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Strengthening the economic security of the country: optimization of the financial monitoring procedure



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INTRODUCTION

The formation of financial security and resilience to modern challenges in the context of socio-economic and political transformation, digitalization and intellectualization of society is a rapidly growing priority for each state.

Innovative modification of the political, economic, and social sphere increases the financial system's dependence on digital solutions, stimulating strengthening security. Any significant disruption of cyberspace, whether global or local, will impact economic activity, the security of citizens, the efficiency of the public sector, financial institutions, educational institutions, production and service processes, and national security.

The financial system also needs cybercultural changes, modifications that provide knowledge of quality best practices for the organization of financial monitoring procedures and combating money laundering for all participants in financial transactions at the level of individuals, economic agents, government. This will help in the long run to strengthen the state's capabilities in the field of cybersecurity, using the benefits of information awareness and the peculiarities of financial monitoring procedures.

The work is devoted to comparative analysis of current financial monitoring systems in different countries, review of regulations in terms of cybersecurity and cybersecurity of the financial sector, IT sector, development of an integrated summary indicator of financial security and distribution to clusters based on values of economically and statistically sound Effectiveness, Technical Compliance, GDP per Capita (current US\$), Ease of Doing Business, Internally displaced persons, new displacement associated with conflict and violence

(number of cases), Corruption Perceptions Index, Global Terrorism Index, Business Freedom, Monetary Freedom, Financial Freedom), which determine the degree of use of financial institutions and the propensity of countries to legalize criminal proceeds; development of a prototype of an automated module that will automate internal audits of financial transactions by financial monitoring entities; automation of processes of identification and verification of persons who carry them out; integration of internal monitoring results into the automated system of state financial monitoring.

The scientific monograph was performed within the framework of the research theme “Optimization and automation of financial monitoring processes to increase information security of Ukraine” (Reg. No.: 2020.01/0185), which is financed by the National Research Foundation of Ukraine.

1. FUNDAMENTAL CONCEPTS OF THE FINANCIAL MONITORING PROCEDURE AND ECONOMIC CYBERSECURITY

Processes of technologization of financial instruments, rapid introduction of innovative information technologies in business processes of national economies, banking, socio-political sphere, educational systems, on the one hand, contribute to social development, economic growth, prosperity and competitiveness of countries on the world stage, and the other – cause the change of cross-border economic crime, the increase and spread of various cybercrime schemes, the increase in the amount of illegally obtained income, accompanied by the improvement of mechanisms for money laundering. The legalization of criminal proceeds has a destructive effect on the stability of an individual financial institution, as well as on the stability of the country's financial system, its investment attractiveness, as well as on the trust of international partners and organizations.

Since the beginning of the pandemic COVID-19, which led to the transition to the online format and the use of digital services, there is a significant increase of cyberattacks on government agencies, private companies, and individuals. Cybercrime is now the world's fastest-growing crime. In 2020, the damage from cybercrime to the world economy is estimated at 5.5 trillion euros, which is twice as much as in 2015. And according to Cybersecurity Ventures forecasts, in 2021, the losses from cyber fraud will be 6 trillion dollars. USD per year, USD 500 million USD – per month, 115.4 million dollars, US – for a week, 16.4 million dollars. USD – per day, 684.9 million dollars, -- per hour, 11, 4 million dollars. US – per minute, 190 thousand dollars. The USA – for a second. Business attacks in 2021 will be carried out every 11 seconds, compared to 40 seconds in 2016 (Cybersecurity

Ventures). Suppose we draw an analogy between cybercrime and the concept of national economy. In that case, cybercrime will be the third-largest economy after the United States and China. Among the different sectors, the finance sector was the top target, with a 38% increase in cyberattacks against financial institutions. The exponential growth of cyber frauds in the financial sector and their sophistication leads to large-scale negative consequences of both financial (money loss by financial institutions and their customers, the bankruptcy of financial institutions, lack of tax revenues) and public (theft of personal data of consumers of financial services, reduction level of business reputation of financial institutions, loss of public confidence in the financial sector). The chairman of the US Federal Reserve Powell J. (2020) identified the cyber threat as perhaps the most important risk for financial services today.

Cyberspace is particularly difficult to protect due to several factors: the ability of attackers to work from anywhere in the world, the existence of links between cyberspace and physical systems, the difficulty of reducing vulnerabilities and consequences in complex cyber networks. There is growing concern about the cyber threat to the financial and economic infrastructure, which is increasingly exposed to difficult cyber intrusions and new risks. As information technology becomes increasingly integrated into physical infrastructure operations, the risk of large-scale events or consequences could harm or disrupt the services on which countries' economies and millions' daily lives depend.

The urgency of financial security in the digitalization of the economy and the intellectualization of society is confirmed by a large number of scientific publications. Thus, at the request of finance monitoring in the Scopus database, 1842 documents were found, published by 5245 scientists over the past decade. Bibliographic analysis of these publications using VOSviewer 1.6.15 tools allowed to form 9 clusters (Table 1, Figure 1), covering 62 countries with a publishing activity of 347

financial security researchers (minimum number of publications is 5 units).

