Identifying Risks of Global Finance Digital Transformation

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Abstract: The relevance of the research subject in this study is based on the significant changes in the development of the global financial system in the last few years, which have increased the risks of the digital transformation of global financial assets and the necessity to identify effective options to cope with the current situation. The main objective of this research is to identify realistic prospects for identifying risks to the digital transformation of global financial assets and tools to address them in a timely and effective manner. The methodological approach in this research is based on a combination of systematic analysis of general principles for identifying the risks of digital transformation of global finance with a comprehensive study of methodologies for preventing the impact of these risk factors on the global financial system. This research has produced results that clearly illustrate the main risks of the digital transformation of global financial assets and the extent to which they have a real impact on the global financial system. The practical significance of the results obtained in this research study and the conclusions drawn from them is the possibility of their use for the timely detection of the risks of digital transformation of the financial activities of enterprises in various areas of the economy, and their timely and effective elimination.

Keywords: Financial Field; Digital Finance; Digitalisation; Information Security; Artificial Intelligence; Global Financial System.
JEL Codes: G30; G32.

1. INTRODUCTION

The problem of this research is the dramatic changes in the global financial environment over the last 10-15 years. The result of this process is that commercial and financial banks and other traditional financial intermediaries have begun to rapidly lose market share to fintech companies, and major non-financial corporations (e.g. Alphabet, Apple, Alibaba) have become competitors to conventional financial institutions. It is highly possible that this rate of change will continue in the next decade. One of the main reasons for this massive transformation is the increasing role of digital technology, both in the financial services industry and in the wider economy. Digital technology is deeply integrated into international financial markets and all areas of the global financial system and is fundamentally changing the way financial institutions operate and deliver value to customers. Thus, researchers and policymakers refer to these processes as financial digital transformation or the digitalization of finance. G. Caprio (2020), in his academic study, examined the key principles of the global financial system. In the author's opinion, artificial intelligence (AI) and machine learning (ML) programs, robotics, blockchain, big data, cloud computing, etc. should be considered the most breakthrough digital technologies enabling and driving the digital transformation of the global financial system. With such technology, the global financial industry will gain new business models while being able to deliver more value at a lower cost and respond quickly to the ever-changing demands of customers (Ibragim et al., 2020; Tukhtamisheva et al., 2020; Zhukov et al., 2015).

For their part, M. Melvin and S. Norrbin (2022), in a joint study of the prospects for global financial markets, note that the digital transformation of global finance has been accelerated by the COVID-19 pandemic. While the trend towards digitalization in the global financial industry and the ability of digital technology to improve financial services has already been recognized, the pandemic and pandemic-related measures have increased the importance of these factors (Nurdaulet et al., 2018; Yu et al., 2022). COVID-19 has revolutionized customer behavior, increased their willingness to interact digitally, and moved much of the financial industry online. The subject is developed by M. Fitzgerald et al. (2014) in a collaborative study of the possibilities of using modern digital technology. According to academics, the pandemic has resulted in four fundamental changes that have accelerated the digital transformation of global finance: forced use of online, mobile, and call centers; the 24/7 virtualization of the workforce and modes of working interaction; the evolution of the underlying market structure and economy; and the tipping point for digital and contactless payments (Miethlich et al., 2021).

Therewith, S. Gong and C. Cullinane (2019), in a collaborative study of financial risk management challenges, highlight the fact that the spread of digital technology in global finance brings many benefits to all participants in the financial

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industry. These benefits include: improved cost efficiency, streamlined operations, automated functions, higher productivity, a wider range of financial products and services offered, improved delivery of these products and services, increased profitability by attracting new customers, improved convenience for customers, increased access to financial services, etc. Therewith, V. Sidenko (2021), in a study of risks and global changes in the global financial system, notes that the digital transformation of finance brings opportunities and benefits, and risks. The most obvious and high-priority digital risk is cybersecurity issues. But no less important are endogenous technogenic-deterministic risks: the protection of personal data, the increase in information noise and unproductive loss of time, the emergence of new possibilities for controlling the minds and behavior of large groups of people, and the risks of transforming thinking and behavior (Mazakov et al., 2020; Tanirbergenova et al., 2021).

The main purpose of this research study is to identify feasible opportunities for identifying risks to the digital transformation of global financial assets, and opportunities to address them efficiently.

