating in the financial market, acting as operators of the technological market itself. Thus, the question arises of analyzing and systematizing existing approaches that are used to regulate the activities of economic entities such as FinTech and TechFin, including in the field of cryptocurrency circulation (Grennan, 2022). The formation of a legal framework with approximation to the norms of European and world legislation should be aimed at harmonizing

the terminological base and the general principles of legal regulation of transactions with cryptocurrencies. In the future, on the basis of these regulatory legal acts, it is necessary to develop relevant regulatory documents in the field of accounting, auditing and taxation. Any cryptocurrency that emerged after Bitcoin has the common name of altcoins, which share characteristics with Bitcoin but use a different consensus mechanism to create blocks or verify transactions. There are already about 2,000 such cryptocurrencies (the first altcoin was Namecoin, which appeared in 2011, and differs from Bitcoin in that it has an identification system that allows people to use the blockchain to store information about a person or a site. Digital assets as an element of the market financial technologies, as well as substantiating the opportunities and threats to the traditional financial market that arise as a result of the active development of FinTech and TechFin companies (Pollari, 2017).

LITERATURE REVIEW

Over the past five years, the attention of many scientists has been drawn to the study of issues of creation, development, operation and regulation of financial technology companies. At the same time, the existing position that financial technologies allow solving most of the urgent issues of financial market regulation is considered too simplistic, is a manifestation of "techno-solutionism" and creates a real danger for state policy. On the other hand, Allen (2024) states that FinTech together with artificial intelligence, blockchain, cryptocurrency mining, BigData, crypto and central bank digital currencies is presented as a unique and effective interactive system that includes finance, technology and law. Blockchain technology and the principles of its use in simplifying society's life were studied as the possibilities of blockchain technology are almost limitless (Mahmood and Dabagh, 2023).

This technology can be used in the energy industry to regulate demand in the electricity market; in voting for candidates and selecting them for power; analysis of ecological factors affecting the environment from human activity; search and decision-making in conditions of uncertainty, etc. They offer a new approach to mining that is more environmentally friendly, studying the mining process and the conditions that encourage individuals and legal entities to engage in this activity. A relationship was established between the mining process, the increase in the hash rate of the network and the amount of electricity consumed (Zheng et al., 2023).

The potential bidirectional relationship between the price of cryptocurrency and electricity consumption remains unknown. The economic and legal regulation of transactions with cryptocurrencies as a component of digital assets is considered in a monograph (Kud, Kucheriavenko and Smychok, 2019).

The focus of attention of researchers (Buckley, Arner and Zetzsche, 2023) is also the issue of proper regulation of the financial technology market. In particular, research on regulation (Buckley, Arner and Zetzsche, 2023) emphasizes the feasibility of focusing efforts on reducing the cost of coordinating complex financial services with liability, financial crimes, tax obligations, etc. At the same time, offshore, regulatory sandboxes, self-regulatory organizations, etc. are considered effective regulatory solutions. In existing research, there is also a clear understanding of the need to develop new approaches at different levels of economic systems in order to maximize the benefits of synergistic and network effects, the scale of digital finance and simultaneously track and control the possible risks of platforming finance through existing regulatory reserves.

Moreover, as the technology firm transitions to a state (Arner et al., 2021; Zetzsche et al., 2017), the regulator must understand and timely identify the moment when the technology firm itself turns into a regulated financial institution, since in these conditions uncovered, unsettled and unidentified risks of regulatory arbitrage, as well as the likelihood of unfair competition, become key issues.

AIMS AND OBJECTIVES

The main goal of the presented research is the analysis and systematization of existing approaches that are used to regulate the activities of economic entities such as FinTech and TechFin, including in the field of circulation of cryptocurrencies as an element of the financial technology market, as well as the substantiation of opportunities and threats for the traditional financial market, which arise as a result of the active development of FinTech and TechFin companies.

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METHODS

In the process of the presented research, a set of methods of scientific knowledge was used, which made it possible to achieve the set goal. In particular, the main trends of the FinTech market and the impact of TechFin companies on the development of the financial market were determined using statistical data analysis methods. The application of comparative analysis methods made it possible to determine the differences in the nature of the functioning of financial market participants such as FinTech and TechFin companies, which became the basis for further assessment of the opportunities and threats of the functioning of such companies and the necessary steps to regulate their activities.

The use of a systemic approach made it possible to systematize the existing approaches to regulating the activities of FinTech financial market participants, as well as the international experience of recognizing the nature of cryptocurrency and its institutional support.

The critical analysis of the scientific works of modern scientists made it possible to determine the degree of relevance of the task from the point of view of scientific approaches and to identify previously unresolved issues, which became the motivational basis of the presented research.

RESULTS

Analysis of statistical data on market activity shows that due to a combination of global problems, including high interest rates, constant inflation in various regions of the world, the war in Ukraine and the Middle East, as well as growing caution and negative opinion of FinTech investors about exit routes from this market, in 2023, there was a significant drop in such investments.

