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Research Paper

Anti-corruption Management Mechanisms and the Construction of a Security Landscape in the Financial Sector of the EU Economic System Against the Background of Challenges to European Integration: Implications for Artificial Intelligence Technologies

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ABSTRACT

The article is devoted to modern topical theoretical and practical problems of interaction between international anti-corruption and financial and legal norms in the field of preventing the financing of terrorism, corruption and money laundering in the integrated EU financial market. It is shown that the current mechanisms of foreign exchange control and banking supervision of the EU over the financial transactions of entities need to be strengthened by anti-corruption measures. The steps taken in this direction, as well as the current regulatory documents and agreements, are analyzed. International legal norms against financial crime, corruption and terrorist financing should be successfully translated into the norms of national administrative, financial, anti-corruption law within the common space of the EU economic system in order to provide the necessary security landscape. The security challenges and threats associated with the increasing digitalization of financial markets, as well as the possibilities of using artificial intelligence tools to combat corruption, are considered.

HIGHLIGHTS

- The article is devoted to understanding the current security landscape of the integrated EU financial market in the context of the fight against corruption, in particular through the use of artificial intelligence capabilities.
- The obtained results allowed carrying out outlined systematization of the challenges in development and implementation of anti-corruption management mechanisms and the construction of a security landscape in the financial sector of the EU.
- The practical significance of the research lies in the possibilities of its use by EU regulatory bodies in designing and implementing policy for fighting corruption and enabling favorable security landscape in the financial sector of the EU economic system.

Keywords: Financial Market, EU, Corruption, Artificial Intelligence, Security Landscape

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The European and global financial legal order means the presence of a stable system of international legal regulation of interaction of legal entities, government agencies and international financial organizations in the global financial sphere. The financial system of the EU has an extremely complex internal structure. The EU, "unreservedly" classifying the monetary system established under the auspices of the United States as a "conscientious monetary system", does not pay serious attention to the issues of modern assessment of the effectiveness of the international legal framework for foreign exchange and financial regulation, ensuring the security of the national budgets of the European EU member states and the financial markets of the EU from global crises, corruption, financing of terrorism, generated in the depths of the "Americanized" financial legal order.

The European financial legal order includes, on the one hand, national and European unified rules on the financial activities of private entities, conflict and customary rules in the field of accounting, finance turnover, and financial transactions of individuals. On the other hand, it provides for public agreements between state and supranational bodies of the EU countries and international organizations to protect the financial system and financial stability.

The international financial activity of the EU member states is dynamic and subject to both national and international problems of economic development, crises and fluctuations (Klymenko *et al.* 2016; Kryshtanovych *et al.* 2022). Therefore, the "multiple options" of lawmaking and law enforcement in the financial activities of the EU began to directly depend on such negative or dubious factors as terrorist financing, "organization of financial crises", corruption, cross-border financial crime, offshore jurisdictions, e-commerce, financial pyramids, "wild jumps" in the stock market, "the import of the financial crisis" (Sviridenko, 2010). As a result, the EU is forced to look, through the supranational mechanisms of the EU, for ways to unite efforts to ensure the European financial legal order and, first of all, in the field of combating corruption.

EU members with a fairly stable financial system, such as Germany, France, Italy, Belgium, the Netherlands, and other countries that have relied on the "transparency" and control of financial transactions in international circulation by the EU, are actually "ready" to recognize the need for "fast" unification and harmonization of EU international anti-corruption law up to the development of a draft EU Anti-Corruption Model Code. At the same time, a solid platform for the EU member states in the fight against corruption was the long-term work of the EU states in the development and implementation of international legal and European model and advisory norms on various types of financial supervision (banking, insurance, accounting, exchange, anti-corruption, anti-fraud, anti-monopoly, etc.) for operations in the financial markets.

Meanwhile, it should be emphasized that minimizing threats to the economic security of the country in the context of the development of digital technologies is a priority task for the modern state (Moloney, 2021). A number of researchers are beginning to actively study this issue, experimenting with various approaches at the intersection of Big Data and combinatorics algorithms, on the one hand, and the phenomena of psychology and sociology, on the other, fixing latent factors that cause negative impacts on society and the economy.

Corruption, being a serious barrier to any country's socio-economic development, distorting moral norms, reducing citizens' trust in government institutions, is at the same time a rather complex phenomenon that constantly eludes the researcher (Deyneha *et al.* 2016; Akimov *et al.* 2021). This is largely due to the fact that corruption is a very 'taboo topic', it is difficult to observe, and is often measured by indirect or integral indicators, and often relies on expert subjective assessments (Rothstein and Varraich, 2017). Meanwhile, the sociology and psychology of corruption continue to accumulate and develop a wide range of methodological techniques, using the variability of different approaches.