2. MATERIALS AND METHODS

The methodological approach in this research is based on a combination of a systematic analysis of the key factors that influence the process of identifying the risks of digital transformation of global finance and a comprehensive study of opportunities to prevent the development of these risks and limit their impact on the global financial system. In addition, a comparative analysis has been performed of the results obtained in this research with the findings and conclusions of several available academic researchers in the above and related fields. The main study was preceded by a qualitative theoretical framework, which is an analysis of available academic research on the impact of the risks of the transformation of global finance on the modern world economic system.

Applying a systematic analysis of the main factors that have a direct impact on identifying the risks of the digital transformation of global finance has identified the main risks in the global financial system that pose a risk in terms of the possible consequences they pose to the system. Therewith, the classification of risks of this kind has allowed for the classification of risks according to the risk they pose to the global financial system, and for the prediction of their prospects for prevention. Using a comprehensive analysis of the impact of opportunities to prevent and limit the impact of these risks on the global financial system has identified key areas of digital transformation of the global financial system that is significant in terms of their impact on global financial markets. Therewith, an analysis is provided of the interconnectedness of the global financial system with regional and national financial systems, in terms of the objective impact of the identified risks of digital transformation. The combination of research methods chosen determined the specific stages of the research.

The first stage of this research identified the risks that pose the greatest risk to the global financial system. These risks included: cyber security risks, risks from crypto assets, legal and regulatory risks, and financial stability risks. In addition, a detailed classification of these risk factors has been provided in terms of assessing the real risk they pose to the global financial system. In the second phase of this research, key aspects in assessing the role of the digital transformation of global finance, as applied to the financial systems of individual states, were explored. Risk factors have been appropriately assessed in the context of their impact on the efficiency of the interaction of the global financial system with regional ones, in terms of the impact of the risks of the digital transformation of global finance on public financial management processes. In the final stage of this research, a comparative analysis was performed with the results and conclusions of several available research on this and related subjects. The analytical comparison allowed clarifying the results obtained in this research and the development of objective conclusions based on them, which logically reflect and summarise the whole range of research performed in the framework of the stated subject.

3. RESULTS

Among the many and varied digital risks in finance, the authors of the research have identified the most dangerous and those that will have the greatest impact on global finance. Moreover, it is not the purpose of this study to cover exhaustively the existing risks of the digital transformation of global finance. Cyber incidents pose a huge threat to the global financial system, and their sophistication and frequency are steadily increasing. From 2015 to 2020, finance and insurance were the most targeted industries for cybersecurity crime on a planetary scale (X-Force Threat Intelligence…, 2022). Cyber threats or cybersecurity threats can establish uncertainty about the reliability and security of digital technology but cause enormous damage to global finances. Cyber threats are a source of both operational and reputational risk. A cyber incident can damage or completely undermine a financial institution's ability to conduct business (operational risk). In addition, financial institutions can lose the trust of their customers due to cyberattacks (reputational risk) (Rao and Mishra, 2020). Some of the most common types of cyberattacks against financial companies include:

1. Ransomware. It is a type of malware that can encrypt files or even the operating system. It blocks users from accessing important documents or the device itself. Therewith, the perpetrator threatens to publicize or sell the stolen information for ransom.
2. Web application. Most companies in the financial sector use a variety of web-based applications for their business operations. These applications are vulnerable to cyberattacks and allow attackers to collect personal information belonging to customers of a financial institution.
3. Phishing. Using social engineering to get employees of a financial institution to perform an action that allows the malware to be installed on the company's network. Another option is using fictitious websites and login pages, which are spoofs of the financial company's official resources. Customers go to the fake website, enter their credentials, and lose their financial data.

4. Attacks that exploit vulnerabilities. These attacks allow criminals to gain access to target networks.
5. DDoS (Distributed Denial of Service) attacks. Causing disruptions and the crash of the financial institution's website. It disrupts business operations and poses a great danger to financial companies.
6. Domestic threats. Many cyber incidents are the result of threats from current or recently dismissed staff or staff negligence. Therewith, the risk of internal attacks is increasing, they are becoming more unpredictable and more difficult to counter.