Aggregate investment in FinTech fell sharply to a five-year low of USD 113.7 billion across 4,547 deals, down 42% from the USD 196.3 billion announced in 2022 and the weakest showing since 2017. At the same time, it should be noted that such a decrease occurred in all sectors of the FinTech market: payments - a decrease in financing volumes by 2.8 times (from USD 57.9 billion in 2022 to USD 20.7 billion in 2023); Regtech - 8 times (from USD 21.0 billion to USD 2.6 billion), Wealthtech - 4 times (from USD 0.8 billion to USD 0.2 billion), blockchain and cryptocurrencies - 3.2 times (from USD 24.3 billion to USD 7.5 billion). It is characteristic that against the background of such a drop, the growth of funding in the insurance sector and environmental and social projects, in particular: InsurTech - USD 8.1 billion in 2023 compared to USD 5.9 billion in 2022; ESG/Greentech - USD 2.3 billion in 2023 compared to USD 1.2 billion in 2022. At the same time, the cyber security sector remained practically unchanged: from USD 1.7 billion in 2022 to USD 1.3 billion in 2023. However, the number of deals decreased in all sectors. Such an observation makes it possible to confirm the fact that the issues of insurance, social, and environmental responsibility and security of payments remain relevant both for investors and for regulatory authorities, since in the EU regulatory regulations regarding cryptocurrencies will come into force only in 2024 (Markets in Crypto Assets Regulation - MiCAR), Electronic Identification and Trust Services (eIDAS 2.0), Corporate Sustainability Reporting Directive (CSRD) and Green Asset Ratio, which concerns the field of ESG/Greentech.

Also, the Consumer Credit Directive, Late Payments in Commercial Transaction Directive, and Payment Service Directive 3 (PSD3) are under discussion. Ripple, which increases the speed of banking operations and thereby saves money on them, was created by order of venture capital funds that are focused on investing in a high-risk project that allows for extra profits. That is, if the turnover of the bank is USD 5 million, and the number of transactions is 300 thousand per year, then one can save USD 3.4 on each transaction. In a year, the bank can save more than USD 1 million. A peculiarity is the universal exchange protocol of various cryptocurrencies RTXP and the use of the intermediate internal cryptocurrency XRP. If two counterparties cannot find a common currency/gateway combination, they can use XRP as a neutral currency without any counterparty risks. The Ripple network is not tied to any specific currency. Users can use their preferred currency, be it USD, BTC, XRP or something else. It is a universal tool for exchanging one value, expressed in certain units of value, for another value through a decentralized system of market makers and the shortest route of convertibility (Nugraha et al., 2022.). Bypassing the chain of intermediate participants, and manually entering into agreements, the protocol itself optimizes the traffic, calculating the optimal nodes (as the shortest route in the navigator) and offers the best solution for users.

Regulatory authorities and TechFin companies are not left out (Zheng et al., 2023). According to the report of the Bank for International Settlements, 11.3% of the income of TechFin companies comes from financial services, which, taking into account the volume of their income, is a significant amount, especially compared to FinTech companies, which mostly operate as startups and do not have wide access to financial market resources (Aldboush et al., 2023). European regulators are actively applying numerous disciplinary actions against such TechFin companies as Google for violating antitrust laws,

Amazon, Facebook and Apple for various violations of privacy, data sharing and anti-competitive business practices, etc. To form a clear vision regarding the peculiarities of the functioning of the FinTech market and the role of TechFin companies in the financial market, a comparative analysis of FinTech and TechFin companies regarding the peculiarities of their functioning will be conducted, paying attention to regulatory aspects as well. The business use of cryptocurrency during payment transactions has been rapidly increasing in recent years. For example, such global giants as PayPal, Microsoft, Overstock, and Expedia already accept cryptocurrency as a payment method. The increased demand for the use of this asset forces the governments of various countries around the world to decide on its status, and the Committee on International Financial Accounting Standards to start the development of a unified standard that would determine the methodological principles for the formation of information about cryptocurrencies in accounting and its disclosure in financial reporting because currently neither US GAAP nor IFRS address this issue.

The Global Financial Sustainability Report 2021 (Hubanova et al., 2021) states that the size of the decentralized financial market has increased from USD 15 billion at the end of 2020 to about USD 110 billion as of September 2021, which occurred primarily due to the rapid growth of 1) decentralized exchanges that allow users to trade crypto assets without intermediaries; 2) credit platforms that do not assess the credit risk of clients. This is the case when a certain phenomenon occurs in society without existing institutional support, in the so-called legal vacuum. This was the case with the advent of radio, cars, the Internet and many other achievements of scientific and technological progress. The same thing is happening now with the new alternative money - cryptocurrency. The latest UN report "The Age of Digital Interdependence", which was presented at the beginning of the summer of 2019, was precisely about the challenges that humanity faces in the digital age. In the spring of 2019, the OECD, in its report "Solutions to the tax problems of digitalization of the economy", thoroughly investigated the change in the tax sphere, the principles of income generation through digital tools, in particular cryptocurrencies.

According to expert estimates (Novak et al., 2022), the number of users of crypto assets, a significant part of which is cryptocurrency, was more than 100 million people on the planet. For 15% of them, crypto-assets became the main source of their income, and for another 36% - a significant source of income. However, despite the rapid development of cryptocurrency operations in different countries of the world, the regulatory and tax bases for their implementation are very different, starting from what kind of object should be recognized as cryptocurrency, and ending with the institutional basis. New tasks are being formed before the states, related to the need to regulate cryptocurrency operations, compare the positive sides with the existing risks, and integrate blockchain innovations into the current financial and legal system. Banning or completely ignoring transactions with cryptocurrencies is just a disclaimer. However, blockchain technology already exists and it works. In contrast to the old technologies, as e-mail once supplanted ordinary mail, and messengers - telephones, cash - coins made of precious metals. Business is already ready to use cryptocurrency, smart contracts and other blockchain tools (Mahmud et al., 2023.).