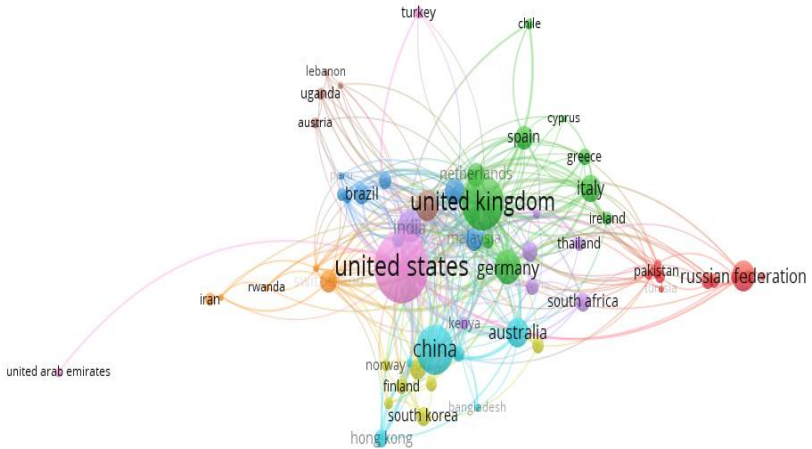


Figure 1. Bibliometric analysis of scientific publications on the finance monitoring

Source: developed by the authors on the Scopus data base and VOSviewer 1.6.15 tools

Table 1. The division into clusters by country according to the number of scientific publications of 5 or more units on financial monitoring

Cluster	Country
Cluster 1	Czech Republic, Egypt, Hungary, Latvia, Pakistan, Poland, Russian Federation, Saudi Arabia, Slovakia, Tunisia, Ukraine
Cluster 2	Belgium, Chile, Cyprus, Germany, Greece, Ireland, Italy, Netherlands, Spain, United Kingdom
Cluster 3	Brazil, Colombia, France, Ghana, Malaysia, Mexico, Peru, Portugal
Cluster 4	Finland, New Zealand, Norway, Singapore, South Korea, Sweden, Taiwan

continued Table 1

Cluster 5	Denmark, India, Indonesia, Kenya, Nigeria, South Africa, Thailand
Cluster 6	Australia, Bangladesh, China, Hong Kong, Japan, Philippines
Cluster 7	Ethiopia, Iran, Rwanda, Switzerland, Tanzania
Cluster 8	Austria, Canada, Lebanon, Sri Lanka, Uganda
Cluster 9	Turkey, United Arab Emirates, United States

Source: developed by the authors

Strengthening cybersecurity measures for financial socio-economic facilities of countries that are members of the European Union is described in detail in the strategic plan of the Directorate-General for Informatics 2020–2024 (DIGIT), which plays a coordinating role in the development of information technology and information and communication technology systems. The main goal is to create a safe and modern digital environment capable of providing reliable, cost-effective and secure infrastructure and services, in line with new methods of work and collaboration that are consistent with the expectations of staff, citizens, businesses and stakeholders.

In addition, the European Union has completed the process of approving Directive 2018/843 / EU of the European Parliament and the Council of the European Union amending Directive 2015/849 / EU on the prevention of the use of the financial system for money laundering and terrorist financing and amending Directives 2009/138 / EC and 2013/36 / EU (The Fifth Anti-Money Laundering Directive, 5 AMLD).

A generalized scheme for the practical prevention of money laundering and strengthening financial security is shown in Figure 2.

Consider in more detail the EU algorithm for combating money laundering and terrorist financing. The starting point is the standard set of European Banking Authority (EBA) rules for regulating and supervising banking activities in all EU

countries, as the banking system is the most vulnerable to the use of a large number of various sophisticated fraudulent schemes involving all participants in financial transactions: bank customers or legal entities), employees of banks, economic agents (enterprises, firms), the state.

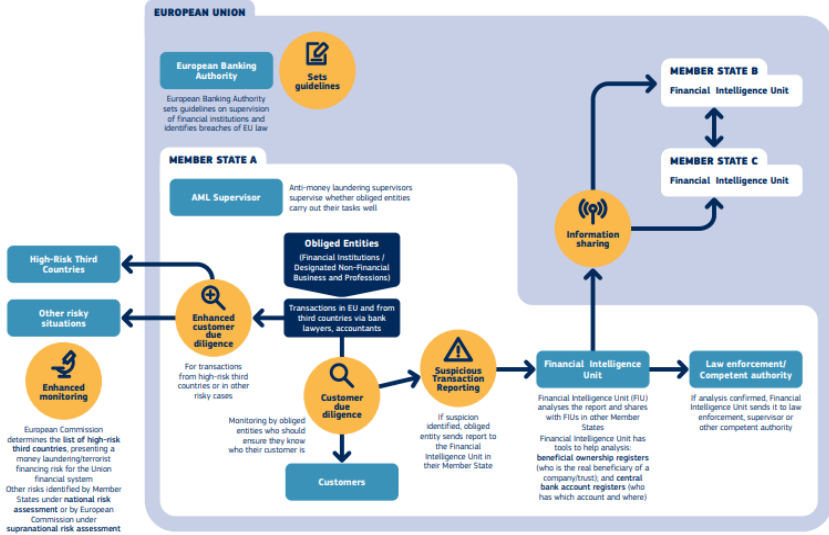


Figure 2. Preventing money laundering and terrorist financing across the EU
Source: European Commission

As of January 2020, 5,411 banking institutions were active in Europe. It is a significant number compared to the list of other socio-economic facilities. But a substantial contribution to the development of financial systems in Europe is made by the banking system. The exactly amount of banks in Germany – 1531, in Poland – 627, in Austria – 522, in Italy – 485, in France – 406, in United Kindom – 401, in Ireland – 312, in Finland – 241, in Spain – 196, in Sweden – 154, in Portugal –

147, in Luxemburg – 127, in Denmark – 100, in Netherlanl – 93, in Belgium – 84, in Lithuania – 83, in Romania – 75, in Czechia – 58, in Latvia – 54, in Hungary – 46, in Estonia – 38, in Greece – 35, in Slovakia – 27, in Malta – 25, in Bulgaria – 25, in Croatia – 24, in Slovenia – 17.

