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IMPLICATIONS OF BIG DATA TECHNOLOGIES FOR RESILIENCE OF FINANCIAL INSTITUTIONS

Abstract. The research examines the impact of Big Data-based FinTech and AI technologies on the development of the financial sphere and financial stability. The subject of the research is the transformation of key areas of financial activity under the influence of large-scale data analytics, including banking, risk management, insurance, stock markets, accounting, auditing and taxation. The purpose of the study is to identify main benefits, risks and structural consequences of Big Data implementation in financial institutions, and to assess regulatory, ethical, security and human resource challenges arising from this process.

The research is based on a qualitative analysis of recent academic literature, comparative analysis of sector-specific applications of Big Data technologies, and synthesis of empirical findings from international studies. The methodological approach combines systemic and structural analysis, allowing the interconnections between technological innovation, financial stability, institutional adaptation to be identified.

The results demonstrate that Big Data and AI technologies significantly improve efficiency, risk assessment accuracy, fraud detection and financial inclusion. At the same time, their unbalanced or poorly governed adoption contributes to increased systemic risk, cybersecurity vulnerability, regulatory fragmentation and third-party dependence on BigTech platforms. It is also established that the effectiveness of Big Data solutions varies across financial sphere and depends critically on data quality, regulatory alignment and organisational readiness. Significant changes in human resource needs and requirements are identified, with growing demand for analysts and specialists combining financial and technological competencies.

The results of the study may be applied in the development of financial institution strategies, regulatory frameworks, risk management systems and professional training programmes. It is concluded that Big Data-based FinTech can contribute to financial stability only when its implementation is strategically justified, ethically grounded and supported by effective regulation, robust data governance and investment in human capital.

Keywords: FinTech, Big Data, RegTech, AI, BigTech, financial institutions, financial security.

JEL Classification: C88, G28, G32, J24, O33.

Absztrakt. A tanulmány a Big Data-alapú és mesterséges intelligencián nyugvó FinTech-megoldások hatását vizsgálja a pénzügyi szektor fejlődésére és a pénzügyi stabilitásra. A kutatás tárgya a pénzügyi tevékenység kulcsterületeinek átalakulása a nagy adathalmazok elemzésének hatására, különös tekintettel a banki működésre, a kockázatkezelésre, a biztosítási szektorra, a tőkepiacra, a számvitelre, az auditálásra és az adózásra. A vizsgálat célja a Big Data pénzügyi intézményekben történő alkalmazásának fő előnyeinek, kockázatainak és strukturális következményeinek meghatározása, valamint a folyamatot kísérő szabályozási, etikai, biztonsági és humánerőforrás-kihívások értékelése.

A kutatás módszertani alapját a korszerű tudományos publikációk kvalitatív elemzése, a Big Data ágazati alkalmazási gyakorlatainak összehasonlító vizsgálata, valamint a nemzetközi empirikus kutatások eredményeinek szintetizálása képezi. A tanulmány rendszerszemléletű és strukturális megközelítést alkalmaz, amely lehetővé tette a technológiai innovációk, a pénzügyi stabilitás és az intézményi adaptáció közötti összefüggések feltárását.

Az eredmények azt mutatják, hogy a Big Data és az MI alkalmazása növeli az operatív hatékonyságot, javítja a kockázatértékelés pontosságát, erősíti a csalásmegelőzést, valamint elősegíti a pénzügyi inklúziót. Ugyanakkor e technológiák megalapozatlan vagy gyengén szabályozott bevezetése fokozza a rendszerszintű kockázatokat, a kiberfenyegetéseket, a szabályozási fragmentációt és a BigTech-platformoktól való függőséget. Megállapítást nyert, hogy a Big Data-megoldások hatékonysága jelentősen eltér a pénzügyi szektor különböző területein, és nagymértékben függ az adatok minőségétől, a szabályozási koherenciától és a szervezeti felkészültségtől. Jelentős változások azonosíthatók a pénzügyi intézmények munkaerő-igényeiben és kompetenciaelvárásaiban is.

