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Volatility on stock exchanges and its impact on transformations in the financial services market

Abstract. In modern global economy, stock market volatility has become one of the decisive factors shaping the financial services market. Exchange rate fluctuations not only affect asset valuation, but also investment decisions, risk management mechanisms, and the strategic development of financial institutions.

Problem statement. Despite significant research on volatility measurement and forecasting, there is insufficient analysis of how volatility drives structural transformation of the financial services market, especially under conditions of geopolitical instability, technological progress, and financial digitalisation.

Unresolved aspects of the problem. The interdisciplinary connection between volatility, financial innovations (cryptocurrencies, Big Data, AI-driven analytics), and transformations of financial services remains underexplored. Knowledge gaps concern the interaction of global spillover risks, geopolitical shocks, and the adaptive capacity of financial institutions.

Purpose of the article. The study aims to identify how stock exchange volatility influences transformations in the financial services market and to propose strategies for adaptation under instability and uncertainty.

Presentation of the main material. Using an interdisciplinary approach, the article combines theoretical analysis, systemic modelling, and review of empirical studies. It shows that volatility manifests through spillover effects across interconnected markets, amplified by geopolitical risks, and intensified by digital innovations such as algorithmic trading and cryptocurrencies. The author highlights the growing role of machine learning and AI in forecasting volatility, while emphasizing the limitations of algorithmic tools and the importance of combining them with expert financial analysis. Special attention is given to regional disparities, third-party risks, and the need for hybrid analytical platforms integrating local and global expertise.

Conclusions. Volatility is both a challenge and a driver of transformation in financial services. It accelerates the introduction of new technologies, changes risk management approaches, and demands new regulatory and analytical frameworks. A hybrid model combining digital tools and human expertise can mitigate risks, improve resilience of financial institutions, and expand access to financial services in underdeveloped markets. The results provide a foundation for adaptive strategies and future research on multi-level models of volatility assessment.

Keywords: *volatility, stock market, risk management, digital technologies, geopolitical risks, machine learning, Big Data, financial services market, analytics, transformations.*

JEL Classification: F21; G15; G24.

Formulas: -; fig.: 1; tabl.: -; bibl.: 26.

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Introduction. In the current environment of global economic instability and dynamic changes in financial markets, the issue of volatility on stock exchanges has become particularly relevant. Fluctuations in the stock market affect not only the value of assets, but also the functioning of risk management systems, investment decisions and strategic approaches to the development of financial institutions. In particular, during periods of heightened geopolitical tension, economic crises or technological shifts, the level of volatility increases significantly, leading to chain reactions in the financial services market.

Contemporary research mostly focuses on analysing volatility in the context of individual financial instruments or national markets, but there is a lack of interdisciplinary and systematic analysis of its impact on transformational processes in the financial services sector. Given the rapid development of digital technologies, the emergence of new financial instruments (in particular, cryptocurrencies), and changes in consumer behaviour, there is a need for a deeper understanding of the relationship between stock market volatility and structural changes in the financial services market.

Thus, the relevance of this study lies in the need for a comprehensive analysis of the impact of stock market volatility on the transformation of financial services, which will allow us to formulate approaches to adapting financial strategies in conditions of increased risk and uncertainty.

Literature review. The issue of volatility on stock exchanges has become globally significant, covering a wide range of research in the fields of finance, economics, investment analysis and political economy. Scientific works of recent decades have shown rush progress in understanding the nature of volatility, the methodology of its measurement, sources and consequences for the financial services market.

The concept of volatility is widely used to assess risk in financial markets. The first approaches to assessing and forecasting volatility were developed within the framework of classical models, in particular the ARCH model proposed by Engle [14]. Engle, and later Black et al. [6], proved that volatility is dynamic and asymmetric, which became the basis for the development of GARCH models and their modifications, which are allowing to make more accurate consideration of the time dependence of market fluctuations.

Modern studies, notably by Christensen et al. [10] and Ding et al. [12], have expanded the range of volatility analysis tools by integrating artificial intelligence, machine learning algorithms, and Big Data to forecast market dynamics.