The dynamics of the banking system of the EU countries based on the values of banking structural statistical indicators, namely the number of shares of the 5 largest credit institutions in total assets (Shares of the 5 largest Credit Institutions in total assets, CI5) over the past decade are shown in Table 2 (Statistical Data Warehouse of European Central Bank).

EBA is an independent EU body working to ensure an effective and consistent prudential regulation and supervision throughout the European banking sector. Its overall objectives are to maintain financial stability in the EU and ensure the banking sector's integrity, efficiency, and orderly functioning. In addition, the EBA is part of the European System of Financial Supervision (ESFA), which consists of three supervisory authorities: the European Securities and Markets Authorities (ESMA), the European Banking Authority (EBA) and the European Insurance and Occupational Pensions Authority (EIOPA). The system also includes the European Systemic Risk Board (ESRB) and the Joint Committee of European Supervisory Authorities and National Supervisory Authorities. Therefore, EBA set guidelines on supervision of financial institutions and identifies breaches of EU law.

Table 2. Banking structural statistical indicators: shares of the 5 largest Credit Institutions in total assets (CR5, Percent)

Country EU	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Austria	38,52	36,01	36,02	36,07	34,45	35,76	36,84	36,72	36,49	38,38	35,87
Belgium	75,3	73,98	73,4	68,8	66,19	65,45	65,79	63,99	66,35	70,77	74,86
Bulgaria	67,1	62,51	59,69	56,48	58,03	57,64	55,03	49,85	50,38	52,58	55,17
Cyprus	86,48	85,7	86,92	84,16	65,78	67,51	63,4	64,06	62,55	60,68	64,23

continued Table 2

Czech Republic	65,26	64,77	64,49	63,68	63,89	62,51	60,86	62,04	61,38	61,9	62,63
Germany	34,03	31,22	29,1	29,71	31,35	30,56	32,12	30,59	33,01	33,55	32,6
Denmark	67,1	66,2	64,5	65,65	68,33	67,78	68,08	68,38	65,61	66,3	64,42
Estonia	93,73	92,95	90,97	90,3	88,04	88,63	89,85	89,71	89,6	90,64	92,26
Spain	66,43	67,42	68,53	63,73	61,8	60,2	58,3	54,4	51,4	48,1	44,3
Finland	80,07	80,36	81,61	73,46	80,52	88,02	89,73	87,11	85,95	86,9	89,17
France	49,17	48,66	47,73	45,38	45,95	47,23	47,64	46,74	44,62	48,27	47,4
United Kingdom	31,05	31,21	31,82	36,88	35,49	36,99	38,85	43,67	42,82	43,55	42,52
Greece	97,03	97,35	96,83	96,98	97,28	95,23	94,06	94,01	79,47	71,99	70,64
Croatia	80,52	79,79	79,42	72,79	73	72,65	72,27	72,85	73,94	72,13	71,05
Hungary	50,09	52,72	50	49,64	49,83	49,38	49,3	51,89	54,02	54,63	54,64
Ireland	55,68	49,71	46,13	45,51	44,27	45,93	47,56	47,83	46,4	46,72	49,88
Italy	49,34	47,88	45,59	43,43	43	41	41	39,6	39,68	39,46	39,84
Lithuania	91,85	90,44	90,93	90,13	87,1	86,85	85,7	87,1	83,63	84,75	78,83
Luxembourg	31,6	27,68	26,31	26,18	27,63	31,27	31,95	33,72	33,08	31,21	31,11
Latvia	87,77	83,18	80,93	73,6	66,6	64,58	63,6	64,13	64,05	59,57	60,43
Malta	74,81	75,14	77,52	80,85	80,27	81,32	81,49	76,48	74,44	71,96	71,28
Netherlands	84,32	84,71	84,67	83,84	84,72	84,59	85,01	83,83	82,07	83,56	84,2
Poland	54,28	49,8	49,51	47,51	47,73	48,63	48,31	45,24	44,4	43,69	43,37
Portugal	73,56	73,34	72,95	73,12	71,2	72,32	69,23	70,26	69,95	70,76	70,86
Romania	62,4	62,6	61,6	59,5	59,1	57,4	54,2	54,4	54,7	54,6	52,7
Sweden	55,15	54,83	54,28	58,17	56,28	57,83	58,54	58,26	57,42	57,81	57,78
Slovenia	67,34	60,93	60,79	61,53	60,99	59,15	55,61	57,08	58,35	59,33	59,27
Slovakia	76,78	75,69	75,57	74,54	72,72	72,3	70,69	70,32	70,72	72,23	72,03

Source: author's investigation based on Statistical Data Warehouse of European Central Bank

Further anti-money laundering supervisors supervise whether obligated entities carry out their tasks well. Such responsible organizations are financial institutions, designated non-financial business and professions. Namely, transactions in EU and third countries are checked via bank lawyers, accountants. For example, Figure 3 shows statistics on the number of Entities responsible for the financial security of electronic services in Poland from 2019 to 2020. But before allowing

transactions in EU countries or through a country or countries, customers due diligence is carried out: monitoring by obligated entities who should ensure they know who their customer is. If a suspicious transaction is identified, the obligated organization sends a report to the relevant EU Member State's Financial Intelligence Unit (FIU).