The world's largest banks are not only studying but are already implementing new modifications of blockchain and alternative analogues. In the case of individual countries, the historical section of the development of the researched topic clearly illustrates the complete inability of most states to respond adequately and competently to IT innovations and the scientific and technological revolution. Globalization causes problems with the legal regulation of cryptocurrency circulation. It is impossible to solve these problems with traditional power tools and methods, as it is necessary to take into account the socio-economic factors of the modern world and the conflicts of jurisdictions of individual countries. At this time, at the legislative level, it is necessary to recognize that cryptocurrency is already an objective economic and legal phenomenon that requires the creation of optimal legal conditions for its development. Amendments to the current legislation should not allow Ukraine, in particular, to fall out of the general trend of financial technology development and allow capital outflow, and at the same time - minimize the risks of using cryptocurrency to legalize criminal income and finance terrorism. Under these conditions, science should offer for practice a legal concept of cryptocurrency that would define its subject boundaries and demarcate zones of free and shadow circulation.

Japan, which has a stable economy and uses the latest technologies, recognized Bitcoin as a legal means of payment back in April 2017. The consequences of this process for the Japanese economy were the growth of demand for cryptocurrencies from investors and the start of using Bitcoin as one of the payment methods in retail stores (Bitcoin as payment is accepted by several large networks). In accounting, cryptocurrency is shown as "an asset-like value", as a result of which, in the process of sale, it is subject to VAT. Representatives of the Bitcoin business in Japan began to actively unite in groups. Their goal is to promote the benefits of Bitcoin-related businesses (Table 1). For example, the Japan Authority of Digital Asset (JADA) group is the only one in the field of bitcoin business that provides for clear regulation of internal standards and the development of a code of conduct for its members. In the process of organizing the group, preliminary consultations were held between representatives of JADA, the government committee on information technology and the Financial Regulation and Supervision Authority of Japan (FSA).

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Table 1. Main indicators for countries favourable to mining in 2023. (*Source: generated by the authors based on KPMG (2024)*)

Number in the Rating	Country	Average cost, USD	Average internet speed in MB/s	Terms for business %	Average temperature
6	Uruguay	195.3	22	94	18.4
3	Japan	170.6	78	34	11.9
5	United Kingdom	164.8	52	7	10
1	Austria	149	16	22	8.5
4	Sweden	121.5	87	10	4.1
7	USA	107.8	77	6	9.3
2	Canada	61.3	70	18	-4.9
8	Ukraine	48.5	33.5	76	8.4

As a result, JADA has developed an approach that allows it to occupy a niche as the official guide of Bitcoin business interests in government bodies. Such a model will be an option for many countries that are currently working on the issue of establishing relations between the innovative cryptocurrency system and the current legal field. Table 1 shows the main indicators for countries that contribute to cryptocurrency mining in 2023. Among them are the technical requirements for the mining process, namely: Internet speed, temperature in the country, and business conditions (in terms of the complexity of the taxation process). By 2020, Japan's major banks planned to create a national currency, J-coin (Cryptocurrency.tech, 2017). to reduce the country's dependence on cash, which accounted for 70% of the total volume of transactions. However, as of the beginning of 2022, it was possible to launch the J-coin pilot project, which will be used to pay for goods and services throughout the country using smartphones (scanning QR codes). However, J-coin will be very different from other cryptocurrencies. First, it will have an issuing bank (a separate company was created to manage it), and secondly, the value of the new currency will be secured by the yen.

Therefore, FinTech companies encompass technological innovations and solutions used to optimize or simplify access and implementation of financial services and operations, which include mobile banking applications, payment systems, online lending, robotic investing, etc. At the same time, FinTech companies mostly appear in the form of startups and remain in this form for quite a long time, passing through various stages of financing from Family & Friends, through several rounds of financing (seed round, A, B, C, ...) before actually entering the IPO market or resort to M&A operations, merging with large financial institutions, or becoming part of TechFin companies, which thus buy a ready-made financial solution together with a certain client base. Entering the financial market, FinTech startups do not have access to a wide range of sources of financing, being limited not only by the respective stages of their development and the sources of financial resources inherent in each stage but also by legislative requirements regarding participation in the financial market, access to certain sources and forms of financing, etc. At the same time, FinTech startups, especially at the initial stages of development and primary rounds of financing, are in a high-risk zone, since their innovative solutions may not find popularity among users, become the subject of new unpredictable regulatory restrictions, actions of more powerful competitors, both from traditional financial institutions and FinTech companies that have already strengthened their positions on the market, or even TechFin, which have greater technical capabilities to implement certain technological solutions. That is, being under severe pressure from traditional financial institutions in the fight for the client, other previously established FinTech companies in the competition for the market segment and TechFin companies in the field of quality and reliability of technological solutions, FinTech companies are additionally under pressure from regulatory bodies of various countries depending on their localization, facing certain restrictions not only regarding the execution of certain financial transactions but also regarding the protection of customer data, open data, reporting, etc.

When considering cryptocurrency as a financial instrument, it is necessary to comply with three basic conditions:

- the existence of contractual relations;
- the existence of two parties in the relationship;
- the simultaneous occurrence of an asset, on the one hand, and a financial liability or capital instrument, on the other.