Increased global instability has also intensified the scientific debate on geopolitical risks as determinants of volatility. The works of Batten et al. [4], Yilmazkuday [26] and Salisu [20] show that geopolitical shocks, such as war or international conflicts, can cause avalanche effects in stock markets, which are then transmitted to other sectors of the financial services market. At the same time, Baruník et al. proved that negative information has a much stronger impact on volatility than positive information and even than the occurrence of a negative event itself [3].

The international dimension of volatility is actively researched in the context of so-called ‘spillover effects’ in the works of Chen et al. [9], which confirm Hong Kong’s intermediary role in transmitting volatility from the United States to China. Similar effects are observed in other regions, indicating the need for comprehensive intermarket analysis.

Christoffersen et al. investigated the relationship between asset returns, volatility forecasting, and market dynamics [11]. The works of Ding et al. point to the growing role of analysts as intermediaries between investors and markets, especially in countries with limited access to information [12], while Twedt and Rees explore the shortcomings of traditional analytics, such as bias, excessive influence of colleagues, and limited local knowledge [21].

Thus, the literature demonstrates the multifaceted nature of volatility issues: from mathematical modelling to socio-economic analysis of its impact. All of these approaches emphasise the need for integrated interdisciplinary solutions to ensure the stability and development of the financial services market in conditions of global turbulence, although this issue has not been clearly reflected in contemporary research, which is a significant gap that needs to be filled.

Purpose, objectives and research methods. The purpose of the study is to identify the nature of the impact of volatility on stock exchanges on transformation processes in the financial services market, as well as to formulate approaches to adapting financial strategies in conditions of increased instability.

The objectives of this study are summarising of current scientific approaches to the interpretation and classification of volatility in financial markets and investigation of the sources and factors of volatility in relation to the development of digital financial technologies, as well as, based on the results of the research, identifying trends in the transformation of the financial services market under the influence of volatility on stock exchanges and measures that can mitigate the negative impact of volatility in the long term.

The research used an interdisciplinary approach, including theoretical analysis of scientific literature on economics, finance, risk management and digital technologies; a structural-functional approach for identifying the interrelationships between stock markets and financial services market segments; systemic analysis of global risks, their spillovers and secondary effects; content analysis of empirical studies on the application of machine learning, algorithmic trading and Big Data tools in the financial sector; and expert assessment methods and logical generalisation methods for formulating conclusions and proposals to mitigate the negative impact of volatility.

Research results. Research results demonstrate the complexity and ambiguity of the concept of volatility on stock exchanges and in the context of financial markets in general. In general terms, volatility can be defined as the degree of deviation of asset prices from their average values in dynamics, which is a key indicator of risk and market sentiment for investors and other market participants [18]. Its importance is also determined by the fact that it has a decisive influence on risk management procedures, investment and development strategies, as well as overall market dynamics.

Volatility is not a monolithic and unambiguous concept; it takes many different forms, and its impact has multifactorial significance for different financial instruments. The development of FinTech also leads to the emergence of additional factors that cause volatility. In particular, one of them is the emergence of cryptocurrencies and crypto exchanges. This, in turn, has led to the need to modify traditional volatility models and develop innovative methods adapted to the unique characteristics of these markets [15].

The complexity of studying the impact of volatility on key actors of the financial market, as well as of the financial services market, is caused by the fact that this concept is not a homogeneous metric, but rather it encompasses various dimensions, which often provide an opportunity not so much to clearly model the situation or prepare a forecast, but rather to gain a nuanced understanding of market behaviour. This is confirmed by calculations, in particular by the ARCH method, which helps to calculate conditional volatility – the degree of price fluctuations in future periods based on prices in past periods [14]. The situation is further complicated by the fact that the difference between predicted and actual volatility can be significant [6].

It has also been found that volatility is crucial in risk management, portfolio optimisation and the pricing of derivative financial instruments in financial markets. Investors rely on volatility to assess investment risks and adjust their portfolios accordingly, while traders use volatility indicators, such as the VIX (volatility index), to assess market sentiment and adapt their strategies to changing conditions [18].