One consequence of using modern digital technology in finance is the establishment of a fundamentally new type of financial asset – crypto-assets. Crypto-assets are entirely digital assets that use cryptography, P2P (peer-to-peer) networks, and distributed ledger technology to establish, verify and protect transactions. The most common types of crypto-assets are cryptocurrencies, security tokens, service tokens, and non-fungible tokens. Risks of this kind affect the functioning of banking systems and markets, both in individual states and globally (Mishchenko et al., 2018). Crypto-asset markets are currently having a significant adverse effect on the cyclicality of the global financial distribution system. It is explained by their significant scale, their vulnerability within certain structures, and their ever-increasing interconnectedness with financial systems that are conventional for individual states (Paranque and Revelli, 2019; Patashkova et al., 2021). The international nature and rapid expansion of this type of market establish opportunities for the stabilization of global financial companies within specific economic regions and on account of the interests of the entities operating in those regions.

Potential sources of risk associated with crypto-assets: crypto-assets are generally not covered by (or compliant with) a proper regulatory regime; increasing share of crypto-assets in portfolios of institutional investors; increasing speed of acceptance of crypto-assets for basic payments; crypto-asset trading platforms; no identified intermediaries or parties responsible for governance; different regulatory and regulatory arbitrage; gaps in the information provided, which pose significant obstacles to the assessment of risk factors and the adoption of priority options for implementing financial policies. Legal and regulatory requirements for global finance have increased significantly since the 2008 financial crisis. Moreover, the increasing digitalization of finance requires regulators to adopt new laws and regulations. Legal and regulatory regimes around the world are at different stages of development and can pose compliance challenges for financial firms. Financial stability risk involves the possibility that financial problems may arise and develop. In addition, it is an issue of the resilience of financial systems to such problems and the inability to respond to them. Digital technology can affect financial stability by changing the structure of global financial markets. The market structure is changing through different channels:

1. The emergence of new banking service providers that compete or partner with generic providers promoting similar services. It could affect markets and bank behavior.
2. Provision of financial services by large-scale technology organizations.
3. Provision of important services by third parties (Chen and Zhang, 2021).

All of the above risks of the digital transformation of global finance should be objectively considered in the context of assessing the role and importance of the interconnectedness of the global financial system with national financial systems (Luo et al., 2021; Kerimkulov et al., 2015). Therewith, in assessing the significance of the digital transformation of global finance in this context, the following aspects must be considered:

1. The digital transformation of global finance, in its optimum version, should ensure that every citizen of every state has access to any information resources, knowledge sets in a given area, and the possibilities of receiving services that are provided through the application of digital and information and communication technologies.
2. The digital transformation of global finance should be designed to establish benefits for national public finance in terms of the ability to improve public financial sector development services and financial security at the scale of a single public system. The issues of information and cyber security of citizens, given the increasing risks of digital transformation, and ensuring the protection of personal data and privacy, must be effectively addressed. Therewith, the protection of the rights of users of modern digital technologies, combined with the growth of trust in cyberspace, are responsible for sustainable digital development and the prevention of risks of digital transformation of global finance on a national and global scale (Ketners and Petersone, 2021; Naumenkova et al., 2022).
3. The digital transformation of global finance must become a qualitative and effective tool for the economic growth and development of individual states, through a gradual increase in their efficiency, productivity and competitiveness. This, in turn, implies new competitive characteristics and advantages in various areas of economic and financial activity. A system of this kind should be gradually developed, considering internationally accepted standards for digital systems, platforms, and infrastructures that citizens, businesses and governments should use to develop effectively, establish healthy competition and succeed in the modern market system.
4. The digital transformation of global finance must fully respond to the real development requirements of modern information and media, both globally and nationally. The establishment of quality information content within the information space of any state will contribute to the active and full social, economic, and cultural development of society, the strengthening of its information space, and the trends of democratic development in general (Zhansagimova et al., 2022).

5. The digital transformation of global finance about changes in the financial system of individual states must change with a particular emphasis on becoming an object of integrated public management. The modern state, while implementing a set of measures for the digitalization of its national financial system, must ensure a qualitative adjustment of the problems of existing regulatory mechanisms of the domestic market system, overcome legislative and institutional obstacles, and support digital transformation projects at all levels of its own life, with investment injections to stimulate growth and development of digital infrastructures. It applies in all areas of the state and society, not just financially. In addition, government agencies should assume a regulatory role in expanding the popularity of technological innovations in the digital transformation of national finance (Sarybayev et al., 2021; Ivanov et al., 2021).