Cryptocurrency can be a financial instrument only if the following conditions are met:

- the state, any international body or specific entity will control the emission of cryptocurrency;
- the issuer recognizes the owner's right to convert cryptocurrency at a certain rate;
- the issuer will be able to insure the cryptocurrency in the Global Guarantee Fund

Thus, most cryptocurrencies, which have a decentralized emission and are not tied to any physical assets, cannot perform the role of a financial instrument. At the same time, some cryptocurrencies (for example, the Tether stablecoin, which is backed by fiat money and issued by the Tether company), have a centralized emission and are tied to physical assets, corresponding to the characteristics of financial instruments, and in this case, investing in this instrument is quite fair to recognize as financial investment. The issue of determining the accounting value of cryptocurrency is unresolved, as there is no methodology for its determination in Ukraine and the world. Even if we consider cryptocurrency purely as an intangible asset that must be credited to the balance sheet of the enterprise at its initial cost, which consists of the cost (purchase) price and other costs associated with this asset, the valuation of the value of intangible assets is a very complex issue. This is due to the specificity of this category, the lack of evaluation standards, an insufficiently formed active market that is constantly developing, and new cryptocurrencies are being developed. All this complicates the assessment of this object. Thus, Figure 1 shows a structural and logical diagram of the influence of factors on cryptocurrency mining. Among them are the technical conditions of such a process: equipment capacity indicators, equipment cost, exchange rate differences, depreciation, cost components, etc.

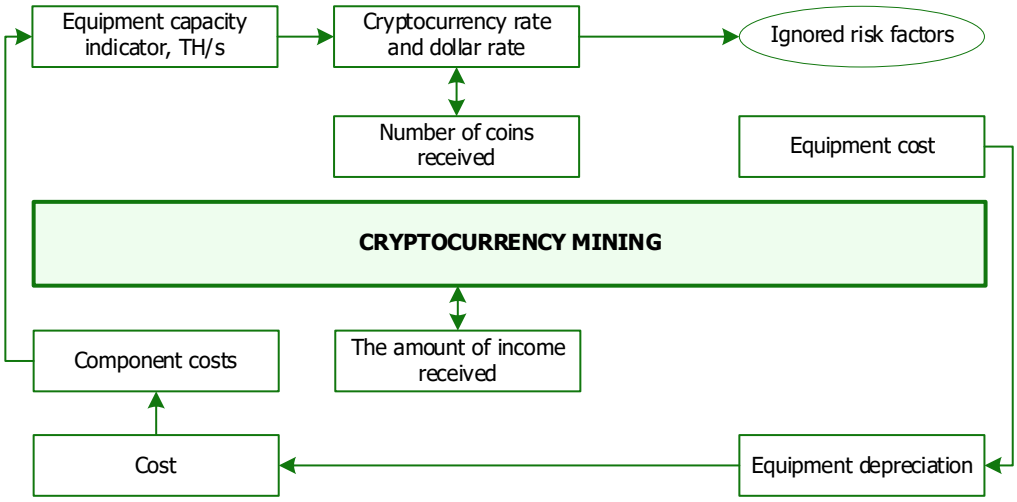

Figure 1. Structural and logical diagram of the influence of factors on the mining process.

Are TechFin companies in a better position than FinTech? It should be understood that when technology giants (BigTech) or companies that are not traditional financial institutions, such as, for example, Google, Amazon, Facebook and Alibaba, use their technological infrastructure and expertise, technology and access to big data to create innovative financial solutions and the provision of financial services, they often resort to cooperation with traditional financial institutions or use their services to provide themselves with legal and regulatory protection. TechFin companies have large financial resources and can finance their financial initiatives at the expense of their own funds (Table 2).

Table 2. Market indicators of 10 TechFin companies at the beginning of 2024, USD billion. *(Source: built using CompaniesMarketcap (2024))*

№	The company name	Market capitalization	Earnings
1	Apple	2 830	121.41
2	Alphabet (Google)	2 109	96.14
3	Amazon	1 972	49.42
4	Meta (Facebook)	1 205	54.82
5	Alibaba & Tencent	193	17.30

An important competitive advantage in the financial technology market is that TechFin companies use significant internal resources to develop and implement new financial services based on their existing technological infrastructure, freeing the company from the need for additional investment in the creation and development of this technological infrastructure, at least in the initial stages of implementation of financial services. It is also obvious that with a multi-billion level of market capitalization and profits (Table 2), such companies have more flexible financing strategies since they have not only large financial resources but also access to capital markets, attracting additional capital both in the form of equity capital, as well as a wide range of debt instruments.

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Accordingly, TechFin: companies generally face fewer risks related to raising, allocating and using financial resources, however, as mentioned above, most of them face regulatory or competitive factors that can also significantly limit their activities. Despite the existing advantages of the operation of TechFin companies in the financial market, in particular: the use of innovative technologies and technological infrastructure to increase the availability, convenience and inclusiveness of financial services, in the fields of electronic commerce, mobile banking, insurance and investment, the growth of TechFin companies can lead to high, and sometimes excessive concentration of power in the hands of a few large technological market players, which antitrust legislation is designed to combat.