At the same time, it has been found that during periods of high volatility between the stock markets of related countries, appears a so-called spillover of risks [23], which significantly complicates the processes of volatility forecasting, risk assessment, and profitability of operations, and also has a significant indirect impact on the international financial services market in general. Spillovers, in particular, are not necessarily one-sided and may have a more complex structure. Also, they do not always occur evenly and equally among all connected countries [17]. This phenomenon contributes to increased global uncertainty and instability in the financial system and creates a basis for additional research and changes to existing stock portfolio management

strategies, as well as to the functioning of the financial services market in general. The impact of such factors becomes particularly noticeable in conditions of growing global instability, when it is exacerbated by other factors, in particular geopolitical risk.

Geopolitical risks have a rather complex impact on the stock market and the financial services market in general. This is influenced by the large number of disparate sources of geopolitical risks, as well as the fact that their impact will vary significantly depending on the combination of such risks and the country in question. The heterogeneity of their impact on sectoral indices is proven, in particular, by Cadena-Silva et al. using the example of the United States [8]. The situation is further complicated by the fact that they can have both negative and positive effects at the same time, which potentially offset each other, making it difficult to determine the factor that caused the overall change in stock market volatility. In such conditions, research based solely on complex indices that assess geopolitical actions or threats is ineffective [8], and fluctuations on stock exchanges caused by geopolitical risks have a significant impact on both financial stability and the financial services market in general. This is confirmed by studies by Batten et al. [4] and Yilmazkuday [25], who proved that governments, companies and investors can adapt relatively quickly to new circumstances after serious exogenous shocks, and sometimes such shocks and the resulting fluctuations on the stock exchanges can have a positive effect on the financial market in the future.

The impact of geopolitical risks is complicated by the fact that stock market volatility reacts more sensitively to bad news than to good news [3], which in turn becomes particularly important in conditions of global instability and escalating international conflicts, as well as their related consequences, particularly in the political environment. The fluctuations caused by this have a significant impact on the financial market as a whole, as well as on the services provided. In fact, every type of financial institution has to adapt to the new realities in one way or another. It is becoming increasingly difficult to ensure the stability of previously established processes, including in the financial services market. Such changes also lead to the transformation of the market in line with the new needs and challenges of the modern world.

Discussion. Volatility on stock exchanges is not a new phenomenon. Despite numerous studies in this area, there is a need to study its impact on the financial services market, as the stock market is dynamic. The emergence of new financial services and instruments leads to changes in the stock market and, consequently, affects volatility, and vice versa. The financial services market and stock exchanges are not only closely interrelated (Fig. 1), but are also influenced by a significant number of external and internal factors, which only amplifies the impact of each individual factor and makes it more difficult to research.

Given the level of interconnection between them, the modern key problem is that most studies focus on specific issues related to volatility, markets or individual factors and their impact on the financial services market or the financial system of a particular country. Also the most of existing studies focus on examining the risks that are causing volatility in the stock market, ways to assess their impact, and forecasting dynamics. However, given the development of the financial services market and the global instability that is only intensifying, and the globalisation of world financial markets, there is a need to study general trends in the transformation of financial services under the influence of volatility on stock exchanges, as well as to determine which areas of possible transformation could mitigate the negative effects of volatility in the long term perspective.

First and foremost, in this context is the development of technology. This has led to changes in both the approaches to defining and forecasting volatility and the factors that influence volatility itself.

On the one hand, a completely new financial market has emerged – the cryptocurrency market. Even the most stable cryptocurrencies are characterised by high volatility, atypical distribution and limited retrospective data. This has led to new challenges in measuring volatility, but has also opened up new opportunities in this area [15].