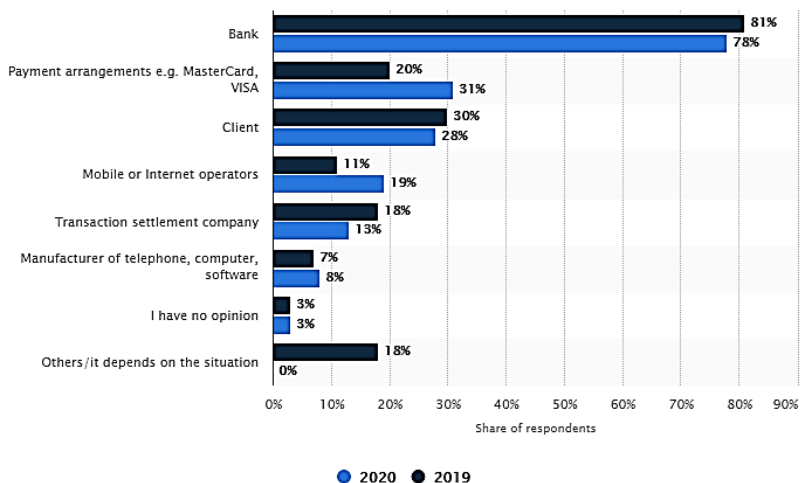


Figure 3. Entities responsible for the financial security of electronic services in Poland from 2019 to 2020

Source: developed by the authors based on Statista.com

The Financial Intelligence Unit analyzes the report and sends it to the Financial Intelligence Units of other EU member states. The financial intelligence unit has special tools for qualitative analysis. Such tools are accessible to the registers of beneficial owners, which indicate who is the real beneficiary of the company or trust, and access to the records of accounts of the Central Bank with detailed information about who has which account and where it is placed. If the analysis of the

dangers of financial transactions is confirmed, the FIU sends it to law enforcement, supervisor or other competent authority.

Transactions involving High-Risk Third Countries, which have strategic shortcomings in their anti-money laundering and anti-terrorist financing regimes and pose a significant threat to the EU financial system, are closely monitored by obligated financial institutions. The list of these countries according to 5 AMLD as of 2020 is as follows (EU policy on high-risk third countries, 2020): The Bahamas, Barbados, Botswana, Cambodia, Ghana, Jamaica, Mauritius, Myanmar, Nicaragua, Panama, Zimbabwe. При цьому такі країни як Afghanistan, Democratic People's Republic of Korea (DPRK), Iran, Iraq, Syria, Uganda, Vanuatu, Yemen are on the high-risk list since 2016, and, Pakistan, Trinidad and Tobago – since 2018.

The main provisions of the 5 AMLD are as follows (Directive (EU) 2018/843 of the European Parliament and the Council). First, there has been an increase in the transparency of information on beneficial owners of companies (access to centralized registers of such beneficiaries has now become public and open to all, but as in AMLD 4, access to registers of beneficiaries was available to competent authorities and obligated entities), and any other person could obtain this information only if there is a legitimate interest).

Secondly, the transparency of information about trusts and similar structures is enhanced by adding to the centralized registers of trusts information about the Trust Founder, Trust Owner, Trustee (if any), Beneficiaries or other individuals who exercise effective control over the trust, the so-called “Information on beneficial ownership”. As well as expanding access to the register of trusts (except for the competent authorities and obligated entities, this information can be obtained by any person in the presence of legitimate interest). According to the provisions of 4AMLD, relevant information

was to be entered in the register of trusts only if the trust had tax consequences, and access to the register was provided only for competent authorities and obligated entities.

Third, EU financial institutions are prohibited from providing anonymous, safe deposit boxes to their customers. And their current owners must be identified within 6 months from the date of entry into force of the directive (January 10, 2020), but in any case, until they use such safes (cells) in one way or another. In 4 AMLD, similar bans were imposed on anonymous accounts and anonymous passbooks. These prohibitions remained unchanged under the provisions of AMLD 5.

Fourth, the range of so-called obligated entities has been expanded. Such entities include custodian wallet providers and virtual currency exchange platforms. They, as well as financial institutions, trade unions, insurance companies, credit unions, are obliged to identify and verify the reliability of their customers. Also, in the provisions of AMLD 5 there is a strict regulation of the use of virtual currencies, blockchain technologies by clearly defining the meaning of virtual currency.

Fifth, it should be noted that the competent financial intelligence agencies of the European Union, FIUs, are empowered to request, receive and use information from obligated entities to prevent, detect and effectively combat money laundering and terrorist financing.

Sixth, the criteria for classifying third countries (non-EU countries) as High-Risk Third Countries, whose transactions with residents should be given special attention, have been clarified. The list of such countries is approved by the executive body responsible for implementing the decisions of the European Parliament and the Council of the EU – the European Commission.

Turning to the issue of the organization of cyber protection of countries' financial systems, we will focus on the existing state cybersecurity systems in terms of individual countries and EU member states. Thus, if we consider the activities of government agencies in the European Union, which carry out financial monitoring and provide cyber protection for both the financial sector and the IT sector, which is a key chain in digital transactions, then, for example, Germany has established a National Cyber Security Center since 2011. (NCAZ), whose main tasks are to gather information and prevent cyber attacks on IT systems at an early stage.

The National Framework of Cybersecurity Policy of the Republic of Poland for 2017-2022 is a strategic document in a continued process of actions taken by the governmental administration, aimed at raising the level of cybersecurity in the Republic of Poland. Its main goal is to ensure a high level of security of the public and private sectors and citizens in providing or using essential services and digital services. As well as the provisions of the National Framework of Cybersecurity Policy of the Republic of Poland are aimed at increasing the capacity for nationally coordinated action to prevent, detect, combat and minimize the impact of incidents that threaten the security of ICT systems vital to the functioning of the state; strengthening the ability to counter cyber threats; increasing national capacity and competence in the field of cyberspace security; building strong international positions in the field of cybersecurity.