In addition, the use of large amounts of TechFin personal data by companies that systematically accumulate, store, use and update them may cause problems with the level of protection of the privacy of the user's personal life, as well as with ensuring the security of storage, use and distribution of such data. In this aspect, the emphasis should be on cyber security, which should not only protect users' personal data from third parties but also prevent the unfair use of accumulated data by the technology companies themselves as a tool of unfair competition. In this aspect, the regulator is entrusted with a difficult and complex mission to determine the limit where the use of personal data not only does not violate the privacy of the user's life, harm his financial condition, and psychological and personal health, but, while leaving the freedom of entrepreneurial activity for the company, regulates the degree of dependency of users of relevant services, including financial, ensuring a sufficient level of competition for further innovative development. It should be taken into account that compared to traditional financial institutions, TechFin companies often have less regulatory coherence, which can create risks from the point of view of not only the protection of service users but also the stability of the market as a whole.

Thus, both FinTech and TechFin companies operate in a saturated, highly competitive financial market, relying on their own advantages in terms of mobility, technology, access to relevant data, technology and technological infrastructure. At the same time, competing on the financial market with traditional financial institutions, both types of companies have the advantage of less regulation of activities on the financial market, but face other significant limitations regarding their functioning. The study of the regulatory framework shows that the regulation of FinTech activities in the European Union and in Ukraine differs in a number of key parameters. In particular, significant differences are observed in the field of harmonization of legislation, both externally and within the Ukrainian financial market. However, the key factor is precisely the degree of development of the FinTech market in the EU and Ukraine, which significantly restrains the development of relevant financial technologies. For example, each type of cryptocurrency has different liquidity and volatility, which must be taken into account when making investment decisions. In general, all current assets are divided into 3 classes according to the decreasing level of liquidity: 1st class – cash and current financial investments (the most liquid assets); Class 2 - promissory notes, accounts receivable; Class 3 – stocks, unfinished products, finished products. Non-current assets are the least liquid.

The dissonance is that de facto cryptocurrency should belong to the 1st class of liquid assets, and de jure - in the vast majority belongs to the 3rd class, and even to the least liquid non-current assets. Therefore, with the adoption of regulatory documents that would recognize cryptocurrency as a means of payment, it is necessary to develop appropriate accounting standards and recognize cryptocurrency as another means. The existing situation thus distorts the indicators of financial reporting, which affects the analysis of indicators of solvency, creditworthiness, etc. Therefore, regulatory control of transactions with cryptocurrency is relevant. After all, the preparation of financial statements is the ultimate goal of financial accounting. At the same time, it should be taken into account that financial reporting must also meet quality criteria. The quality of financial reporting requires a reliable reflection of the economic situation, a low capacity for managerial manipulation, and the timeliness of providing information. It is accepted to distinguish four qualitative characteristics that increase the usefulness of financial information that is relevant and reliably stated - it is comparability, reliability, timeliness and comprehensibility. The international experience of legal regulation of transactions with cryptocurrencies differs significantly: from full recognition as a legal means of payment to a complete ban, however, the volume of transactions de facto is growing, including in Ukraine. The formation of a legal framework with approximation to the norms of European and world legislation should be aimed at harmonizing the terminological base and general principles of legal regulation of transactions with cryptocurrencies. The definition of cryptocurrency is necessary not only in accounting at enterprises but also in accounting in the financial sector. In the future, on the basis of these regulatory legal acts, it is necessary to develop relevant regulatory documents in the field of accounting, auditing and taxation.

It should be noted that after the adoption of the Strategy for the Development of Finetech in Ukraine until 2025 (NBU, 2020), Ukraine took a significant step towards the regulatory norms adopted by the EU. According to the Report on the Implementation of the Fintech Development Strategy in Ukraine until 2025 for 2021 (NBU, 2022), by the end of 2021, the ratio of non-cash card transactions (including P2P) to the total number of transactions was 90.1% (in comparison with the plan for 2025, no less than 85%), the rules for the use of QR codes were introduced and updated, and 6 banks integrated the QR code, the SEP works 24/7, the Law of Ukraine "On Payment Services" was adopted (from June 30 2021, No. 1591-

IX), which introduced a new regulation on the payment market in Ukraine, the draft law on investment funds, which provides for the formation of a legislative framework for the activity of investment funds in Ukraine in accordance with the European rules defined by UCITS, AIFM, VCF, is being developed, the NBU joined Global Financial Innovation Network (GFIN), etc. Of course, Russia's full-scale aggression against Ukraine made adjustments to the development of the FinTech market, but the FinTech market of Ukraine has 246 companies, 7 of which were founded in 2022. At the same time, the total valuation of the market remains at the level of USD 1 billion, which is several orders of magnitude less than the market value of individual successful FinTech startups. The regulation of TechFin activities in the European Union and in Ukraine also differs significantly due to the difference in the level of market development, approaches to regulation and the presence of specialized legal acts. In particular, the rules for payment services are established not only for traditional financial intermediaries but also for TechFin companies. The General Data Protection Regulation (GDPR) regulates the activities of TechFin companies in the field of accumulation and distribution of financial information. Other aspects related to the functioning of digital currencies, finance, financial platforms, etc. are also subject to regulation. Ukraine is just developing its TechFin regulatory system. To date, there are separate legislative acts that relate to payment services and electronic money, but they are not always adapted to the specifics of technology companies that offer financial services (Unal and Aysan, 2022).