Neural networks can serve as a tool for revealing hidden relationships through data structure analysis. One of the tools of a neural network is a self-organizing map (a neural network algorithm that performs the task of visualization and clustering), which can extract patterns from large datasets – this is actually the principle of AI functioning. This tool can become a serious obstacle to the spreading of corruption. However, the quality of such technologies directly depends on the data on which they are based.

State evidence clearly shows that emerging technologies are helping win the fight against corruption, and the most promising of them is artificial intelligence (AI), based on Big Data and machine learning (ML).

LITERATURE REVIEW

Many authors rightly point out that in EU law, with the expansion of international financial cooperation between states, the norms, principles, and customs of modern currency, banking, insurance, investment, stock, and tax law are especially intensively formed, which entails the expansion and deepening of the interdependence of foreign exchange and other financial markets of the EU, currency regimes and international cooperation of states to create a new European financial order (Khan and Krishnan, 2021). Such trends are due to both the budgetary differences of the EU states, and the "unprecedented" pace of movement of financial resources in the EU markets, the expansion of the spatial scale of international financial transactions, which directly affect the budgetary stability of the EU and the security of each EU state.

The currency systems and financial markets of the EU member states have undergone significant changes and today their "identification" only with the international monetary system of the International Monetary Fund (IMF) does not correspond to reality. All prerequisites are being created for the creation of the European Monetary Fund as an independent interstate financial organization with supranational functions (Kalyayev *et al.* 2019; Kryshtanovych *et al.* 2022). Anti-corruption regulation is needed in the EU as opportunities for corruption are increasing in the EU commodity and financial markets through the use of new information and operational technologies. So, in addition to "currency settlements", "traditional forms of lending" as a means of payment, investment, fulfillment of monetary obligations, a "new network" of transaction and settlement technologies appeared, related to the development of banking communications, clearing settlements, electronic commerce, electronic investment, offshore financial transactions.

The concept of "law and order" was rarely used previously in relation to financial and legal relations, since it was associated with the implementation of the legal responsibility of specific subjects. At present, with the adoption of multilateral universal conventions of the EU on combating financial offenses, there is a convergence of national and international methods of legal regulation. On the example of the unified regime of international financial responsibility of the EU states and private entities for financial offenses, one can see the formation of the European financial legal order, which is similar in many respects to the domestic ones.

Anti-corruption legal regulation in the EU already has its own legal institutions, such as anti-corruption expertise of laws and draft laws, the functions of anti-corruption supervision, monitoring and control bodies, the assessment of financial contracts and operations for their "good faith", countering the laundering of illegal income, liability for budget violations, abuse of financial law, the investigation of the assets of companies and the evaluation of their statements according to the criteria of international "honesty".

We tried to detect some of the trends identified by various authors in the issues of detecting and combating corruption through artificial intelligence and machine learning tools.

An article by Lopez-Iturriaga and Sanz (2018), these Spanish researchers analyzed the level of corruption in 52 provinces of Spain, which, despite the unitarity of the state, are endowed with a fairly high degree of political and economic freedom. Based on materials from the popular Spanish daily newspaper El Mundo, the authors of the study collected information on criminal cases related to corruption offenses against officials since 2000 and trained the artificial neural network SOMs to analyze such publications and distinguish corrupt provinces from non-corrupt ones, bringing the calculations to a single indicator (per 100 thousand inhabitants). The analysis tested the hypothesis of the influence of the following factors on the level of corruption: the level of taxation, public debt per capita, economic growth, population growth, dynamics of registered companies, rising housing prices, unemployment rate, support of the ruling party (the number of votes in support and the number of years in power) (Akimova *et al.* 2020; Gaman *et al.* 2022). As a result of the study, the hypothesis about the difference between corrupt and non-corrupt provinces due

to the correlation of corruption with the growth of investments, the growth of real estate prices, the growth in the number of depository institutions, as well as the duration of the ruling party in power was confirmed. At the same time, the presence of public debt and the number of votes of the ruling party was not associated with the level of corruption in the province.

In another article by two American researchers (Lima and Delen, 2019), the results of using modern machine learning methods to identify the most important predictors of corruption based on advanced non-linear models with a high level of forecasting accuracy are considered. The authors summarized that government openness (90.47%), protection of property rights (78.84%), a fair functioning of the judiciary (77.94%), as well as a high education index (53.93%) are the most influential factors in determining the level of corruption. These conclusions were drawn from 30 models built using several indicators: the Ease of Doing Business Index, data from the Heritage Foundation, Transparency International, and the 2017-2018 United Nations Human Capital Development Reports. Taking into account the cross-validation method, the Random forest method ("random forest method", accuracy 85.77%) manifested itself better; the neural network and support vector methods showed less accuracy (73.84% and 76.15%, respectively), despite the fact that all models were found to be relevant.