Cybersecurity and Infrastructure Security Agency (CISA), established in late 2018, is a federal agency of the USA and an operational component under the Department of Homeland Security (DHS). The main purpose of CISA is to provide operational background information to stakeholders on specific cyber or physical threats to a country's critical infrastructure

based on US intelligence, to conduct incident and risk management operations using software tools, technical services, and regulatory software (if permitted) at the legislative level), assessing the vulnerability of information, as well as developing a comprehensive set of measures to prevent possible cyberattacks or physical threats, and in the event of their occurrence – developing strategies to mitigate the consequences.

The Enhanced Cybersecurity Services (ECS) enhanced protection program should be mentioned separately. This program helps protect IT networks by offering intrusion detection and prevention services through approved service providers. All public or private organizations located locally in the United States, including state, local, tribal, and territorial (SLTT) organizations, are eligible. This program allows you to detect and prevent intrusions in almost real-time. It is secure and safe to interpret the results of various transactions, as CISA only works with approved ECS service providers that have undergone a rigorous system accreditation process. The two primary ECS services are Advanced Domain Name System (DNS) and email filtering. These services block possible malware communications and spear-phishing campaigns targeting networks. ECS has access to information from the National Center for Integration of Cybersecurity and Communications (NCCIC), which receives data from the federal government and intelligence services. In addition, the NCCIC has a unique vantage point into the threats targeting the .gov, SLTT, and critical infrastructure.

In 2016, to ensure the protection of confidential data in transatlantic transactions in the transfer of personal data from the European Economic Area (EEA) to the United States by the U.S. The Department of Commerce, the European Commission and the Swiss Administration were developed and approved by

the European Union and the U.S. Government mechanism The Privacy Shield Framework. In January 2017, the Swiss Government announced the approval of the Swiss-U.S. Privacy Shield Framework as a valid legal mechanism to comply with Swiss requirements when transferring personal data from Switzerland to the United States (The EU-U.S. And Swiss-U.S. Privacy Shield Frameworks, 2017). The Privacy Shield provides many important benefits to US organizations and their partners in Europe: EU Member State requirements for prior approval of data transfers are either revoked or approval will be granted automatically; compliance requirements are clear and cost-effective, which should be of particular benefit to small and medium-sized enterprises. It is also ensured that the participating organizations provide “adequate” protection of confidentiality, which is a requirement for the transfer of personal data outside the European Union under the EU General Data Protection Regulation (GDPR) and outside Switzerland under the Swiss Federal Act on Data Protection. Detailed recommendations on measures that supplement transfer tools to ensure compliance with the EU level of personal data protection were developed in 2020 and adopted in 2021 by the European Data Protection Board and presented in 6 steps: “Know you transfers”, “Identify the transfer tools you are relying on ”, “Assess whether the Article 46 GDPR transfer tool you are relying on is effective in light of all circumstances of the transfer”, “Adopt supplementary measures”, “Procedural steps if you have identified effective supplementary measures”, “Re-evaluate at appropriate intervals”.

In 2017, the Center for Cyber Defense of the National Bank of Ukraine was established in Ukraine, which combines and coordinates efforts in cyber security and cyber security in the banking and financial sectors of Ukraine. Since 2018, the

Cyber Security Center of the National Bank of Ukraine has had a cyber incident response team in the banking system (CSIRT-NBU). In August 2019, the Cyber Defense Center of the National Bank of Ukraine and the State Cyber Defense Center of the State Service for Special Communications and Information Protection of Ukraine signed a Memorandum of Cooperation and Cooperation in Cyber Security and Cyber Defense aimed at preventing, detecting, effectively responding to counter cyber threats, information security and situational awareness in the field of cybersecurity and cybersecurity.

Thus, in light of the risk and potential consequences of cyber events, financial fraud, enhanced financial security and resilience of cyberspace is an essential internal security mission for each country.

Under these conditions, the need for a comprehensive and comprehensive analysis of the risk of financial fraud, especially cyber fraud, their prediction and bias, rapid response to the slightest manifestations of crime and cybercrime both by the financial institution and at the state level is an urgent task today and next five years.

2. SCIENTIFIC AND METHODOLOGICAL APPROACH TO DETERMINING THE LEVEL OF FINANCIAL SECURITY OF THE COUNTRY

The increase in international trade, the technologization of financial instruments, the rapid introduction of information technology, and the growth of transnational economic crime have increased illicit proceeds, accompanied by improved mechanisms for money laundering in response to regulatory changes. Attackers quickly transfer significant amounts of financial resources using a variety of sophisticated and sophisticated financial instruments. Legalization of criminal proceeds has a destructive effect on the stability of a single

financial institution, as well as on the strength of the country's financial system, its investment attractiveness, as well as on the trust of international partners and organizations (report of the State Financial Monitoring Service of Ukraine, 2018; Prince, 2018). Under these conditions, there is a growing need for a comprehensive and comprehensive analysis of the risk of money laundering and determining the level of security of the country through the use of powerful mathematical tools.

In addition, having established the substantive essence of economic security, forming a system of its management and provision becomes relevant. In our opinion, the system of governance and ensuring economic security should be based on its empirical evaluation. The quantitative assessment of any economic category allows not only to establish the level of achievement of the required quality but also to form a set of necessary tools to improve it. Thus, we analyze the existing methodological principles of creating an integrated indicator of the characteristics of economic security of the national economy and ratings, which are used for its quantitative assessment.