When determining the legal status of a cryptocurrency, one must be guided by the Decision of the European Court of Justice in case No. C-264/14, which states that a virtual currency cannot be considered "tangible property", a current bank account, a deposit account or a money transfer, cannot be considered a security or an instrument certifying the right to property. Currently, most countries are focused on attracting Bitcoin to their investment markets (Hossain, 2021). The process of its analysis, full description and further forecasting is underway since it is impossible to tax an object if the process of its formation, creation and functioning is not fully understood. The imposition of excessive rates from irrational taxes will lead to the fact that cryptocurrency will "bypass" Ukraine, which will have a negative impact on the economic and social development of our state. The main goal of tax officials is to define the concept of cryptocurrency taxation and the procedure for its implementation based on the experience of progressive countries. The lack of official recognition of cryptocurrencies and the corresponding legal framework leads not only to the unsettled process of accounting for transactions with cryptocurrencies but also to uncertainty regarding their taxation. In different countries of the world, there are different taxation policies for operations with cryptocurrencies. For example, in Israel, cryptocurrencies are taxed as an asset, while in Argentina and Spain, they are subject to income tax. The Swedish tax authorities have increased their control over crypto-currency transactions, as a significant number of them are carried out illegally. In the countries of the European Union, cryptocurrencies are not considered property or goods. Most states have clearly defined those cryptocurrencies are currency (Makurin et al., 2023).

As a result, it is impossible to tax the value of cryptocurrency. But if cryptocurrencies are treated as digital coins or digital assets, financial instruments or intangible assets, capital gains or wealth tax may apply. A separate significant issue is the issue of identification and regulation of the cryptocurrency market. The lack of official recognition of cryptocurrencies and the corresponding legal framework leads not only to the unsettled process of accounting for transactions with cryptocurrencies but also to uncertainty regarding their taxation (Chowdhury et al., 2022). In different countries of the world, there are different taxation policies for operations with cryptocurrencies. For example, in Israel, cryptocurrencies are taxed as an asset, while in Argentina and Spain, they are subject to income tax. As it is noted (Alvarez et al., 2022), the tax authorities of Sweden have strengthened control over cryptocurrency transactions, since a significant number of them are carried out illegally. In the European Union countries, cryptocurrencies are not considered property or goods. Most states have clearly defined those cryptocurrencies are currency. As a result, it is impossible to tax the value of cryptocurrency. But if cryptocurrencies are treated as digital coins or digital assets, financial instruments or intangible assets, capital gains or wealth tax may apply (Church et al., 2024).

In Japan, profits are taxed not only from the sale of cryptocurrencies but also from the exchange of one cryptocurrency for another; tax rates from 15 to 55% (if profits exceed 40 million yen). Government regulation of the cryptocurrency market in Japan was changed at the end of 2020. The laws "On Financial Settlements" and "On Financial Instruments and Exchange" have been amended to strengthen control of the digital money market to increase consumer protection. The authorities also intend to establish control over derivatives trading, eliminate the risks associated with hacking exchanges and make the regulation of the industry more transparent. Cryptocurrency in the country is now officially called "crypto assets", before that they were defined as "virtual currencies". The Japanese authorities noted that blockchain is a promising technology, but not everyone will use it for good. In Switzerland, crypto-currencies are recognized as movable property for tax purposes, as they can be sold on the stock exchange, receiving cash for it; income tax is charged (federal tax – 7.83%, cantonal – from 1 to 26%); capital gains tax (federal tax – 7.83%); transactions with bitcoin and other cryptocurrencies are not subject to VAT.

DOI: 10.55643/fcaptp.5.58.2024.4505

Analyzing international experience, it was determined that in various countries such types of taxes as value-added tax (VAT), income tax, personal income tax (PIT), capital gains tax, etc. are applied to operations with cryptocurrencies, which were taken as a basis for developing proposals for taxation of such transactions in Ukraine. The Ministry of Finance of Ukraine is also actively working on the settlement of issues of taxation of transactions with cryptocurrencies. In order to regulate the cryptocurrency market by providing summary information from the tax consultation on the taxation of cryptocurrency in Ukraine, a working group was created under the Ministry of Finance, which began the development of such a consultation. In addition to representatives of the Ministry of Finance, the members of the group included lawyers, businessmen, and owners of "Bitcoin farms". The first step, which confirms the readiness of the state to work on the formation of legislative and regulatory bases that will ensure the transparency and quality of relations between investors and market participants with cryptocurrency, is made in the form of the concept of state regulation of transactions with cryptocurrency in Ukraine. In this Concept, it is proposed to define cryptocurrency as a new type of financial instrument, however, at the legislative level in Ukraine, the types of financial instruments currently include securities and derivatives. Therefore, it is necessary to monitor the recognition of cryptocurrency in the world (Fratrič et al., 2022) (Table 3).

Table 3. Foreign experience in recognizing the nature of cryptocurrency and its institutional support. *(Source: Created by the authors based on the Quarterly Bulletin (Bank of England, 2023)*

Country	Prerequisites, institutional support, recognition	Taxation
Lithuania	Is not recognized as a legal tender	
Germany	Legal tender, unit of account, financial instrument; The Federal Office of Financial Supervision has published a statement, the text of which contains the conditions that allow bitcoins not to be recognized as electronic money, because it is difficult to establish the issuer of the money, and it is impossible to tie the cryptocurrency to traditional currency.	Purchases paid with virtual currency are exempt from taxation; Capital gains tax at the rate of 25% if the gain was made within one year of acquiring or mining the bitcoin.
Poland	Sale and mining of cryptocurrency is allowed.	Providers of virtual assets are subject to state registration.
Romania	Not recognized as a legal tender.	
Finland	Defined as a financial instrument.	Transactions with them are considered private transactions and are exempt from VAT.
France	Expendable assets (movable property) without a defined legal status.	Cryptocurrency investments are taxed at the level of intellectual property.
Croatia	Not recognized as legal tender.	
Sweden	Legal tender.	Mining is subject to personal income tax or income tax; Transactions are exempt from VAT.