A kutatás gyakorlati jelentősége abban áll, hogy eredményei felhasználhatók a pénzügyi intézmények stratégiáinak kialakításában, a szabályozási politika formálásában, a kockázatkezelési rendszerek fejlesztésében és a szakmai képzési programok megtervezésében. A következtetés szerint a Big Data-FinTech csak akkor járulhat hozzá a pénzügyi stabilitáshoz, ha bevezetése kiegyensúlyozott, stratégiailag megalapozott és etikai szempontból felelős módon történik.

Kulcsszavak: FinTech, Big Data, RegTech, MI, BigTech, pénzügyi intézmények, pénzügyi biztonság.

Анотація. У статті досліджується вплив FinTech-рішень на основі Big Data та технологій штучного інтелекту на розвиток сфери фінансів і фінансову стабільність. Предметом дослідження є трансформація ключових сфер фінансової діяльності під впливом аналітики великих масивів даних, зокрема банківської діяльності, управління ризиками, страхування, фондового ринку, бухгалтерського обліку, аудиту та оподаткування. Метою роботи є визначення основних переваг, ризиків і структурних наслідків упровадження Big Data у фінансових установах, а також оцінка регуляторних, етичних, безпекових і кадрових викликів, що супроводжують цей процес.

Методологічну основу дослідження становлять якісний аналіз сучасних наукових публікацій, порівняльний аналіз галузевих практик використання Big Data та узагальнення емпіричних результатів міжнародних досліджень. У роботі застосовано системний і структурний підходи, що дало змогу виявити взаємозв'язки між технологічними інноваціями, фінансовою стабільністю та інституційною адаптацією.

Результати дослідження свідчать, що використання Big Data і ШІ підвищує операційну ефективність, точність оцінки ризиків, рівень протидії шахрайству та фінансову інклюзію. Водночас необґрунтоване або слабко регульоване впровадження цих технологій спричиняє зростання системних ризиків, кіберзагроз, регуляторної фрагментації та залежності від платформ BigTech. Встановлено, що ефективність Big Data-рішень суттєво відрізняється серед різних секторів фінансів та залежить від якості даних, рівня регуляторної узгодженості й організаційної готовності. Виявлено значні зміни у потребах і вимогах до

персоналу фінансових установ.

Практичне значення результатів полягає у можливості їх використання при формуванні стратегій фінансових установ, регуляторної політики, систем управління ризиками та програм професійної підготовки. Зроблено висновок, що Big Data-FinTech може сприяти фінансовій стабільності лише за умов збалансованого, стратегічно обґрунтованого та етично відповідального впровадження.

Ключові слова: FinTech, Big Data, RegTech, ШІ, BigTech, фінансові установи, фінансова безпека.

Introduction. The development of digital technologies increasingly affects all areas of life and the economy, including the financial sector. While this impact is uneven, the uncontrolled implementation of digital technologies can lead to structural changes and new risks. In recent years, FinTech, Big Data, and artificial intelligence (AI) have become key drivers of change, influencing financial companies' structures, management strategies, and the financial services market as a whole. Many large companies are significantly increasing investments in Big Data analytics and using AI-driven solutions to develop financial products and analyse consumer behaviour, thereby enhancing competitiveness. However, market instability and inefficient Big Data management create serious challenges that financial institutions often struggle to address, posing additional risks to financial stability. Moreover, digitalization is changing user behaviour, supporting the view that Big Data will significantly influence future financial companies [1], which underlines the relevance of this study.

Problem description. The rapid diffusion of Big Data, FinTech and AI is profoundly reshaping the financial sector, affecting business models, risk profiles and regulatory environments. While these technologies offer significant opportunities for efficiency gains, financial inclusion and improved decision-making, their uneven and poorly regulated adoption creates new systemic, operational and ethical risks. This raises important scientific and practical challenges related to financial stability, data governance and the long-term sustainability of financial institutions, which require comprehensive and structured analysis.

Literature review. Recent studies highlight the growing importance of Big Data, FinTech and AI in the transformation of financial markets. J. Guerreiro et al. [1] emphasise the strategic role of Big Data analytics in corporate decision-making and changes in consumer behaviour.

In banking, research by K. Zhu and L. Guo [2] show that Big Data improves credit assessment, reduces default risk and supports financial inclusion. At the same time, Y. Liu et al. [3] and W. Hirata and M. Ojima [4] demonstrate that FinTech adoption may reduce liquidity and increase risk-taking and systemic vulnerability.