An earlier article (Ralha and Silva 2012) by researchers from the University of Brazil and the Federal Controlling General of Brazil highlighted the problem of extracting useful anti-corruption information from the Brazilian federal procurement database, which is used in particular by public auditors to detect and prevent cartel corruption (collusions). The main obstacles in detecting corruption are, according to the authors, the large amount of data used to study the relationships, as well as the dynamic and diversified strategies used by companies to hide their fraudulent schemes and operations. To solve these problems, a number of tools were used, including distributed data mining (DDM), knowledge discovery in databases (KDD), as well as multi-agent systems (MAS) and other distributed computing technologies (grid, cloud, etc.) included in the concept of an intelligent software agent (ISA).

In the study, the authors combined two data analysis techniques, DDM/KDD and MES. Using the first tool, the researchers found the necessary primary information, and using the second tool, they grouped interacting agents involved in procurement, which allowed the authors to detect latent forms of corruption (Litvinova *et al.* 2020; Khomiuk *et al.* 2020). For example, in nine different public procurements carried out in the same state for the same government agency, the algorithm found a procurement process involving two companies, one of which won all purchases. The researchers noticed that the losing company did not participate in any other purchases, but only acted as a kind of sparring partner for the winner. This was an evidence of possible simulation of competition to mask the formation of a cartel. The shell company was probably set up only to simulate competition in public procurement, where competition is mandatory (Panasiuk *et al.* 2020; Panasiuk *et al.* 2021). In this way, the authors of the study showed how the system allows not only to effectively group public procurement data, but also to discover more hidden mechanisms that mimic competition in favor of cartels.

Another article (Berru *et al.* 2020), which investigated corruption in public procurement contracts, used the Torres-Carrión systematic literature review method. The scientists selected 102 scientific articles published in the Web of Science (WOS) and the Scopus database for 2015-2019 and examining corruption using data mining and artificial intelligence. The analysis of the selected articles allowed the authors to answer the following four questions: on the methods used to investigate corruption in public procurement contracts; on the characteristics of the entities under investigation; on technological tools used to investigate the detection and prevention of corruption in the public procurement system; about algorithms, methodology and data analysis tools used to detect corruption in the system of public contracts.

Thus, according to the results obtained by the authors, 87% of researchers work with a previously structured database, more often using quantitative research. The depth of their search retrospective is 1-3 years, and the most commonly used method is multivariate analysis and correlation using the Webscraping tool. In 89% of the articles studied, the

authors use web platforms to analyze corruption in public contract procedures and in the procurement of medicines and medical equipment.

The reliability rate in detecting or preventing corruption using the Darwish tool was 98.5% when analyzing credit card transactions in the banking environment. In a government environment, shell vendors are identified by analyzing satellite imagery of company locations, resulting in a more accurate detection rate (97%). Various types of mining, data pre-processing methods, outlier value processing, artificial intelligence methods, training types and methods, and technological tools were used within a toolkit in the research (Novak *et al.* 2022). The review of publications focuses on prevention (21% of publications) and detection (79% of publications) of corruption. It was noted that the main methods of used artificial intelligence technologies are those based on Bayes' theorem, neural networks, support vector machine (SVM), and decision tree (Lui and Ryder, 2021). To a lesser extent, set theory, graph theory, natural language processing, k-means, Adaptive Boosting machine learning algorithm and genetic algorithms are used. The confusion matrix is combined with fraud scoring and machine learning, the Matthews correlation coefficient is often used, and the most commonly encountered programming languages are Java, MatLab, Weka, and Python.

MATERIALS AND METHODS

The study of the chosen topic requires an integrated approach, so it is needed to pay attention to relevant publications in the field of general theory of international law, international economic law, international financial law, and European Union law.

As the main ones, methods of analysis, comparison, as well as systemic and structural approaches are used. The method of analysis, in particular, is applied in the study of regulations used in the course of disclosure of the research topic. In the process of work, general scientific and special (historical, socio-legal, logical, comparative and systemic-legal) research methods were used. Additionally, the methods of this research were a combination of international legal and historical-legal methods, which make it possible to determine the ways of developing the activities of the European Union in the implementation of the tasks set.

The general methodological basis for solving the problems posed in the study consisted of general scientific and dialectical methods: analysis and synthesis, deduction and induction, detailing and generalization.