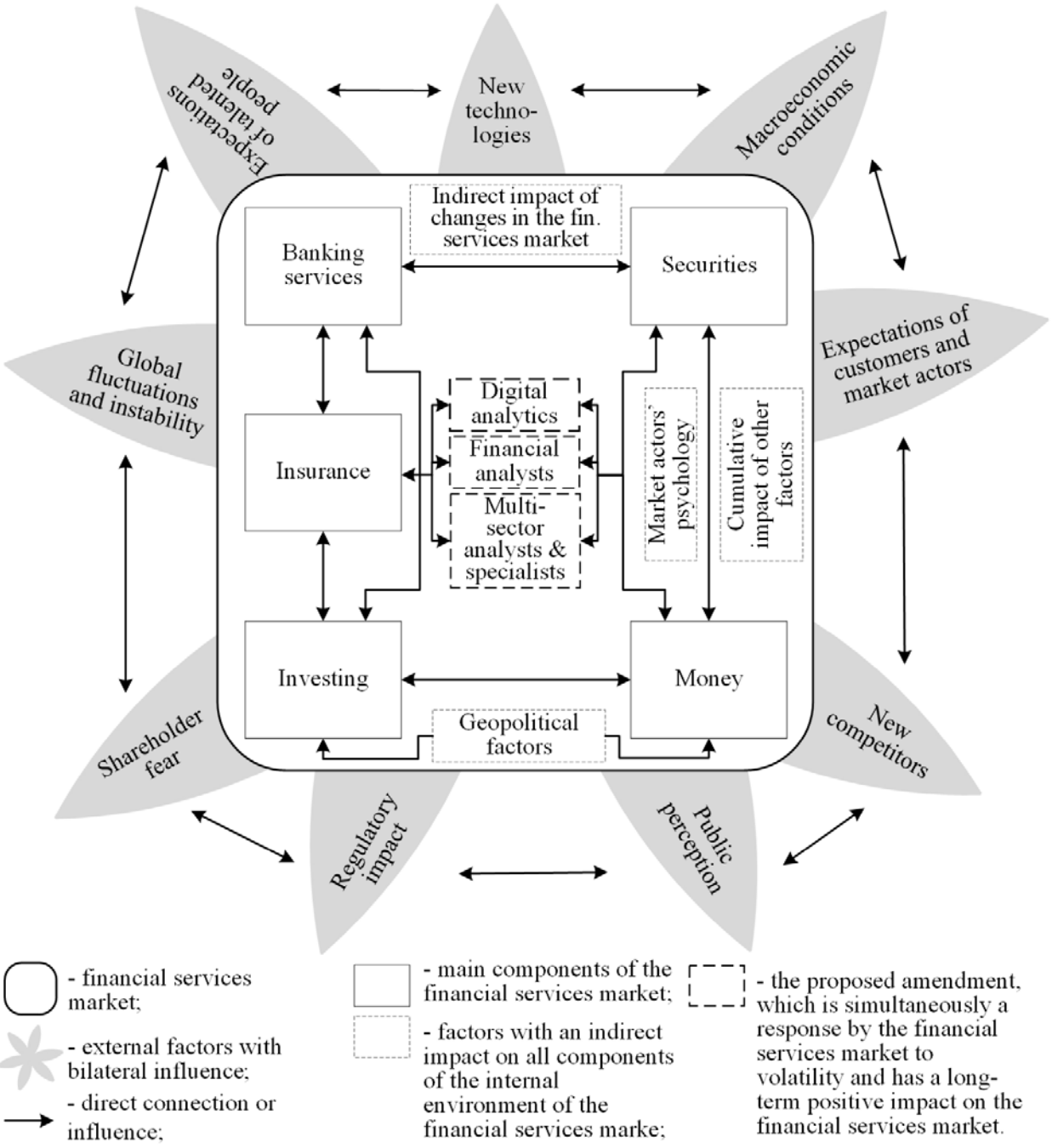

Figure 1. Interrelationships between the external and internal environment of the financial services market
Source: prepared by the author

On the other hand, experts and scientists have been able to use machine learning methods, artificial intelligence, and Big Data to forecast volatility more accurately and quickly. Such tools allow combining different types of analysis and tracking dynamics in real time, as well as quickly adjusting forecasts.