In risk management, insurance, accounting and auditing, studies by A. V. Thakor [5], M. Zhang et al. [6] confirm the potential of Big Data to enhance risk modelling, fraud detection and analytical depth, while K. M. Bakarich and P. E. O'Brien [7] point to low adoption rates and implementation risks.

Regulatory, ethical and security challenges are addressed by D. W. Arner et al. [8], while cybersecurity risks and third-party dependence are highlighted by R. P. Hendrikse [9].

Despite the breadth of existing research, the literature remains fragmented and

largely sector specific. Insufficient attention is paid to the combined impact of Big Data-driven FinTech on financial stability, regulatory coherence, ethical standards and human resource transformation across the financial sector. Addressing these unresolved issues constitutes the focus of this article.

Goal of the article. The purpose of this article is the examination of the role of Big Data-based FinTech in the development of the financial sphere by identifying its key benefits, risks and structural implications. The study aims to analyse the impact of Big Data technologies across major areas of financial activity, assess associated regulatory, ethical and security challenges, and determine the implications for financial stability and human resource management.

Results and discussions. For better understanding of the role of Big Data in financial markets, this research focuses on its impact, benefits, and risks in key areas such as banking, risk management, insurance, stock markets, accounting and auditing, and taxation and common to all financial companies.

Banking sector. The use of FinTech in general and Big Data in particular has changed traditional banking. They have gradually penetrated the internal and external environments of banks. Banks, like other financial institutions, use FinTech quite effectively for the optimisation of internal processes, operations, behaviour analysis and user needs research to improve service delivery. A significant part of banking institutions already has positive experiences in this area, as Big Data analytics helps them to expand their customer base and, consequently, increase the volume of loans and deposits provided, which helps to increase profits. Collecting and processing customer data and analysing their behavioural patterns also helps banks to reduce credit risk and thus to increase their own stability [10]. Research conducted on the Chinese banking sector shows that the use of FinTech and Big Data analytics has significantly reduced the risk of loan defaults. It has also been proven that such technologies help to improve service efficiency and customer experience, as well as experience in inclusive financing, which has had a positive impact on bank profitability [2]. The development of FinTech can also improve liquidity management and correct bank profitability according to systemic risk. The integration of Big Data analytics has led to the adaptation of financial products to new conditions based on innovative approaches. Its use in assessing creditworthiness has enabled the development of a new product in the form of alternative credit solutions, which have provided the relevant service to segments of the population that previously did not have access to it [11], thereby increasing the level of financial inclusion and creating competition for alternative organisations in this segment.

However, despite significant advantages, the use of FinTech and Big Data in the internal environment of banks is also associated with major risks, including for their liquidity. For example, increasing the level of FinTech implementation by banks through enhanced screening and monitoring may reduce bank liquidity. In this case, banks reduce their activity in the area of low-quality loans and decrease the share of collateralised and mortgage loans, which reduces the supply of liquidity. In addition, the significant investments required to implement and support new technologies are

accompanied by an outflow or redistribution of resources available to banks. This statement is supported by the fact that the development of FinTech changes the distribution of loans by banks and, at the same time, their leverage ratio, as well as increases their risk appetite [3]. This, in turn, increases systemic risk, with the level of risk varying for banks of different types and sizes, and the efficiency of traditional instruments in reducing it is low.

Another negative factor caused by the impact of FinTech and Big Data on banks is their increased propensity for risky behaviour and, often, shadow activities, which contributes to the accumulation of endogenous risks and, consequently, exacerbates systemic risk [4].

Externally, FinTech, in turn, is not used by all banking institutions, as it involves the use of technology to provide innovative services or solutions that modify traditional services. The latest is more common for financial platforms or virtual banking institutions. At the same time, exogenous risks for banks are high. It has been found that external FinTech reduces the ratio of net potential income to total assets, return on assets and equity, and return on profitable assets [12]. The decline in the efficiency of commercial banks due to debt and increased spendings costs is another risk [13]. External FinTech platforms, especially cloud services that also provide financial solutions, pose a significant risk to banks because, on the one hand, banks themselves often depend on large technology companies (BigTech) implementing their own digital solutions, and on the other hand, digital financial platforms are becoming more attractive, albeit not always reliable, for users and are taking over functions that were traditionally performed by banks. The result of these actions is a reduction in the number of banking institutions, which is observed around the world, and their replacement by digital platforms.