RESULTS

The EU seeks to offer its own approaches to the harmonization of financial and legal regulation to ensure the stability of the banking system, financial security and combating corruption to the rest of the world. There is no doubt that the European integration experience of organizing a financial security system can serve as an example for many states, but in practice difficulties inevitably arise (Gupta *et al.* 2021; Gavkalova *et al.* 2022). Thus, in the course of preparatory measures for the implementation of the international requirements of Basel II, difficulties arose related to the adaptation of the Basel Agreement on Banking Supervision to the realities of the national banking systems of the EU member states. The dates for the introduction of the new Basel standards were repeatedly postponed and again were determined approximately at the end of 2008 - the beginning of 2009. However, even by the specified time, not all EU banking entities were ready: the problem is that the introduction of the Basel schemes is not an act, which can be initiated at once, by anyone's decree – this is a process that can take different time in different banks of the EU countries, and only some parts of it can be implemented as a requirement of the European Central Bank.

Many leading EU banks still express doubts about the advisability of introducing these standards in their entirety in their current form. The reason is the insignificant benefits of the Agreement for small and medium-sized banks in comparison with the costs of its implementation. In addition, the EU supervisory authorities express concern about a possible decrease in the volume of capital reserve allocations, which will increase the risks of the country's banking system as a whole. The need to study possible problems has postponed the implementation of the EU plans to incorporate Basel II into the legislation of the member states. Similar doubts have a negative impact on the development of anti-corruption regulation in the EU. In Europe, Basel II entered into force in December 2008 in trial mode. In some

EU countries, the work on the implementation of Basel II was complicated by the lack of unity in the requirements for risk management across the entire spectrum of financial services, i.e., the insufficiency of "coordination of positions" in the format under discussion. The third part of the Basel Accord was developed in response to shortcomings in financial regulation exposed by the financial crisis of the late 2000s. Basel III, entered into force in January 2022, tightens bank capital requirements and introduces new regulatory liquidity requirements. The main goal of the Basel III agreement is to improve the quality of risk management in banking, which, in turn, should strengthen the stability of the financial system as a whole. But it also did not manage to enable really effective and well proven mechanism to facilitate real integration of the EU financial market. Despite the fact that compared to Basel II, the new agreement does significantly tighten the requirements and moves from recommendations to norms, many critical areas of activity (for example, managing the concentration of bank portfolios) have remained at the level of recommendations. Moreover, Basel III requirements do not apply to the activities of such non-banking financial institutions as insurance companies, hedge and pension funds, and investment funds, etc. Thus, the activity of these institutions is not only not controlled in accordance with international standards, but also implies significant competitive advantages compared to banks (Akimov *et al.* 2020; Kryshtanovych *et al.* 2022). The structure of global and cross-country regulatory oversight also has remained fragmented.

The EU requires member states to develop their own legislation to implement the provisions of EU directives. In Europe, in addition to the EU Directives, in 2008 the provisions of Basel II came into force. As already mentioned, the actual scope of its application is much wider than indicated in the document itself. Given the implications for other banks, for the banking clientele and for the conditions of domestic and international competition, this is, in essence, a large-scale introduction of new 'rules of the game' in the EU financial markets. And the main goals of these new rules are the fight against corruption and against the use of EU financial institutions for fraudulent purposes that violate the stability of the EU financial system. Compliance with its standards has become "virtually" mandatory in the EU since 2009. In the EU, this system applies not only to commercial banks, but also to investment banks, investment and financial firms that manage various financial funds and (or) flows. All this has led to the fact that bank management is forced to devote increasingly more hours of work and spend shareholder funds in order to fight corruption to comply with regulatory requirements, the number of which is constantly growing.

On the one hand, the Basel process, in the light of the intensification of combating corruption and ensuring the global financial legal order, is inevitable, and, on the other hand, Basel II is not 'cheap' in its implementation, not harmless, not obligatory for everyone, especially in terms of the timing and scale of implementation. However, according to most experts in the field of banking law, the Basel process and its principles should be implemented. However, to obtain the desired results many appropriate actions will be required, from almost all participants in the banking sector, understandable both from a methodological and organizational point of view. Most banks are basically ready for changes in these directions. The same cannot be said for part of the necessary measures related to risk management. The point is not only that the level of knowledge and practical skills in the field of risk management at the intersection of interests of both commercial banks and their clientele is insufficient, but that the full implementation of ideas of the Basel process requires integrative risk management on the scale of the interests of all participants in banking operations. It should be about changing the paradigm of managing the financial system in the spirit of prevention and proactivity. Internal and external risk factors can mutually reinforce each other, destabilizing the financial system, and vice versa, mutually compensate for dangerous influences, stabilizing the situation.