Efficiency and timeliness in identifying the risks of the digital transformation of global finance are achieved through the coherent functioning of technology security services of financial institutions and government agencies responsible for ensuring an appropriate level of technological protection across the state (Terra, 2015; Issabayev and Issabayeva, 2020). Therewith, at any stage in the process of identifying the risks of digital transformation of global finance, it is necessary to comply with the legal provisions adopted by the legal system of the particular state, which regulates the procedure for detecting risks belonging to any of the above categories. The implementation of measures of this kind necessarily requires compliance with the principles of protection of confidential information and personal data of users of modern information systems and privacy. The legal responsibility for the effective organization and qualitative implementation of measures to identify risks of this kind rests with the heads of technological safety control services of the enterprises and institutions in the financial sector of a given state (Azieva et al., 2021; Miethlich et al., 2022).

The digital economy includes a number of risks, including the interaction of private business with the state, a decrease in the level of data security, increased complexity of business models, intrusion into the privacy of customers, changes in the behavioral models of financial institutions and consumers of financial services, and others (Bakirov et al., 2021). Each of the listed risks poses a direct threat to the financial system of the country in the absence of their forecasting and prevention. At this stage of the introduction of digital technologies in the financial sector, the economy is being transformed not only in individual countries, but also on a global scale. In particular, the ways in which savings, payment, lending and investment services are provided are undergoing changes. At the same time, the objects that provide these services also change. Moreover, metamorphoses are predicted even for the currency - the usual money can gradually be replaced by cryptocurrency. Given the above processes in the modern financial system, it is important to be able to benefit from them and calculate possible risks, since the financial stability of consumers depends on the speed of adaptation.

Among the steps to prevent financial risks in the era of digitalization of the economy, the following can be noted:

1) Development and implementation of socially integrated digital infrastructures. Thus, it will be possible to ensure equal conditions of use for financial transactions. A digital currency can also act as a universal accessible platform.

2) Minimization of monopoly in the financial market by introducing uniform standards for promoting competition. Thus, customers will be able to easily exchange data and gain freedom of decision and healthy competition, and operators will become interoperable.

3) Renewal of policy approaches in the field of competition. Today, financial market monopolists can operate not with material resources, but with information resources. Ignoring uncontrolled data collection by financial companies and institutions can lead to a high entry threshold for new organizations.

4) Improving the degree of protection of personal data of consumers. With the advent of digital technologies in the economic sphere, it is becoming increasingly difficult to control the amount of customer data collected. As a result, financial companies have sensitive consumer data, which can lead to manipulation.

5) Facilitating the joint work of policymakers in all areas. It means that digitalization cannot exist only within the framework of the financial sector. Therefore, it is important to pay attention to improving also the legal, informational and political sphere in the context of reducing financial risks for the population and for financial institutions.

Another significant threat to the digital economy is a large-scale cyber-attack on the global economic system. Christine Lagarde spoke about this in February 2020. She added that such an attack could lead to a serious financial crisis. A cyber incident can lead to the failure of the apparatus of the financial system and lead to destabilization of the economic state. In order to prevent the destruction of the system of online services in the financial sector, which was created and developed in connection with the covid 19 pandemic, it is important to make the issue of cyber security a priority. However, it should be understood that the newer financial digital products appear on the market, the more targets' hackers have. However, the digitalization of the financial sector has a significant advantage. The development of new technologies in the economic environment makes it possible to detect and prevent risks faster. This is possible due to natural by-products that are a by-product of financial activity. Such data will be especially effective in the case of lending, insurance and investments (IMF Annual Report, 2020).

In this context, a significant factor is supervisory authorities' use of modern technology to detect risks and deal with their possible impact on the global financial system on time. Using the latest technological solutions in practice enables supervisory authorities to gradually improve their supervisory capacity and, for regulated institutions, to strive to implement the regulatory orders they have established. These technologies are associated with several risks and challenges: cyber risk and data security; data standardization and data quality; third-party dependencies; data localization; competition barriers; potential for regulatory arbitrage; resource requirements and costs; and reputational risks (Banna et al., 2021; Suleimenov et al., 2020). Identifying the risks of transformational global finance is a must on the way to establishing the financial and economic stability of individual states and geographical regions. A timely and effective solution to this problematic issue will contribute to a gradual recovery of the economic situation, removing the negative trends characteristic of the impact of various risk factors. All of this is essential for the economic and financial welfare of individual countries and geographical regions, the recovery of the global economy, and the elimination of the preconditions for economic and financial crises of both global and national proportions.