The positive impact of such tools is noticeable, and the influence of volatility on the development of financial instruments is also clearly evident, as not only has data analytics been incorporated as a basic element into the bulk of financial services, but algorithmic trading has also emerged [19], which in turn, through the butterfly effect, has led to a series of subtle but significant transformations in related financial services. This allows us to hypothesise that the use of machine

learning models will improve the process of forecasting volatility and its consequences, and the integration of appropriate tools into the systems used in the provision of other financial services will allow to optimise and automate processes, mitigate risks and will have a profound positive impact on the risk management strategies of all financial market actors.

To a certain extent, this assumption is correct, as analysis has shown that the use of neural networks, random forests, machine learning algorithms, and support vector methods allows to identify complex patterns in the analysis of large data sets, as well as to adapt them to conditions of dynamic environment [10]. This has resulted in more and more financial services companies starting to use them in their activities or using the services of firms that perform such analysis on a professional basis. However, it has been found that this direction of development cannot help to solve the existing problem and requires additional solutions, because relying solely on the results of algorithmic analysis can lead to associated challenges that could potentially cause even more negative consequences than an incorrect volatility forecast. This is related to one of the main functions of financial analytics – data interpretation, which in many approaches to machine learning is perceived as a 'black box' that does not provide an understanding of the internal workings of models and complicates the understanding of the results they offer, and therefore the reliability of the forecast [10; 12].

Another important consequence of volatility is the complication in adapting financial services to the needs of specific regions. In the case of international markets, the situation is exacerbated. In this case, we are also talking not only about the need to assess the risks, prospects and characteristics of the development or adaptation of specific services not only to the characteristics of a particular region, but also about taking into account the impact of these characteristics and volatility on each of the markets in general on the specifics of providing a particular financial service. In particular, it has been proven that the psychology of actors of each market, as well as the specifics of national legislation, mentality and interrelationships form different patterns of behaviour, as well as responses to challenges, shocks and fluctuations in the stock market [8]. Thus, volatility in interconnected markets, as well as its impact on financial services that are in one way or another related to the stock market or depend on international markets or operations, can be compared to the ripples caused by a stone thrown into water – it brings about changes in one way or another, even if such changes are not global. Although it could be assumed that such an impact is more characteristic of global markets and that local markets will remain virtually unaffected by fluctuations, as they are less dependent on the external environment, this assumption would not be fair. Although local markets are less dependent on volatility in the global market, currency fluctuations, pricing issues, raw material procurement and product sales, insurance against various types of risks, and a number of other factors affecting the stability and financial condition of the enterprise, including its development and activity strategies, remain relevant for them. Thus, all actors of the financial services market must, in one way or another, adapt to fluctuations in the stock market and, at the very least, include them in risk management and take them into account when planning trends for future periods.

Another reason for the increase in regional risk to the development of the financial services market, related to stock market volatility, is the spillover of risks from the market of one country to the market of another. Chen et al. demonstrated this using the example of the impact of volatility in the United States stock market on the Chinese stock market and also highlighted the associated risks [9]. This exacerbates the problem of assessing and forecasting risks for virtually all types of financial services. The spillover of risks caused by volatility is also closely related to the impact of geopolitical risks. Although the latter themselves have a significant impact on the financial services market, especially in times of instability and global shifts, the destruction of part of the existing chains for both production and service provision, they also amplify the destabilising impact of volatility also due to the heterogeneity of responses to market fluctuations and geopolitical changes in different sectors of the economy. This is emphasised, in particular, by the research of

Yilmazkuday [26], while Umar et al. [22], in turn, prove that the impact of geopolitical risk on asset returns depends on the type of market and market conditions, which necessitates a more in-depth analysis of the market and an assessment of the impact of various factors on each individual industry. On the other hand, studies by Bouri et al. [7] and Lee and Lee [17] show that rapid changes in the geopolitical dimension, as well as deepening global instability, particularly in the context of security, complicate the problem of the influence of volatility, as the market begins to react to these changes in different ways, the differences in reactions becoming increasingly noticeable not only depending on the country or region, but also on the specific industry, which exacerbates systemic risk and leads to the need for in-depth analysis and increased attention to emerging risks, as well as their accompanying impact on the transformation of financial instruments.