The Basel process and the fight against corruption are pushing the EU and the entire global financial community in this direction. The emphasis on risk management has clearly increased in the last two decades in the development of banking and corporate governance in general and in the framework of the transition to the Basel III format in particular.

Beginning with the passage of the Foreign Corrupt Practices Act in the United States in the 1970s, the idea of anti-corruption norms spread to other national governments and international organizations, although the process was initially very slow and did not bring concrete results. Only after the end of the Cold War, issues of change and good governance suddenly took on a new dimension, corruption was recognized as a threat to successful change and development, and international organizations, national governments, and the private sector began to take action against various types of corruption. Several international organizations have played a leading role in this new anti-corruption regime. On the European continent, these were primarily the OSCE, the Council of Europe and, finally, the EU. The OSCE has become the first forum for a transnational anti-corruption campaign by establishing the Anti-Bribery Working Group, the Anti-Bribery Convention, and the Anti-Corruption Cooperation Agreements in the EU, the US Agency for International Development, the United Nations Development Program and the Asian Development Bank. The World Bank has played a very active role in promoting anti-corruption norms and research on corruption and, together with the International Monetary Fund, has set conditions on loans to influence national governments.

As part of a growing international anti-corruption movement, in the mid-1990s, the EU began to fight corruption by adopting the Convention on the Protection of the Financial Interests of the European Community and the Union Anti-Corruption Policy, which called for the development of anti-corruption programs in all countries cooperating with the EU (Kryshtanovych *et al.* 2021; Levytska *et al.* 2022). Since then, several Plans of Action and Consequences, the Millennium Strategy for the Prevention and Control of Organized Crime and the Convention against Corruption have been developed with the participation of officials of the European Community or officials of EU member states.

From the very beginning, the EU's anti-corruption policy not only has embraced EU member states and structures, but has also sought to integrate its approaches into international anti-corruption activities in order to influence partner countries. This position was further strengthened with the adoption in 2003 of the communiqué "On a comprehensive EU policy against corruption", calling for harmonization of the internal and external anti-corruption policies of the EU. At the international level, the EU, like other international institutions, promotes the fight against corruption in the context of a holistic approach to good governance. Being among the first international organizations to explicitly include the concept of good governance in their agreements with partner countries, the EU has now made this concept an integral part of its foreign policy.

In addition, the Council of the European Union issued a Framework Decision "On Combating Corruption in the Private Sector" No. 568 of July 22, 2003, in which it defined the concept of "active" and "passive" corruption and established sanctions for committing such crimes.

Article 29 of the Treaty on the European Union specifies a number of serious crimes (including corruption), the prevention, suppression and punishment of which represent the main focus of the activities of the European Union and member states. "In implementing these provisions of the founding documents, the EU institutions adopted a number of clear legal instruments, the nature of which is determined by the specifics of this integration association" (Szarek-Mason, 2010).

In 2001, Directive 2001/97/EC was issued to prevent the use of the financial system for money laundering. In 2003, a Framework Decision of the Council on the enforcement of freezing orders for property and evidence in the EU was adopted (Ragazou *et al.* 2022), in December 21, 2007 Framework Decision of the Council on the European Order of Evidence to obtain objects, documents and data for their use in criminal proceedings. In order to promote anti-corruption policies in the new EU Member States, in the candidate countries and in third countries, the Commission has developed ten main principles, which are enshrined in the Annex to the Communication (Mungiu-Pippidi and Heywood 2020). The Commission noted that each EU candidate country or partner of the Union should ideally fully comply with these principles and integrate them into their national political, legal, and administrative systems. These 10 Principles are

aimed at solving problems in both the public and private sectors.

In 2020, a new division of Europol was created the European Center for Financial and Economic Crimes. The new division fights against money laundering, corruption and fraud, which are especially intensified during economic crises. Another expected function of the new unit is to assist in the confiscation of funds obtained illegally. Europol estimates that only 1% of criminal proceeds have now been seized in the EU. The new division employs 65 analysts who collect data and help EU member states share information.

Moreover, it should be noted that great importance is attached to the practice of Due Diligence. There are different versions of the interpretation of the term "Due Diligence": "due faith", "careful observation", "comprehensive study of the information provided" (Boly and Gillanders, 2018). All of them imply a set of actions aimed at verifying the purity of the transaction. The term first appeared back in 1933 in the USA. Modern Due Diligence standards were developed in 1977 in Switzerland: several large banks signed the Swiss Banks Due Diligence agreement, which regulates a unified approach to collecting information about customers to protect their property from possible damage. Later, the principles laid down in the agreement began to be used by the consulting business to analyze the activities of companies in terms of legal, economic, and financial integrity (Hlatshwayo *et al.* 2018).