4. DISCUSSION

The team of authors, represented by E. Abad-Segura et al. (2020), in a joint study of key trends in global financial technology at the current time, note that there are growth and development trends in this area that can be seen in the analysis of current international studies. According to the authors' group, this is evidenced by the significant increase in the number of publications on finance and the risks of digital financial transformation, covering current and future research areas in the field. In general, the findings of the researchers are consistent with the findings of this research, significantly complementing and extending them in the context of assessing the role and importance of available publications on finance and the possible risks of financial and digital transformation. For their part, a group of researchers represented by A. Majchrzak et al. (2016) in a joint scientific study of the design principles of modern technological devices for digital transformation highlight the fact that the application of digital technology in the financial sector means the beginning of a new phase in modern society associated with significant digital transformation. According to academics, this will translate into better customer service for financial institutions and the establishment of new, better business models. The findings of the researchers are fundamentally consistent with and very much complementary to, the findings of this research.

The subject is further developed by C. Watanabe et al. (2021) in a collaborative research study on the transformational processes in the social economy resulting from digital innovation. Researchers note that the current processes of digital transformation in the global economy have radically changed the structure of many markets and industries and are considered inherently disruptive. One of the hardest hit was the financial services sector. Recently, there has been a lot of research exploring the phenomenon of the digital transformation of finance. These studies add significantly to the overall picture of perceptions of the major trends in the global economy affecting financial services in the context of evolving digital transformation processes. Researchers M. Hrysenko et al. (2022) conducted a collaborative study of the correlation and interaction of economic creativity factors as a determinant of sustainable economic growth and concluded that there is now intensive growth in the creative economy and a steadily increasing share of the creative sector in the gross domestic product. According to the authors, the active development of the creative sector in the European Union has a straightforward impact on its economy by increasing its efficiency and establishing jobs, stimulating innovation, and contributing to planned social and sustainable development. The findings of the researchers do not contradict the results of this research work, extending and complementing them significantly.

Therewith, research scientists G. Whitney and S. Hara (2018), in research exploring the risks and opportunities of digitalization for financial inclusion, highlight the fact that one of the critical benefits of digitalization in finance is increased access to financial services for underserved and underbanked populations. As digital technology becomes cheaper, more accessible, and more advanced, the trend toward greater access to financial services will develop significantly in the longer term. The authors note that modern financial institutions, through the introduction of digital technology, can effectively protect the financial autonomy and financial independence of a huge number of citizens around the world and attract more customers. The researchers' conclusions require significant additions since the introduction of digital technology in financial institutions can ensure the financial independence of the country's citizens only if an established legal framework governing all the nuances of the process is followed.

In turn, researchers B. MacCarthy and D. Ivanov (2022), in collaborative research exploring several problematic aspects of supply chain alignment using modern digital technologies, concluded that big data, machine learning, robotic advice, and related technologies are improving access to financial services by reducing fixed costs and unwarranted human biases against minorities. The authors note that artificial intelligence and machine learning technologies are frequently used in the transformation of global finance as a result of the considerable amount of data available, and the computing power that can be rationally and fully utilized at a later date. By applying artificial intelligence technologies, the costs of financial institutions are significantly reduced and their efficiency is dramatically increased. The researchers' findings add significantly to the findings of this research, in the context of assessing the role of artificial intelligence in the digital transformation of global finance.

The interconnectedness of modern global financial market concepts has been addressed in an academic study by M. Raddant and D.Y. Kenett (2021). The researchers conclude that the rise of global digital transformation can help make global finance more efficient, and more inclusive, making global financial institutions more versatile in responding to changes in the external environment and increasing their profitability. But, at the same time, it comes with great challenges and risks. Digital risks and the risks of digital transformation of finance are therefore important subjects that have been widely explored in the academic literature. The researchers' conclusions are fully consistent with the findings of this research. M. Feldkircher (2014), in a study of the factors determining the financial vulnerability of enterprises in the global economic crisis of 2008-2009, has concluded that any significant changes in the financial system of a single enterprise or state caused by innovative innovations are not without significant risks. Therewith, the author notes that innovative solutions alone do not guarantee the smooth functioning of the company in a changed financial situation, as much depends on how its managers can interpret and implement them correctly, considering the realities of the current economic situation and the particular financial situation in which the organization finds itself at the current time. The scientist's findings greatly complement and extend the findings of this research, in the context of assessing the role of innovation in the digital transformation of the global financial system.