This assumption correlates with the thesis of Salisu et al. [20] that geopolitical risk threats have a relatively more pronounced impact on stock market returns than geopolitical risk actions as such. In other words, tracking trends and forecasting their possible impact on the financial services market becomes more important than adapting to the consequences of the risk itself. Thus, analytical activity takes on particular importance. The growing role of analysts is indirectly confirmed by Ali et al. [1], as their research shows that various sectors of the United States economy can generate significant positive returns facing with geopolitical threats, which requires further study and analysis.

Another important factor to consider when assessing the impact of stock market volatility on the financial services market is the formation of third-party risk. The point is that most companies are directly or indirectly dependent on stock market fluctuations, and significant changes in the environment or situation of one inevitably affect the other. These can be direct relationships based on the supplier-consumer principle, the client of services, in particular financial services, and the supplier, as well as relationships within industries, when significant changes in the position of one company lead to a redistribution of the market by others. In this case, volatility will have an additional impact on all market participants through a specific company. This impact is usually quite difficult to track and calculate, as it can be cumulative in nature, and the internal environment of a firm can only be analysed to a certain extent. Therefore, such risks and their impact on the financial services market as a whole are generally difficult to research and predict.

Another factor related to third-party risk that has a significant impact on the transformation of the financial services market is the formation of not only direct but also indirect links between markets in different countries. In other words, the influence of one country’s stock market on another is largely mediated by one or more other countries. This can be caused by a number of different factors, such as the formation of production chains, indirect trade, sanctions, direct conflicts between specific countries, trading characteristics, geographical proximity, etc. In such cases, the volatility of one country’s stock market can have a completely different, unpredictable impact on the markets of another country.

Research by Chen et al. [9] clearly demonstrates such effects using the example of the impact of United States stock market volatility on the Chinese stock market via Hong Kong. The researchers prove the importance of the intermediary and analyse its impact on the distortion of the standard forecast regarding the direct impact of United States market volatility on the Chinese market. This study leads to the conclusion that the intermediation of other countries has similar consequences. In other words, assessing the impact of volatility on the financial services market in such conditions requires an even more comprehensive and in-depth analysis.

Thus, having researched the peculiarities of the impact of volatility in the stock market on the financial services market, we conclude that it has a direct and immediate impact on it and necessitates the transformation of financial instruments, management strategies, as well as approaches to conducting activities and providing services.

Based on the above, it can be assumed that a logical solution in such conditions would be to

develop a comprehensive multi-stage methodology for assessing the impact of volatility, taking into account various factors and relationships based on digital technologies, while access to it should be provided to all financial services market actors in the context of their activities, for example, based on specific analysis parameters and necessary relationships, as well as the sector of the economy and field of activity. However, it should be noted that such a solution cannot be supported and provided, both in terms of resources and information, by a single organisation or financial service providers from a specific region, because it would be potentially too costly. In addition, its support would require a significant amount of data and corrective coefficients or parameters in real time. Moreover, such a solution cannot function without the constant intervention of experts who can adjust the algorithms to take into account changes in people's behaviour in different countries around the world.

Potentially, it will be costly and require constant investment, and there will also be issues of compliance and scalability. A failure or the entry of inaccurate data by one of the operators or participants in the core of the system will lead to the formation of a whole series of incorrect reports, and it will be extremely difficult to correct such errors and algorithms. Also, as already mentioned, a problematic issue is the internal processes in machine learning and artificial intelligence models, which do not provide a clear understanding of the algorithm and how exactly the forecast or report is formed [10; 12]. This means that in the case of multifactorial models, which include a large amount of variables and will depend to a large extent not on objective indicators and specific data, but on more abstract concepts and user psychology, cultural characteristics, behavioural patterns, and will also take into account a significant array of indirect connections, significantly complicated by data from various areas of economic activity, – the reliability of the obtained results will be minimal. Even if we assume that separate automated risk analysis and volatility forecasting systems will be created to work with data from specific industries or markets, and an independent superstructure will function, which will operate the results of lower-level systems and supplement their data with additional factors of influence specific to particular countries or markets, the reliability of the data will potentially be even lower. In addition, there is the risk of failures and the risk of third parties in the context of Big Data [24].