Turning to the study of existing methods used by scientists in calculating the state's economic security level, we note that the general approaches include assessing vital macroeconomic indicators and comparing them with thresholds. Assessment of economic security, in this case, is carried out according to the following algorithm: determination of functional characteristics of economic security of the state; allocation of structural components of economic security of the state; determination of the nomenclature of indicators (indicators) of economic security; establishment of normative values of economic security indicators; monitoring of indicators, hierarchical coordination of results and their analysis. For the most part, this approach uses the country's economic growth rate on key

macroeconomic indicators (GDP, price index, public debt, employment and others).

At present, Ukraine has developed “Guidelines for calculating the level of economic security of Ukraine” (2013). These guidelines were developed to determine the level of Ukrainians economic security. In addition, Ukrainian economic security is seen as one of the components of the country’s national security. In order to obtain reliable and rational indicators in these guidelines, a list of key indicators of the state of economic security of the state, as well as their thresholds and the algorithm for calculating the integrated index of economic security.

It should be noted that the methodological recommendations for calculating the level of economic security of Ukraine are not mandatory for use but have a recommendatory, informative and explanatory nature.

To understand the reasons for this distribution of indicators, it is necessary to find out countries’ approaches to ensuring economic security.

In countries such as the Czech Republic, Bulgaria, Hungary, Poland, Slovakia, when choosing methods of ensuring the economic security of the country, take into account the geopolitical situation, the vector and strategy of economic development by the trends of regional and global evolutionary process, the direction of economic reforms (Derenutsa, 2017).

In the United Kingdom, specific rules governing economic security are contained in defence policy regulations. They are based on assessments of national interests and are implemented through their protection. Methods for ensuring economic security are forecasting and preventing the most economically dangerous external and internal risks (Ocepek, 2010).

In Latvia, Lithuania and Estonia, economic security is based on the relevant EU regulations. Methods of ensuring economic

security are aimed primarily at implementing financial and economic security (Derenutsa, 2017).

In Germany, the main issues on this issue are reflected in the directives of the Ministry of Defense, which regulate the most important areas of market activity and define the control functions of the state.

In Romania, issues of economic security are contained in the national security strategy. The main areas of economic security are implementation of effective measures of macroeconomic stabilization, acceleration of structural reforms in the economy, creation of the private sector, the attraction of foreign investments and support of small and medium business; harmonization of financial and economic legislation, financial, economic and customs policy with EU legislation, etc.

In France, certain provisions on economic security are reflected in the National Security Act (Ocepek, 2010). Ensuring economic security is aimed at reducing the vulnerability of the economic system of the country, maintaining the independence of foreign policy, eliminating imbalances in the level of economic development of economic entities; prevention of excessive external dependence in the most important sectors of the economy, minimization of risks associated with dependence on the outside world.

In Spain, the legal framework for economic security is flexible, clearly defining the functions of governments and organizations in this area, which develop special programs for economic development. Regulations on ensuring economic security are related to the relevant EU legislation. Methods for ensuring economic security protect the interests of priority industries, as well as aimed at stimulating investment, ensuring

currency control, the development of legislation on joint stock companies (Derenutsa, 2017).

In terms of ensuring economic security, Italy is guided by its international agreements. Methods for ensuring economic security are aimed primarily at protecting the interests of domestic producers in domestic and foreign markets.

The generalization of foreign experience shows that ensuring economic security in the national economy significantly affects the international prestige of the country. In turn, the Head of the State Fiscal Service of Ukraine Melnyk VI adds that most national security strategies are focused on ensuring national and economic security through radical economic reforms, close integration into global and European security systems, and accession to economic and political alliances and organizations. Consider the main approaches to economic security in Europe.

Thus, each country has its own idea of economic security and, accordingly, the methods of its provision, which can be aimed at achieving national, public interests or the sustainability of economic development, or the independence of the national economy from the foreign market. Pugach O.A. also emphasizes that the common characteristics and basis of the presented systems of economic security in different countries is the legal framework for regulating domestic and foreign economic operations, including the participation of foreign capital in the national economy, as well as institutional protection of national economic interests international integration (Pugach, 2015).

Analyzing the concept of US economic security, it is necessary to emphasize its main areas, such as ensuring national economic interests in competition with rivals in world

markets, protecting the interests of the state in high-tech areas, and strengthening its capacity to meet international trade and economic obligations and other areas. The US National Security Strategy states that to maintain a high level of combat capability of the armed forces, it is necessary to increase the efficiency and competitiveness of the economy, open new foreign markets and create new jobs. It is advisable to consider Japan's experience, where scientists in the 1980s proposed an analytical method for assessing the national strength of the state. The national strength of the state is determined, firstly, by the ability to contribute to the international community, in its economic, financial and scientific and technical spheres of activity, and secondly, the ability to survive in crisis and extreme global conditions. Third, the ability to promote and defend their national interests relies on all components of a comprehensive national force, mainly through force. The modern Japanese approach to solving problems of economic security is based on two principles:

- preservation and development of economic power of the country;
- formation of a favorable global environment that will ensure the maximum realization of national interests (Shulga et al., 2010).

As world experience shows, a key element of the system of economic security is an effective mechanism for identifying threats to national economic interests that pose an immediate threat to the national economic system, thereby disrupting the macroeconomic balance and the process of social reproduction. It should be borne in mind that there are very different economic security systems and models in the world (Fig. 4).