Risk management and insurance. Most of the advantages and threats in the activities of these companies are common and are based on working with Big Data for risk assessment and new product development. This allows them to better adapt to user needs, offer products that meet those needs and to assess risks more accurately. Due to the significant number of new threats, companies need to establish fundamentally new, higher-quality risk management systems based on the use of Big Data, as the development of FinTech has not only changed the structure and functioning of the financial market, but also profoundly affected activities and risk management of financial institutions [5]. At the same time, the positive aspect is that FinTech opens up new opportunities in credit risk assessment and user behaviour research by supplementing the array of classic Big Data with data that was previously impossible to collect and analyse. This also allows companies to conduct much deeper customer risk screening and prevent significant losses. Big Data analysis also allows to significantly adjust risk management models, including fraud prevention, both in financial institutions in general and in insurance companies, as well as to increase the reliability of services.

The stock market, in addition to the advantages and risks common to all financial companies, is characterised by a rather ambiguous situation related to the

activities of stock exchanges and analytical activities. The most significant fact is that digital tools cannot satisfy the needs of stock exchanges in the context of their global activities. Although they can speed up routine processes to a certain extent, complex comprehensive analytics proved to be not fully accessible to them. Studies confirm and justify the need to increase the participation of analysts, in particular local ones, in the activities of stock exchanges [14]. Given the limited scope of this study and the thorough coverage of the issue in a related study [14], this issue will not be explored in more detail in this study.

Accounting and auditing are an area where FinTech and Big Data have significant potential, particularly through extensive automation using distributed ledgers and AI-based analytics. Given the continuity and significant routine nature of accounting, such tools can greatly streamline the process, increase financial transparency, and identify inconsistencies or errors. Another advantage is the automation of complex processes and the ability to quickly process large amounts of data, search for inconsistencies and generate reports, and collect the necessary data from various sources. Such tools can also be used to identify anomalies and predict potential threats, thereby improving the quality and depth of the audit, identifying additional opportunities for verification, and freeing up time for the auditor's analytical activities [6]. The use of Big Data and AI in auditing also allows auditors to move to a fundamentally new level of verification, making it more comprehensive and identifying associated or potential risks. This not only increases accuracy but also allows auditors to identify well-hidden abuses or errors and uncover relationships that would be extremely difficult or impossible to detect through manual verification [15]. But this is only possible if Big Data is managed effectively. However, despite the numerous positive aspects and opportunities available to accounting and auditing firms, data shows that auditors do not often use FinTech solutions in their work, and about half of auditors never use tools other than Excel spreadsheets in their work [7]. This is explained, in particular, by the fact that the effectiveness of implementing FinTech and AI-based solutions in this area is not guaranteed. Moreover, it has been found that they can not only improve the work of accountants and auditors, but also significantly disrupt it [16]. On the one hand, this happens due to a certain level of distrust of digital tools. On the other hand, it is also caused by the discrepancy between expectations and the results of such systems, as they may not consider many specific factors, leading to significant errors in judgement. Also, in the context of changes in the regulatory framework, not all essential aspects can be taken into account by the system, which leads to the formation of erroneous judgements and conclusions, especially if the audit period covers the period of validity of different regulations in the legislation. The convenience of working with such systems also does not always meet the needs of users. The field of accounting and auditing may be an example of how complex solutions are not always effective, while simpler ones that perform less complex and not overly complicated tasks, but at the same time significantly speed them up, are a priority. In other words, each solution and proposed tool must meet the needs of a specific group of users.