Thus, it is clear that volatility on stock exchanges leads to a certain consolidation of needs and challenges in the financial services market, which are faced by virtually all its participants, as well as to the need to transform the financial services market in the direction of deepening and specialising risk management and comprehensive analytical activities. The results of the study also show that although digital tools can help to a certain extent in solving the above-mentioned problems, they cannot become the basis for decision-making and business processes.

Given the complexity of the issue and the results obtained from the study, it can be concluded that the solution to the problem of volatility's impact on the financial services market could be a combination of machine learning and artificial intelligence tools and an increased role for diverse analysts in the stock market with the subsequent dissemination of key information from them to other financial services market participants for building of their own development and transformation strategies based on it. This assumption is supported by research results showing the positive effect of machine learning and artificial intelligence tools on the processing of large data sets and the identification of certain patterns [10]. At the same time, increasing the role and involvement of analysts will reduce errors resulting from automated algorithm-based assessments, supplement basic analysis with empirical research results, as well as other previously unaccounted factors that lie more in the realm of understanding the functioning and connections of a particular market based on psychological and traditional factors, as well as taking into account the behaviourism of representatives of a particular region. Research by Jeong et al. [16] support this assumption, as they have demonstrated the growing role of international analysts as intermediaries in the global financial environment, and in particular that the existence of an international analytical network significantly reduces barriers to investor access to foreign assets, especially in countries

with underdeveloped information infrastructure. These studies also showed a steady natural growth in the number of financial analysts in the international stock market between 1987 and 2020 [16].

This confirms our assumption, and in particular that the market itself is gradually transforming in this direction under the influence of contemporary challenges. The need for truly multifaceted and broad-based expertise is confirmed, in turn, by the research of Twedt and Rees [21], who argue that the activities of financial analysts alone have certain significant shortcomings. These include, in particular, the fact that financial analysts tend to significantly exaggerate both negative and positive scenarios when making forecasts and assessments, use the opinions of other analysts as the basis for their reports, and a number of other reasons, such as language barriers, limited access to local markets and information about them, focusing on data from a specific region in a broad sense without knowledge of its specifics and peculiarities of local behaviourism, and as a result a lack of data and unreliability of judgements despite the significant authority of their conclusions, material costs and time spent on their formation, can lead to significant losses on the part of the customer of the analytical conclusion. This gap in analytics and the problem of incomplete data can be compensated for by local financial services market specialists who can potentially also carry out analytical activities. They have better information about the situation in the local market and can take into account the influence of factors with a higher degree of reliability, including the moods of financial services market actors, which are overlooked by classical financial analysts. They also have direct access to local businesses and companies, including those providing financial services, have in-depth knowledge of local markets, and do not face language barriers, which only increases the reliability of their assessments.

Filling this information gap will also have a positive impact on global investment by increasing the availability of necessary information and enabling more accurate forecasting of the impact of stock market volatility on investments, which also correlates with the research of Baik et al. [2] and Döring et al. [13]. This approach will also reduce the cost of obtaining the necessary information, which will potentially contribute to the revitalisation and to the activation of the stock market and financial services market in regions where they remain underdeveloped. This is because when choosing a company to invest in, an investor, given equal costs of obtaining information about two companies, usually chooses the one that is more familiar or about which more information can be gathered. That is why, when investing globally, they are at a disadvantage compared to local investors in the capital market of the host country, which is why their risk increases, in particular due to the exacerbation of geopolitical risk and market volatility risk [5]. Analytical activities by both intermediaries in the financial market and other actors in the financial services market will help to solve this problem and are also in line with trends that have already begun to form naturally. Thus, we conclude that the consolidation and deepening of analytical activities by specialists in various fields and financial analysts, as well as combining it with specialised digital tools and machine learning algorithms, is not only a logical consequence of the transformation of the financial services market under the influence of volatility on stock exchanges, but will also help in the long term perspective to mitigate its negative impact on all financial services market actors and revive previously depressed markets.