In Singapore, income from the increase in the value of cryptocurrencies is not taxed; profits from the sale of cryptocurrencies to non-Singapore buyers are not taxed; income from the sale of goods for cryptocurrency is reflected at the market price of the goods on the date of sale, as well as expenses; the supply of cryptocurrencies is considered as a supply of services subject to VAT. In Israel, cryptocurrency is considered "asset" and proceeds from its sale are classified as capital gains; the sale of cryptocurrencies is subject to capital gains tax at the rates of 25% for individuals and 47% for legal entities; legal entities carrying out the sale of cryptocurrency are taxed with VAT in the amount of 17%, and individuals, except for miners, are exempt from VAT.

Analyzing international experience, it was determined that in various countries such types of taxes as value-added tax (VAT), income tax, personal income tax (PIT), capital gains tax, etc. are applied to operations with cryptocurrencies, which were taken as a basis for developing proposals for taxation of such transactions in Ukraine. In fact, the process of rule-making and law enforcement should become digital, which will ensure the effectiveness of designing digital regulatory processes. The strategies and programs of world states determined certain models of normative and legal regulation in the digital field. The main goal of these areas of these strategies is the formation of a new regulatory environment that will provide a favourable legal regime for the emergence and development of modern technologies using the digital economy (Danyliuk al., 2020; Tamasiga et al., 2022).

The presented experience of foreign countries and the assessment of applicable models of legal regulation can be used during the development of programs and strategies for the development of the digital economy at the national level. The future of cryptocurrency is quite uncertain, as every country in the world reacts to this type of asset differently. There are countries that have already allowed the use of such assets and at the legislative level recognize them as a means of payment, and there are countries that have completely banned their use. Despite this, any state, or any international

organization must respond to the social relations that arise between individuals who use such a state-of-the-art asset. States have no other option but to respond to such assets and phenomena that arise in society.

Referring to the European Central Bank's 2020 report on virtual currencies, the European Justice noted that a virtual currency can be defined as a type of unregulated digital money issued and controlled by its developers and accepted by members of a certain virtual community. Virtual currency is one of the "two-way flow" virtual currency schemes that users can buy and sell based on the exchange rate (Makurin, 2023). In terms of their real-world use, such virtual currencies are analogous to other convertible currencies. They provide an opportunity to buy both real and virtual goods and services. Virtual currencies differ from electronic money, as defined by Directive 2009/110/EC of the European Parliament and of the Council of September 16, 2009 on the establishment and supervision of electronic money issuing institutions, amending Directive 2005/60/EC and 2006/48/EC and repeals Directive 2000/46/EC because, unlike such money, virtual currencies are not denominated in traditional units of account such as the euro, but instead are denominated in virtual units of account such as "Bitcoin".

Transactions must be carried out electronically using the company's website. The company will buy units of the virtual currency "Bitcoin" directly from private individuals and companies or on international exchange sites. Thus, the exemption from VAT of operations on the exchange of traditional currencies for virtual currencies (and vice versa) is not based on the presence of bitcoin coins of a certain special status. Rather, the Court's conclusions are justified by the presence of virtual currencies with characteristics similar to those of traditional currencies and the application of the principle of technological neutrality of EU legislation. Therefore, the issue of VAT taxation of transactions with cryptocurrencies potentially depends on the legal status of the latter, which may be determined in Ukraine at the legislative level in the near future. At the state level, it is necessary to normalize such relations, because otherwise, they will arise without proper regulation, and such transactions with cryptocurrencies will still exist. Therefore, the state must control the participants of such a process.

DISCUSSION

Khaled et al. (2023) Examined the factors of adoption of financial technology (Fintech) services Identified macro-level factors as well as user-specific factors that contribute to the adoption of customer-oriented fintech services. Emerging market research focuses more on target demographic and socioeconomic segments, limiting their ability to reflect a wide range of relevant factors. Yen and Cheng (2021) investigated the relationship between the Economic Policy Uncertainty Index (EPU) and cryptocurrency volatility. It was found that the change in the EPU of China provides cryptocurrency volatility, but the change in the EPU of the US, Japan, and Korea does not have such an effect. In addition, changes in China's EPU are negatively related to the future volatility of Bitcoin and Litecoin, indicating that Bitcoin and Litecoin are hedging instruments against EPU risk. However, changes to China's EPU may not affect cryptocurrency volatility after the Chinese government has established regulations for cryptocurrency trading.

Zheng et al. (2023), in their own research, found that the rapid rise in the price of cryptocurrency encouraged cryptocurrency miners to participate in the production of cryptocurrency, increasing the network's hash rate and power consumption. The increase in network hash rates has further pushed out small cryptocurrency investors due to the increase in the cost of mining equipment and electricity. These changes encourage cryptocurrency miners to become new investors, which increases the price of the cryptocurrency.

The authors also found that due to the computing power used wherever there is a high profit, transactions are vital determinants of electricity consumption. Tamasiga et al. (2022) highlight that the transition to a low-carbon, green economy and environmental sustainability has gained momentum in both developed and developing countries. Greening policy is an echo of expected climate change and its entrenched disruptions. Financial technologies, or FinTech, seem to be a promising direction in solving the green dilemma. It is established that this current study investigates the relationship between green economic growth and FinTech by conducting a systematic and bibliometric analysis of published works in the Scopus database with the aim of first identifying the role and opportunities of implementing green FinTech as a driver for the transition to green economic growth in African countries.