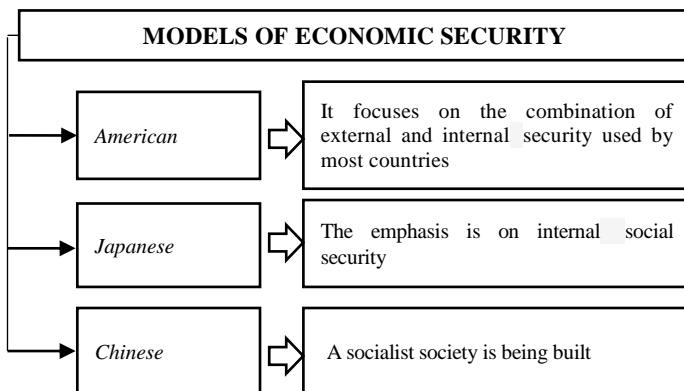


Figure 4. Models of economic security of the world

Source: developed by the authors

The main difference between the Western and post-Soviet approaches to economic security is that in Western scientific thought the initial category of economic security at both the macro, meso and micro levels is an external threat, while domestic scientists distinguish between external and internal threats with a focus on internal ones, as the long-term effects of internal threats, which turn into systemic threats, make the national economy more vulnerable to external threats.

Economic security of foreign economic activity of the enterprise and the country as a whole should be considered one of its main conditions, which from the point of view of the application of both protective and harmonization approaches should be considered as the surrounding reality, with international institutions that use their resources, able to protect their interests in international markets from threats of various kinds or quickly overcome the consequences of threats created by processes, phenomena, materialized interests and objects of other participants in foreign economic relations. It is advisable to form the theoretical foundations of economic security of

foreign economic activity, using theories of interaction (the theory of exchange of J. Homans and P. Blau, the theory of social exchange of J. Thibaut and H. Kelly and the theory of potential conflicts).

The interaction of participants in foreign economic relations is both a source of financial benefit and conflict. The emergence of new economic agents in the market reduces the market potential of existing economic agents. It causes not only the rejection of new ones but also an active struggle against them. The rejection of new economic agents in the market, which can take various forms and can serve as a driving force for many destructive processes, is a source of threats and dangers not only for the process of their entry, promotion and strengthening of the international market but also for their effectiveness in general.

They are especially likely to occur when foreign economic entities from developing countries enter international markets with established participants. The level of economic security of foreign economic activity of domestic entrepreneurs and the state, in general, is determined by the influence of several factors that differ in intensity, duration of impact and consequences (Fig. 5).

In the conditions of escalation of economic conflicts, the processes of globalization, which are at the same time the cause, method and result of their solution, directly affect the economy of almost all processes in the world economy. Such influence contributes to the intensification of foreign economic activity of economic entities, leads to a change in its strategic management, and at the same time renews the development and functioning of the economic security system.

With all the attention to globalization processes (Tretyak, 2010) and their recognition as a factor of economic security of foreign economic activity, the content of this impact on

economic security of enterprises, foreign economic activity is very short, which requires shallow research given current challenges and threats of macroeconomic scale.

With all attention to globalization processes (Tretyak, 2010) and their recognition as a factor of economic security of foreign economic activity, the content of this impact on the economic security of enterprises, foreign economic activity is relatively short, which requires in-depth research given current challenges and threats of macroeconomic scale.

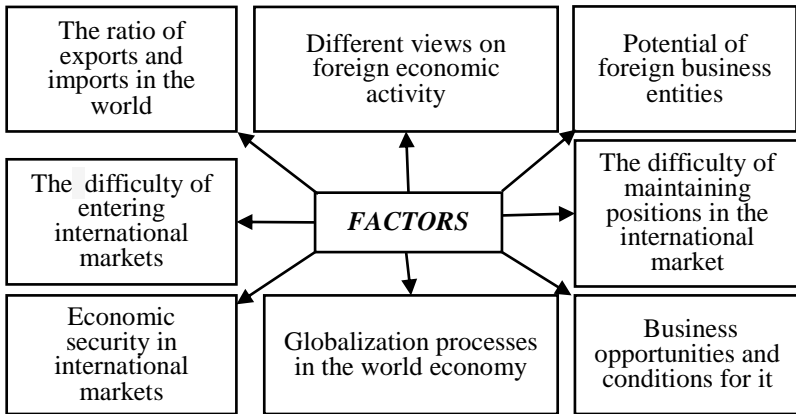


Figure 5. Factors influencing the economic security of states (foreign view)

Source: developed by the authors based on (Schneider et. al., 2018)

In current conditions, there is no unity in understanding the essence and measurement of economic security of the national economy, in the development and study of practical ways and means to prevent the result of instability. In research, scientists focus on the factors that affect the economic security of the national economy. Each author considers a system of elements that he proposes, with a specific purpose, namely: the impact of factors on certain components of economic security.

After analyzing the scientific views of domestic and foreign scientists, we can classify the factors influencing economic security. Given the many different factors that affect economic security, it is advisable to organize a set of characteristics and group them as follows: globalization, macroeconomic, institutional, resource and organizational (Fig. 6).

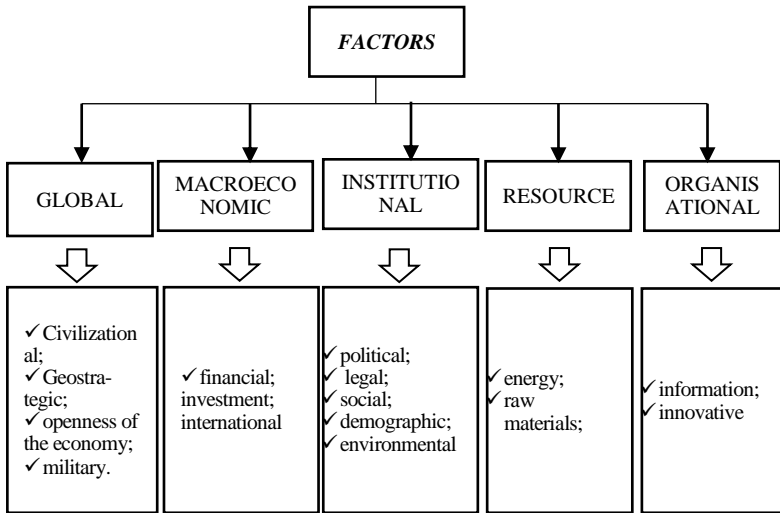


Figure 6. Classification of factors influencing economic security

Source: developed by the authors

Factors of globalization include civilization, geostrategic, open economy, military. The civilizational factor appears in most countries involved in economic globalization. The destructive influence of this factor destroys the civilizational space of countries, initiating the escalation of the conflict that threatens world civilization.