Conclusions. The study concluded that volatility on stock exchanges is not only a key indicator of market changes, but also one of the main factors driving the transformation of the modern financial services market. It influences the structure and logic of functioning of financial instruments, stimulates the introduction of new technologies, changes approaches to risk management, and determines the priorities of strategic planning in financial institutions.

The scientific novelty of the study lies in a comprehensive approach to analysing the impact of volatility on the transformation of the financial services market, taking into account digital transformation, geopolitical factors, spillover risks between the markets, as well as in the proposal for the systematic integration of local specialised analytical expertise and digital tools as a basis for overcoming the negative effects of volatility.

The results of the study allow to deepen understanding of the interrelationships between stock markets and financial services market components, and contribute to the formation of a concept for approaches to assessing and adapting the financial services market to the impact of stock market volatility in conditions of global instability. The results obtained during the study can be used to develop effective risk management strategies, optimise financial services in light of unstable market conditions, improve digital financial products and introduce adaptive volatility forecasting models, as well as during planning changes in the directions of financial intermediaries' activities and requirements for their qualifications. This, in turn, will contribute to increasing the resilience of the financial system to external shocks, reducing losses from unexpected fluctuations, improving access to analytical information for all market participants, and increasing the level of financial activity in regions with low levels of financial services market development.

Prospects for further research lie in the development of multi-level models for assessing the impact of volatility, taking into account behavioural factors, local characteristics of financial markets and cultural contexts, as well as in studying the practical effect of creating hybrid analytical platforms with data unification for a wide range of financial services market participants.

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Волатильність на фондових біржах і її вплив на трансформації ринку фінансових послуг

Анотація. У сучасній світовій економіці волатильність фондових ринків стала одним із ключових факторів трансформації ринку фінансових послуг. Коливання цін на фондових біржах впливають не лише на оцінку активів, але й на інвестиційні рішення, механізми управління ризиками та стратегічний розвиток фінансових установ.

Постановка проблеми. Попри значну кількість досліджень щодо розрахунку та прогнозування волатильності, недостатньо вивчено її вплив на структурні зміни у сфері фінансових послуг, особливо в умовах геополітичної нестабільності, технологічних зрушень та цифровізації фінансів.

Нерозв'язані аспекти. Недостатньо дослідженим залишається міждисциплінарний зв'язок між волатильністю, фінансовими інноваціями (криптовалюти, Big Data, аналітика на основі ШІ) та трансформацією фінансових послуг. Прогалини стосуються взаємодії переливів глобальних ризиків, геополітичних шоків та адаптаційних можливостей фінансових установ.

Мета статті. Дослідження має на меті визначити як волатильність на фондових біржах впливає на трансформації ринку фінансових послуг та запропонувати стратегії адаптації в умовах нестабільності та невизначеності.

Основний матеріал. На основі міждисциплінарного підходу поєднано теоретичний аналіз, системне моделювання та узагальнення емпіричних досліджень. Доведено, що волатильність проявляється через ефекти переливів між взаємопов'язаними ринками, посилюється геополітичними ризиками та цифровими інноваціями (алгоритмічна торгівля, криптовалюти). Відзначено зростання ролі штучного інтелекту та машинного навчання у прогнозуванні волатильності, але підкреслено необхідність їх поєднання з експертною фінансовою аналітикою. Окремо проаналізовано регіональні відмінності, ризики третіх сторін та важливість гібридних аналітичних платформ.

Висновки. Волатильність виступає як загрозою, так і рушієм трансформацій ринку фінансових послуг. Вона стимулює впровадження нових технологій, змінює підходи до управління ризиками та вимагає нових регуляторних і аналітичних інструментів. Гібридна модель, що поєднує цифрові технології та експертні знання, здатна зменшити ризики, підвищити стійкість фінансових установ і розширити доступ до фінансових послуг на слаборозвинених ринках. Отримані результати формують основу для адаптивних стратегій і подальших досліджень багаторівневих моделей оцінки волатильності.

Ключові слова: *волатильність, фондові біржі, ризик-менеджмент, цифрові технології, геополітичні ризики, машинне навчання, Big Data, ринок фінансових послуг, аналітика, трансформації.*

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