In **tax administration** using FinTech, it is generally possible to achieve the same benefits as in most areas of financial activity, as well as increased transparency of corporate information. The use of Big Data and related technologies also helps to curb income manipulation and reduce agency costs [17]. Big Data management also serves as an external control mechanism, ensuring a high level of oversight and analysis of risks, fraud and abuse. However, despite the considerable advantages, the use of FinTech and Big Data in this area can lead to significant negative consequences that may outweigh the positive impact, because companies that are under too much pressure from regulators are looking for additional ways to make a profit, and one of such ways is to invest in high-risk projects [6]. For example, it has been proven that these tools contribute to the emergence of corporate decision-making risks [17], and their impact on different types of companies is uneven – the private sector in this context is exposed to a higher level of risk than state-owned companies. The level of risk of corporate decisions caused by the use of Big Data will also vary depending on the environment in which the company operates, since it is influenced by other factors, such as market competition, the legal environment, and institutional capacity [17], which can somewhat mitigate it. This is primarily due to the fact that Big Data in the tax sphere involves the integration of information from various sources, such as manual input and the Internet, followed by its analysis, identification, processing and use. At the same time, with balanced and rational use of Big Data in taxation, this risk can be significantly reduced, for example, by shifting the focus from control and punishment for violations to a mechanism of external management based on supervision. At the same time, given the nature and characteristics of Big Data, the main advantages and threats of its use will be the same as for other types of financial companies, as they stem from the very essence of Big Data.

Common to all financial companies. The main advantages and disadvantages of implementing and using Big Data and AI in financial companies, as well as the challenges associated with their implementation, have been studied in previous research [18; 19]. This study focuses on the regulatory, legal and ethical aspects of using Big Data, issues related to security management, the compliance of Big Data-based FinTech with established requirements, and human resource changes in financial companies associated with the implementation of Big Data-based technologies.

Regulatory and ethical aspects. These aspects underpin companies' activities and define the rules of the game, interaction between companies within and across countries, between users, and the rules of data handling. That's why they should receive the greatest regulatory attention. However, they are largely absent from this sphere. In most cases, they are governed only by separate provisions of data protection legislation or are not regulated at all. This leads to management difficulties and, in the event of disputes or legal proceedings, to uncertainty regarding the interpretation of legal provisions and the applicable law. This situation creates additional opportunities for abuse by companies, as well as for fraudsters and criminals, potentially reducing the overall level of financial security. The only comprehensive regulation in this area is the EU's General Data Protection Regulation, which establishes data protection

standards for financial institutions. The second most extensive regulatory framework is the US Gramm-Leach-Bliley Act, which governs the confidentiality and exchange of customer data, alongside the Payment Card Industry Data Security Standard. Overall, there is not only a lack of regulation, but also a lack of unified standards for security, data management, and interaction.

Standards for the ethical treatment of user data and users themselves remain insufficiently addressed, despite their growing importance, particularly in the financial sector, where data use extends beyond the scope of legislation alone. As Big Data creates the basis for AI-based tools operating through algorithmic processes, there is a risk of embedding biased or discriminatory assumptions that may exclude certain user groups from essential services. Another key issue concerns the appropriateness and justification of data collection, and the point at which it becomes excessive intrusion into private life. These concerns are especially relevant in credit scoring, underwriting, insurance and marketing, highlighting the need for ethical data-use standards that balance business objectives with fair customer treatment. Current discussions increasingly focus on the ethical use of AI and Big Data [20]. Developing such standards would also enhance financial inclusion, particularly in underdeveloped regions, and contributes to the emergence of regulatory technologies (RegTech), which, alongside FinTech, play a crucial role in addressing growing regulatory complexity through technological solutions [8]. Therefore, development of unified standards for data handling and at least ethical standards for data processing is becoming critical. This is not only a matter of inclusion and financial security for individual companies, but also of global financial security, as it will also help to reduce the level of fraud and financial crime, especially through the use of multinational financial platforms or FinTech start-ups, and will help to regulate the activities of financial companies and their use of Big Data in a global context, since abuse or financial violations can be committed unintentionally due to problems of non-compliance with the laws of the countries in which the company operates. Different countries have different standards and features of legislation, which inevitably leads to problems with adaptation and with determining which country's rules to operate under (especially in the case of applications and cloud platforms). This problem will also arise when a global company or system operates in different countries. The most pressing issues concern databases, in particular those that operate in different countries to perform the same functions using different data sets as required by local legislation. The development of global standards will avoid the risk of errors due to inconsistencies, increase the attractiveness of low-income countries for investment by creating a more equal business environment, i.e. it will reduce the gap between rich and poor countries, close one of the channels for fraud and financial crime, and help to reduce the vulnerability of Big Data and increase overall financial security.