FinTech of individual countries secondly, knowledge gaps and future policy and research directions by developing integrated frameworks to help African countries transition to green economic growth and green financial technologies. Based on these lines of research, the authors proposed an integrated framework that aims to ensure green economic growth using FinTech as a transition mechanism for African countries.

DOI: 10.55643/fcaptp.5.58.2024.4505

CONCLUSIONS

Regulation of the financial technology market involves achieving a balance between promoting innovation, ensuring consumer protection, financial stability and market integrity, and a sufficient level of competition. To date, neither scientists nor lawmakers have a single vision regarding the most effective approaches and tools for regulating the financial technology market, including cryptocurrency. In this aspect, the key areas of creating effective regulatory mechanisms are several areas in particular. Establishment of uniform rules for entry into the financial market for the provision of services, including the use of innovative financial technologies. Despite the fact that such an approach may have a negative impact on the activity of new market players, licensing such activities is an indication that this player is trustworthy and reduces the risk of fraud and misconduct.

To reduce the negative impact of the licensing process, the practice of creating regulatory sandboxes (RegTech SandBox), where FinTech companies can test innovative products and services in a controlled environment with relaxed regulatory requirements, will be useful. It will contribute to the protection of market stability and the establishment of standards that ensure interaction between various FinTech platforms, TechFin and traditional financial institutions, which in turn will ensure not only a sufficient and effective level of competition but also an appropriate level of financial inclusion, allowing seamless transactions in various systems. Implementation of anti-money laundering rules and "Know Your Customer - KYC" for all financial market participants without exception will allow regulatory authorities to oblige any financial service providers and cryptocurrency traders to report suspicious transactions to prevent money laundering, terrorist financing and other illegal activities.

At the same time, the harmonization of relevant financial technology and crypto platforms will contribute to this process as well. An important aspect of the regulation is also ensuring the implementation of norms regarding the protection of consumers of financial services and participants in transactions with cryptocurrency from unscrupulous actions, in particular requirements for transparent disclosure of information, mechanisms for resolving disputes, guarantees of data confidentiality, requirements for compliance with cyber security standards to protect confidential financial data from cyber threats, including a regular audit of systems for the presence of vulnerable areas of activity. Thus, it is substantiated in the research that the market of financial technologies and cryptocurrencies, regardless of the nature of the provider of financial services, needs significant, meaningful, comprehensive and effective regulation. The created regulatory norms and applied tools require careful differentiation depending on the nature of the service provider based on its financial, technical and technological potential, access to potential customers, etc.

At the same time, a comprehensive approach must be used with the harmonization of all aspects of the activities of market participants in order to ensure sustainable innovative development of the financial market, market integrity, fair competition and protection of the rights of consumers of financial services.

Prospects for further research: further research will be aimed at highlighting the specifics of cryptocurrency accounting. Distribution of cryptocurrency into digital assets, stablecoins, and altcoins. Special attention should be paid to the process of cryptocurrency mining with the study of the main areas of equipment use, mining of profitable coins and estimation of resource costs. Further research will be related to the impact of cryptocurrency mining on the environment.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

FUNDING

The Authors received no funding for this research.

CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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FINTECH, TECHFIN І КРИПТОВАЛЮТА: КЕРОВАНА ГРА АБО БЕЗКОШТОВНИЙ ПОШУК

Розвиток фінансових технологій докорінно змінює вигляд фінансового ринку, швидкість здійснення фінансових операцій, можливості залучення нових клієнтів. Зростаюча роль цифрових активів (прогноз 2024 AUM 80,08 млрд доларів США, кількість користувачів на ринку цифрових платежів зросте до 4805,00 млн осіб до 2028 року) відкриває цілий спектр питань, які постають перед регуляторними органами різних країн і які необхідно регулювати, дотримуючись правил відкритого вільного ринку з одного боку та захищаючи й цілі фінансові системи, і окремих користувачів від можливих ризиків, що виникають унаслідок розвитку нових фінансових технологій. Основною метою представленого дослідження є аналіз і систематизація існуючих підходів, які використовують для регулювання діяльності таких суб'єктів господарювання, як FinTech і TechFin, у тому числі у сфері обігу криптовалют як елемента ринку фінансових технологій; а також як обґрунтування можливостей і загроз для традиційного фінансового ринку, які виникають унаслідок активного розвитку компаній FinTech і TechFin. У результаті порівняльного аналізу характеристик компаній FinTech і TechFin установлено, що ці гравці фінансового ринку відрізняються за такими ознаками, як доступ до капіталу, доступ до технологій, доступ до баз даних, доступність і можливість використання технологічної інфраструктури. Установлено, що відсутність гармонізації регуляторних норм щодо надання фінансових послуг або її низький рівень можуть обмежувати конкуренцію, провокувати недобросовісну поведінку на ринку, негативно впливати на споживачів фінансових послуг. Доведено, що саме гармонізація регуляторних вимог та їх диференціація за встановленими самобутніми ознаками сприятимуть збереженню цілісності фінансових ринків і фінансової інклюзії.

Ключові слова: FinTech, TechFin, криптовалюта, фінансовий ринок, регулювання, віртуальні активи

JEL Класифікація: G2, G3, G16