Supervisors, regulators, and governments in jurisdictions around the world are increasingly aware of the importance of adequate risk management procedures. Rules such as the 40 recommendations published by the FATF (Financial Action Task Force) have been adopted by a number of jurisdictions, including the EU. In addition, individual countries such as the UK (we are talking about the pre-Brexit period), Austria, and Germany have introduced primary legislation covering both anti-money laundering and combating the financing of terrorism.

DISCUSSION

The system of unified and harmonized international and national norms of anti-corruption regulation of the EU includes the following blocks: (1) unified norms of international and European conventions on the organization of international financial monitoring; (2) unified international and European standards on anti-corruption expertise of legislative acts and their drafts; (3) unified EU rules on public order in the financial sector (standard financial contracts, accounting and reporting); (4) unified EU rules on criminal liability of officials and other persons related to unjust enrichment (corruption) in the management of public and private finances or property; (5) unified EU rules on the organization of certain types of financial supervision and control in national states (banking, insurance, budgetary, currency, tax, securities market, corporate, pricing, customs, etc.); (6) unified norms of the IMF on international monetary regulation; (7) unified EU rules on the regulation of operations of credit, insurance and other financial organizations in the world financial markets, (8) unified rules on exchange, clearing, depositary, and other professional activities of participants in the securities market; (9) unified norms on the exchange of financial information between financial, tax, budgetary, banking control authorities of different states; 10) unified norms on the criteria for assessing the integrity and legitimacy of transnational financial transactions related to the movement of capital; (11) unified norms on ensuring the stability of financial assets of organizations and managing financial risks; (12) unified norms on preventing the insolvency of financial organizations in international economic circulation; (13) unified norms on international principles for preventing the legalization of proceeds from crime; (14) unified norms on the circulation of securities and financial intermediation; (15) conflict financial and legal norms.

The basis of the European anti-corruption regulation is a complex system of international norms. Among specified illegal purposes of financial transactions and other civil law transactions, criminally punishable acts include "financing of terrorism", "providing unreasonable material advantage (corruption), "laundering of proceeds from crime", since, as socially dangerous acts, they undermine the foundations of the global and national financial law and order. The international community at the turn of the century unified the norms and formed the doctrine of the unity of international financial security, stability, financial control and

reporting. It is represented by such acts as: (1) the UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (Vienna, December 20, 1988), which laid the foundation for the measures currently being taken by the world community to combat money laundering; (2) the UN Convention against Corruption (adopted by the UN General Assembly on October 31, 2003); (3) Convention on Laundering, Detection, Seizure, and Confiscation of the Proceeds of Crime ETS N 141 (Strasbourg, November 8, 1990), which also applies to treaties regulating the issues of combating money laundering: (4) Council of Europe Convention on laundering, detection, seizure, confiscation of proceeds of crime and financing of terrorism, adopted in May 2005 in Warsaw (Warsaw Convention).

In this regard, the main directions of international legal regulation of foreign exchange and other financial relations are determined by the tasks of ensuring the unity of the world monetary regime in the context of the growing need to 'guarantee' the security of national financial markets. The "phenomenon" of European integration tax, banking, corporate, insurance, criminal, procedural law cannot be ignored, the norms and principles of which actually act as the "vanguard" of the unification of legal institutions for ensuring international financial security and combating corruption.

Specific European and international anti-corruption measures can be seen in the evaluation of the five-year activity of the EU Council to promote the development of comprehensive research in the field of combating financial crime and protecting the financial system of the European Union from corruption risks. The process of ensuring the effectiveness of the EU anti-corruption policy is related to the need to incorporate strict anti-corruption measures into the overall EU reform process, the introduction of anti-corruption standards, greater transparency in the management of EU public funds in order to prevent corruption. The EU is achieving positive results in the search for a legal framework and guidelines to combat corruption, although there is no single legal concept of "corruption".

Currently, the EU anti-corruption policy is focused on expanding the role of the EU in international cooperation in the fight against financial offences, which reflects the current EU initiatives to build a system of anti-corruption legislation and improve the functions of anti-corruption and financial supervision bodies in the EU (Shvets *et al.* 2013). The legal definition of "corruption", the elements of corruption offenses, the measures of legal responsibility should be uniform for all EU members and third countries cooperating with it. At the same time, it is not only necessary to develop the criminal law norms of the legislation of the EU countries, but also the legal norms on the control of financial transactions and commercial activities of individuals and organizations within the EU need anti-corruption regulation.