Big Data security and financial security. The main threats facing financial companies and related to the very essence of Big Data are described in a previous study [18] and, therefore, given the limited scope of this study, will not be described again. However, other risks in this area should be added. One of the most significant is

that all measures developed to prevent fraud and data theft from companies have proven to be insufficiently effective. This is evidenced by the Peck Shield report, according to which there is a steady increase in attacks on the data and accounts of financial companies every year, and the share of losses from them is also steadily growing. The rates are impressive – for example, the growth in the share of losses from such attacks in 2025 compared to 2024 is +34.2%, and in monetary terms, $3.01 billion [21]. There is also a strong belief that this trend will continue, as several significant cyberattacks have already been carried out in just two weeks of 2026.

The situation is complicated by another factor – the risk of information loss during collection, as well as the use of unreliable information processed by AI tools, which will not only lead to errors in a single report, but will also have a negative impact on AI algorithms, which are quite difficult to correct in the future, especially for companies with limited resources and a lack of qualified IT specialists. Figure 1 shows a basic diagram of the collection and processing of Big Data in a financial institution.
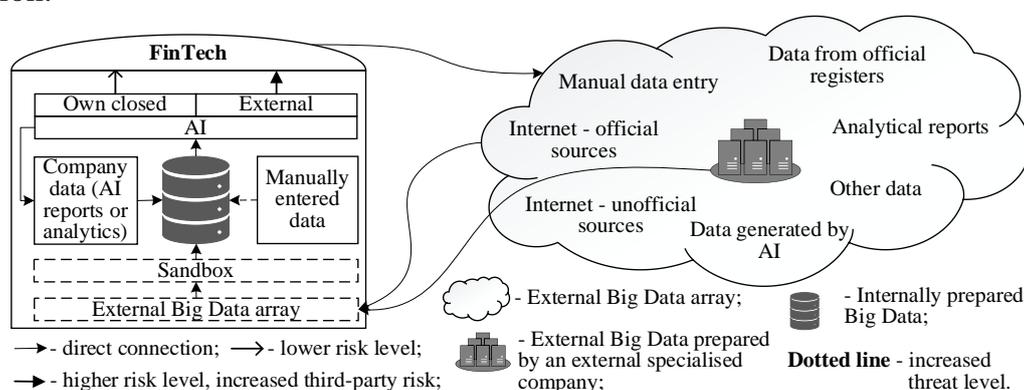

Fig. 1. Basic diagram of Big Data collection and processing in a financial institution

*Source: developed by the authors

The diagram shows the risks of the external and internal environment of the company. For proper use of Big Data, it must be only not collected in accordance with ethical standards, but also properly cleaned. In other words, for an AI-based analytical unit to work effectively, only verified, carefully collected, validated and properly prepared data is required. Data coming from the external environment poses a potential threat if it is processed incorrectly, because algorithms can either accidentally collect unreliable information from open Internet resources, or unreliable data can be obtained, entered manually by one of the users either as a technical error or knowingly incorrect for the purpose of deliberate mischief. Even data received from government agencies can sometimes contain errors, as their processing and collection algorithms may also be incorrectly configured or use improperly cleaned Big Data.

If a financial company uses services of specialised third-party companies or platforms to collect and process external Big Data, a significant part of the actions related to data cleansing and verification is taken over by such a company. On the one hand, this reduces the risk for the data recipient, as well as their costs for processing

and preparing the data, since large data centres potentially spend less resources on this and can ensure higher processing accuracy. However, such data also needs to be verified, as there can be no complete certainty that there were no errors in their algorithms or that the data was not deliberately distorted. This also makes the financial company dependent on third-party BigTech. If the company processes the external data array itself, it will need additional resources to do so. The same applies to working with internal Big Data arrays, as they also need to be cleaned and prepared, albeit to a lesser extent. It is necessary to constantly monitor AI analytical modules and adjust them in case of unreliable data. This is important because incorrectly generated reports or analytical information not only harms the company and leads to additional costs for adjusting algorithms, but also generates unreliable information externally, thereby increasing the risk of external Big Data.