The research team, represented by A. Havlik et al. (2022), in a joint study designed to identify the best way to organize economic activity during the COVID-19 pandemic, concluded that the prevailing world situation has had a significant impact on the transformation of the global financial system, significantly accelerating it. Therewith, according to scientists, the risks of the digital transformation of the global financial system have increased significantly, forcing managers of modern industrial and several other companies to search for optimal opportunities to optimize this process, with timely identification of financial risks and their prevention. The researchers' conclusions fully correlate with the findings of this research. Researchers O.I. Rogach and P.V. Dziuba (2017) in a joint study of exchange rate risks of international portfolio investments in the context of a comparative analysis of Ukrainian other frontier markets note that Ukraine has the highest relative currency risk among frontier markets if the relative returns to the euro and the dollar are taken as the measurement criterion. According to pundits, the current market trends are defined by the highest risk-return trends in these currencies and the national currency. The findings of the researchers are within the framework of the findings of this research, significantly complementing them in terms of the assessment of risk trends in UAH and foreign currencies.

A team of scientists represented by A.R.D. Rodriguez et al. (2022) conducted a collaborative scientific investigation into the role of artificial intelligence, digital transformation processes, and cybersecurity organization in enterprise banking. As a result, scientists have concluded that the oversight of the digital transformation of global finance must be fully traceable at all stages, which will help mitigate various financial risks. According to the authors, much academic and professional research to date has identified and categorized the risks of digital transformation, which will generally contribute to a deeper and better understanding of the problem and to finding the best ways to address it. The results obtained in the cited research are fully consistent with the findings of this research.

Several problematic aspects of assessing the efficiency of national banks in the Ukrainian and Polish economies have been discussed in S. Yakubovskiy et al. (2022). Researchers concluded that in the crisis caused by the COVID-19 coronavirus pandemic, banks with international investment demonstrated the greatest efficiency, while those controlled by domestic capital demonstrated the least efficiency. According to the researchers, the situation could be effectively resolved through the privatization of state-owned banks in Ukraine with the involvement of international investors (Mishchenko et al., 2021). The findings of the scientists, while not in obvious contradiction with the results of this research, significantly complement them in the context of the assessment of risk factors in the banking environment as exemplified by Ukraine. Thus, the results and conclusions of the research presented in this discussion are largely consistent with the findings of this research. It demonstrates the scientific validity of the latter and their current relevance in the context of the stated subject of the research.

5. CONCLUSIONS

The global financial system is subject to numerous risks that are significant in terms of the stability and soundness of modern business firms. Among the main risks that pose the most substantial uncertainty to the stability of the global financial system are cybersecurity risks, risks arising from cryptoassets, legal and regulatory risks, and financial stability risks. These risks are structured according to their adverse impact on the digital transformation of the global financial system.

Timely identification of the risks of the digital transformation of global finance is of paramount importance in the context of assessing its role in the interaction of the global financial system with the financial systems of individual states. Therewith, when assessing the role and significance of the digital transformation of global finance in this context, several aspects must be considered which are of fundamental importance to the efficient economic development of individual states and regional structures and to the prospects of enhancing the security of these states' financial systems. The timely identification of possible risks and threats to financial activities in the digital transformation of the global financial system is designed to ensure that all systems of the state economy work together smoothly and efficiently and that citizens can safely obtain the information they require in various areas of social and public activity.

The prospects for further research in the area defined in this research are determined by the future necessity of establishing an open digital information system for the reception, distribution, preservation, and purposeful use of finances on a global scale. The purpose of this system will be to ensure that financial information is reliable, globally accessible, and open to allow for its targeted use by businesses and organizations around the world in their operations and to address an entire range of ongoing financial security issues.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding this work.

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Received: Oct 15, 2022 Revised: Oct 21, 2022 Accepted: Dec 30, 2022