Much attention has recently been paid to cyber threats, often associated with corrupt activities. In this context, the degree of maturity of the cyberthreat data exchange culture is a complex indicator that is directly or indirectly affected by the number of specialized events, the number of TI (Threat Intelligence) vendors, the activity and involvement of potential exchange participants: members of the TI community, private companies, the state (Kobis *et al.* 2021; Kobis *et al.* 2022). The threat landscape and the activity and sophistication of new attackers' methods also determine the quality of the response and the quality of the defenders.

In Europe, there are organizations created by the European Union Network and Information Security Agency (ENISA). European ISACs (Information Sharing and Analysis Centers) appeared later than the American ones, and they used their experience, so there are some differences between them.

In particular, ISACs in the EU are not necessarily linked to any industry. Here are the models for building ISAC in Europe that can be distinguished:

ISACs within a single country are most often managed by a Computer Security Incident Response Team (CSIRT).

Industry ISACs focus on organizations in a single, usually critical or vital, sector and are mostly supported by the sector itself or the government.

International ISACs bring together key experts from all over the world, but due to cultural differences and different approaches, there is often a problem of trust between experts. Examples of international

ISACs established in Europe are as follows: EU FI-ISAC (financial sector), EE-ISAC (energy sector).

TI data exchange structures are similar in most EU countries. There are ISACs, which may be represented by Response Teams (CERTs), CSIRTs, and others, and there are parent organizations to coordinate ISAC interactions.

The development of the ISAC ecosystem in Europe depends on the general level of trust between public and private entities. Therefore, for countries where this trust is insufficient, it may be appropriate to first develop PPP structures (public-private partnership, a less formal organization compared to ISAC) and then transform them into ISAC (Rusin *et al.* 2021).

The initiative to set up an ISAC may come from the government or the private sector (in which case the government can play the role of an intermediary). Regardless of the structure of ISAC, for flexible and effective cooperation, a regulation on the interaction of members of the association is required, which describes, among other things, the procedures for checking new members of the community.

Collaboration takes place not only within ISAC, but also between different organizations of this type. For example, community collaboration resulted in the creation of the X-ISAC platform. It is operated and maintained by the Computer Incident Response Center of Luxembourg (CIRCL) and the MISP project.

Speaking of ecosystems, we should also mention the fact that the European Union in December 2019 presented its vision of regulating the new ecosystem of the financial market: the "cornerstones" of this regulation were identified the Regulation on Information Disclosure, the Regulation on Low-Carbon Benchmarks, the draft Taxonomy Regulation, which made regulation to fight corruption and maintain an acceptable security landscape even more difficult.

One of the examples of achieving sustainable development in the digital world is the rejection of piecemeal regulation in the digital market. The path to a single digital market in the largest common market, the European Union market, is an important step towards the consistent application of legal principles and norms (Oliinyk *et al.* 2022). We can fully agree with the conclusions of the Spanish author Hermida that the new financial market ecosystem is determined by two directions: (1) financial stability and (2) digitalization (namely, sustainability and digitalization) (Hermida, 2020).

In addition, in order to reorient capital flows towards sustainable financing, the EU Commission has identified two main prerequisites: firstly, the need to avoid market fragmentation and, secondly, the need to protect investors and consumers from greenwashing and bluewashing.

The interaction of European law enforcement agencies is largely conventional and is closely related to the institutional mechanisms of the EU. It should be noted that such issues should also be considered at the level of interaction between the fundamental mechanisms of the functioning of the EU ensuring financial security. In this aspect, the possibility of ensuring the fight against corruption acts is considered. In order to implement this concept, the Convention for the Protection of the Financial Interests of the European Community of July 26, 1995 was adopted, aimed at combating money laundering and legalization of proceeds from crime, as well as developing mechanisms to counter unequal access to the EU markets for various companies (Razzante, 2020). The issues of legal regulation of these legal relations are especially relevant, since corruption crimes are committed against funds belonging to the entire EU as a whole, while the national criminal laws of the EU member states often do not provide for liability for committing "union" malfeasance. This gap was filled by the provisions of the said Convention. However, the sanctions for violation of these provisions, the procedures for criminal prosecution, as well as the execution of the sentence, are regulated by national legislation. A person who has committed a crime will be prosecuted under the criminal law of the country in which the crime was committed if the state, in accordance with the provisions of the Convention, has already made the necessary changes to its legislation.