Another risk factor is the choice of the Big Data management solution itself and its implementation. There are two main options in this regard: using third-party systems and platforms developed by BigTech or developing companies' own system. The first option is suitable for all types of companies and is cheaper in terms of both implementation and service support. Their use contributes to the stabilisation of the AI market and requires less company resources, but there is a significant risk of data leakage, as well as in case of complex systems there is an additional risk that they may cease to operate or be restricted due to legal procedures, which is already being observed to some extent in the EU [9]. In addition, open global AI systems are currently showing significant losses, and it is not yet known how such companies will behave in the future, since this phenomenon is new and unexplored. But if such a company goes bankrupt, consumers of its services may suffer significant losses and the loss of large amounts of data. It is also possible that such companies, seeking to improve their own situation, may sell data from the Big Data cloud of the financial company with which their artificial intelligence language model (LM) operates to competitors. Furthermore, the use of such data in training LMs may lead to the leakage of information that is strategically important for the financial company. That's why large financial companies are hesitant to make such a decision [9], as it also increases the risk of third parties, in particular due to the transfer of risks from BigTech to financial companies, scaling and compliance issues, interpretation and systemic risk. It is safer and more profitable for financial companies to maintain their own AI systems, which may be more limited but closed, working with their own closed Big Data bases and trained only for specific tasks. The result is operational efficiency and a reduction in the number of errors, as well as the absence of external dependence and a significant reduction in third-party risk. Simpler solutions with sequential execution of uncomplicated algorithms make it possible not only to avoid a significant number of errors and reduce the need of specialists' intervention, but also to significantly reduce the level of system hallucination, AI degradation due to processing of low-quality queries and 'information junk,' and to reduce the cost of its development and maintenance. Their advantage is that the entire data array and operational information remain within the company, which can be confident in the confidentiality and security

of the data.

However, both solutions, especially the second one, lead to inevitable and significant changes in the skills and competencies of employees [18; 19], as well as create a need among financial companies for their own narrow-specialised IT specialists and an increase in the number of analysts to identify possible errors and verify generated reports with an analytical and forecasting component. Also, the situation developing in the field of cybersecurity and around BigTech, as well as the increasing relevance of the development and support of proprietary solutions, inevitably leads to structural changes in the principles of financial companies' activities. Their dependence on IT companies and the need for significant investments will potentially lead to a transition from expanding IT departments in companies to establishing their own or purchasing existing IT companies to meet their needs. Such processes increase the importance of financial companies for the IT sector, as they become one of the main customers for their services, and this trend will remain in the future.

The relevance of choosing a Big Data management system reinforces the problem of Big Data-based FinTech compliance **with the established requirements**. The key issue in this context is not the choice of technology, but whether a company actually needs it at a current stage. Although for many financial institutions Big Data analytics has become essential, a significant number adopt such technologies mainly due to competitive pressure, often replicating solutions already implemented by competitors to improve accounting and business processes and remain competitive [22]. However, companies may be unprepared for this transition, leading to higher costs, increased risks, and poor implementation quality. Such decisions may also fail to align with a company's actual objectives, as technology choices are sometimes driven less by efficiency than by integration into a supplier's ecosystem. While this may be beneficial if the supplier provides long-term support, it can also increase third-party risk and reduce capital efficiency. Therefore, financial companies should prioritise a critical assessment of their own needs rather than seeking to enhance customer appeal, especially given evidence that the value of AI in certain roles is often overstated or even negative [23]. Decisions should be based on objective requirements, with tools implemented only where they deliver real value, thereby reducing risks, limiting investment and staffing needs, and improving overall effectiveness.

Human resources. The expansion of the use of Big Data and AI-based analytics by financial companies leads to a reduction in certain routine tasks and, consequently, to the potential layoff of some employees, as well as a decrease in human involvement in the process, which should contribute to a reduction in costs, errors, and cases of unlawful interference. At the same time, however, the role of specialists in the activities of financial institutions is changing significantly, with new needs and requirements emerging. For example, this study has shown that IT specialists and analysts are becoming particularly important. As a result of preliminary research based on an analysis of the role of stockbrokers in the development of the stock market, it was found and proven that AI-based tools are not capable of providing comprehensive

and high-quality data analysis and forecasting based on them, especially in the case of a financial company's global operations. In this context, local analysts and financial specialists with a high level of analytical skills are becoming increasingly important [14]. A study of the impact of technology on the internal environment of corporations has shown that teams in which financial specialists have a certain level of IT knowledge and IT specialists have an understanding of financial processes, significantly increase work productivity, the quality of tasks performed, and the compliance of the created products and digital tools with the tasks set [18; 19]. The results of this study not only correlate with previous studies but also reinforce them. Thus, it was found that to increase labour productivity, financial companies can either keep the number of employees unchanged and use the time saved to improve their qualifications, or lay off staff. However, in the second case, a new need arises: the need for less employees, but with a significantly higher level of qualifications in their immediate activities and with analytical skills that can verify, or at least periodically verify, the accuracy of reports, conclusions, forecasts, etc. generated by the AI system, and know how, if necessary, to make adjustments or set the right tasks for IT specialists. In this case, it is also necessary for specialists to acquire at least minimal knowledge in related fields. Thus, financial institutions need to develop new human resource management strategies and balance them with data management strategies. Specific elements of digital systems can also be used in human resource management; in particular, AI-based tools can help identify employees' soft skills. Employees who demonstrate analytical abilities can potentially undergo specialised training. This approach to human resource management will help to use available resources more efficiently. Comprehensive personnel assessment, both for identifying soft skills and professional abilities in general, is particularly relevant for medium and large companies, because it will help to redistribute employee functions more effectively and develop programmes for improving their qualifications.

However, whatever approach a company chooses, it is necessary to consider the growing importance of analysts, as well as the need to review the staffing structure of companies and their costs for staff training. Such changes have a direct impact on related areas, in particular education and science, since they necessitate the development of new approaches not only to staff training but also to education, in particular, changes to educational programmes. Moreover, both sides must be involved in this process – both higher education institutions and financial companies – in order to give the former an understanding of their real needs. Thus, the conclusion is that this area should become one of the key priorities in the context of the global digitalisation of financial services and should be the focus of attention, as a total lack of properly trained specialists could jeopardise not only the functioning of FinTech, but also the financial security of individual companies and global financial security in general.

Conclusions and prospects for further research. This study confirms the hypothesis that Big Data, FinTech and AI are fundamentally transforming the financial sector by enhancing efficiency, risk assessment and financial inclusion and leading to

the need to rethink personnel policy and transform IT departments, with the possible investment in or acquisition of IT companies by financial companies. At the same time, their rapid and often unbalanced adoption generates new operational, systemic, ethical and cybersecurity risks that may undermine financial stability if they are not properly managed.

In the banking sector, Big Data analytics improves credit assessment, customer assessment and profitability, but may also increase risk-taking behaviour, reduce liquidity and intensify systemic risk, particularly where institutions rely on external FinTech platforms or implement technologies without internal readiness. Similar patterns are observed in risk management and insurance, where improved analytical accuracy and fraud detection depend heavily on data quality and governance. In stock markets, digital tools support routine operations but cannot replace expert human analysis in complex and global contexts.

Accounting, auditing and taxation demonstrate high potential for automation; however, the effectiveness of Big Data solutions remains uneven due to regulatory complexity, data reliability issues and mismatches between technological capabilities and professional requirements. Evidence suggests that simpler, task-oriented digital tools often deliver greater value than complex systems. Across all areas of financial activity, the absence of unified regulatory and ethical standards for data use, combined with escalating cybersecurity threats, represents a critical vulnerability. The choice between own closed systems and third-party Big Data solutions further affects financial security, strategic autonomy and exposure to third-party risks. The research also highlights significant changes in human resource requirements, with a growing demand for analysts and specialists possessing both financial and technological competencies. Overall, the findings indicate that Big Data-based FinTech can contribute to financial stability only when its adoption is balanced, strategically justified and supported by effective regulation, robust data governance, strong cybersecurity measures and sustained investment in human capital development.

Future research will focus on investigating changes in approaches to human resource management, particularly in the context of upskilling and leveraging existing employee competencies, with the aim of improving the effectiveness of digital solutions in financial companies and increasing their resilience.

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