In conclusion, one should also mention a factor that is largely overlooked in the discourse on combating corruption and ensuring security in the EU financial sector this is a cultural factor, the degree of tolerance for corruption, which is specific to a particular country. For example, this indicator differs markedly in Germany and, as the events of the war in Ukraine show, in Hungary.

The topics of corruption manifestations are set in various, differentiated and sensitive cultural environments. Thus, in one country there may be a low prevalence of corruption, but the population may have a heightened awareness of corruption due to an interest in fighting it. The data shows that Central and Southeast Europeans have the highest tolerance for corruption among EU members (see Figure below) (Intellinews, 2020).

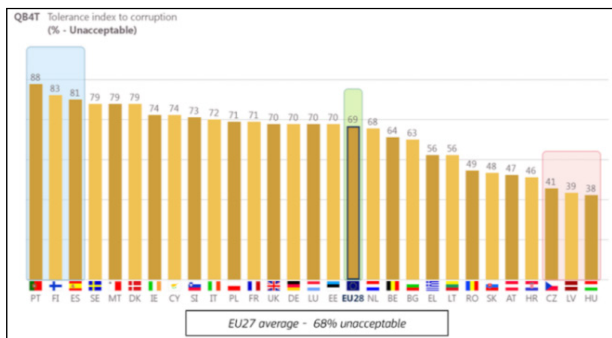

Fig. 1: Tolerance for corruption among EU members, 2020

Naturally, in these extremely complex conditions, under systemic nature of the overall environment, much hope is placed in artificial intelligence to combat corruption.

There are relatively few examples of how AI and ML are applied in anti-corruption work. However, AI already brings new potential to put transparency in action. It saves human resources by taking over key tasks of (pre-)screening large datasets, analyzing it to enable detecting, predicting and reporting risks, suspicions or clear-cut cases of crimes, like corruption (Metz and Satariano, 2020). In particular, AI can make autonomous decisions about corruption (risks) based on Big Data and ML accordingly. Although new forms of using AI to fight corruption received little empirical attention, it is characterized with unique potentials (OECD, 2021; Petheram and Asati, 2018).

However, as Adam and Fazekas rightly state, "the introduction of ICT tools does not automatically translate into anti-corruption outcomes; rather, impact hinges on the matching between ICT tools and the local context, including support for and skills in using technology" (Adam and Fazekas, 2018). Synergy is needed between the efforts of experts in finance, law, and IT on the one hand, and continuously machine-learning AI tools on the other.

CONCLUSION

The financial system of the EU is exposed to serious risks, since the norms of international monetary law, which have been the basis for the stability of the global financial system for more than sixty years, in the late 20th and early 21st centuries turned out to be incapable of resisting corruption, protecting the "budgetary sovereignty" of states and stopping the negative impact of some so-called "new forms" of international financial activity. These include, in particular, "corporate offsets", "asset transfers", "transformation of debts", "trust management of securities", and other types of financial transactions that often have the goal of "organizing the bankruptcy of competitors", "theft of budgetary funds", "tax evasion", "punishment of debtors against creditors", "financing of terrorism", "providing unreasonable material advantage (corruption), "laundering of proceeds from crime".

The system of international legal regulation of the fight against corruption in the EU was initially considered not as an end in itself, but as one of the most effective means of combating serious types of financial crimes, including, first of all, organized crime in the commercial sphere. Therefore, the most important characteristics of the international financial legal order are its institutional and legal foundations. The institutional foundations of the EU include supranational bodies and organizations involved in the establishment and implementation of relevant norms and standards and the direct provision of interaction between the subjects of this system, as well as the methods and means of legal and political regulation used by them.

At the same time, the specificity of the existing international financial legal order, in particular, in the stock market, lies in the fact that it is not limited to the regulation of international cooperation between the competent financial authorities of different countries, but primarily provides for the formation of appropriate national regimes (systems) in each country. At the same time, it is understood that not only states and their competent authorities, but also a wide range of national and transnational financial institutions and other participants act as direct participants.

In addition, in order to effectively combat corruption in the EU and in the international financial system,

the network of safeguard measures must be universal, without gaps or weaknesses in the form of individual countries and territories in which such measures are not applied or are not applied consistently enough. In turn, the effectiveness of national regime depends on how strictly the relevant standards are observed by all financial intermediaries, including financial institutions and other subjects providing access to the financial system.

Given these circumstances, the formation of the security landscape in the financial sector of the EU economic system should be based on an integrated approach laid down on the foundation of a combination of expert assessments and the capabilities of artificial intelligence, which will optimize and significantly speed up the process of collecting and processing the necessary data, analyzing precedents and unique events, and making optimal decisions.

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