Geostrategic factor determines the geographical location of a particular country in the world, its location relative to neighboring countries. This factor affects the socio-economic development of the country: migration flows, international relations, strengthening regional trends in regionalization and more. If any export oil and gas pipelines are laid across the country, it is a transport hub.

One of the most important factors influencing economic security is the openness of the economy. The high degree of openness of the country's economy, based on raw material specialization, in the long run leads or may lead to a decrease in the level of economic security of the national economy and the competitiveness of the national economy along with the growing dependence of the latter on foreign markets.

The military factor explains the existence of a guarantee system of territorial integrity and national sovereignty.

The macroeconomic factors should include the following: international, financial, investment. The international factor influence on the economic security of the national economy is determined by the state's rapid response to the emergence of foreign economic threats, using the benefits of participation in the international labor unit, helping to create optimal conditions for national economic development.

The financial factor is the most important for the economic security of the national economy; this ensures the creation of appropriate conditions to ensure the optimal balance and stability of the financial system in terms of accelerating the impact of internal and external threats. The economic factor should be considered as a complex multilevel system, which is formed from some lower-level subsystems: banking, the subsystem of the non-banking sector, debt, fiscal, budget, money. The investment factor determines the relationship

between the received investments of the country from abroad and own investments directed abroad.

Institutional factors include political, legal, socio-demographic, environmental. The political factor that uses political means determines the creation of appropriate conditions to ensure reliable and stable protection of the rights and freedoms of citizens, their associations, political parties, ensuring unity, integrity, sovereignty and independence of the country from political pressure and aggression in the international arena.

The legal factor is obvious in the improvement of the entire legal system, including the legal framework, the use of modern learning technologies, the publication of regulations and their implementation.

The socio-demographic factor presupposes the provision of the population with a decent and quality standard of living and personal development, regardless of how destabilizing the impact of external and internal threats is.

The environmental factor ensures the proper protection of the environment, as well as the rational use and restoration of natural resources.

Resource factors should include the following: energy, raw materials, supplies.

The energy factor involves providing the state and regions with energy resources at levels that can meet the current needs of industry, agriculture and households to support optimal life and sustainable economic development. The impact of the energy factor on the economic security of the national economy is key for all countries, because today the availability of energy resources is the main aspect in determining the prospects for their socio-economic development.

The raw material factor is also important for ensuring the economic security of the national economy. Its impact is due to

the fact that the current pace of development of the world economy is accompanied by a steady increase in the use of natural resources.

The provision factor affects the level of economic security of the national economy in the complex, on the one hand, the possibility of insufficient food production for self-sufficiency of the country, which depends on the level of agricultural development, on the other, it is determined by physical and economic level of food availability, quality, structure, the level of autonomy of the food market and the degree of availability of food for humans.

Organizational factors include information and innovation. The information factor is formed taking into account the features that determine the security of society and state needs in the media, ensuring the existence and progressive development of the latter, regardless of the degree of negative impact of external and internal information threats.

The innovation factor is aimed at the development and implementation of all types of innovations, the development of high-tech innovation industries; this requires systematic monitoring and constant analysis of the degree of achievement of planned goals and the effectiveness of decisions. The formalization of these groups of factors and the study of their impact on the economic security of the national economy allows to identify factors that have a negative impact, and by monitoring to prevent their actions or to develop measures to prevent even their occurrence. Identifying individual factors within each group allows us to determine their importance in the study of individual levels of economic security in the global environment.

Separately, we will focus on the ratings, which indirectly reflect certain aspects of economic security of the national economy.

Methods for assessing the economic security of the state using existing ratings are standard. Such ratings include the index of economic freedom, the index of human development, the index of corruption, the index of global competitiveness. Accumulation of results according to the given ratings allows describing various elements of economic security in a complex way. The use of ratings, which are essential characteristics of a particular component of economic security, allows to determine the place of the state in the world coordinate system and to analyze the level of economic security in the international dimension.

It should also be noted that the legal framework for combating money laundering, terrorist financing, and proliferation of weapons of mass destruction has significantly expanded in recent years. Scholars worldwide are devoting their research to the formation of a system of preventive, control and regulatory measures aimed at reducing the scale of illegal money laundering, increasing the level of financial security of the country (Frank et al., 2018; Fedulova et al., 2018). According to the Scopus scientometric database, in October 2020, the number of publications devoted to legalising criminal proceeds was 253 units, while in 2005, it was 81 units. The issue of assessing the stability of the financial system of 203 countries and the level of its financial security, respectively, is considered in the work of Kaya (2021). This article examines the extent to which high-income OECD member countries differ in the stability of their financial systems from high-income non-OECD member countries. Assessing the direction and strength of the impact of central bank independence in terms of its individual aspects on the parameters of banking and financial stability for different groups of countries is presented in Dudchenko (2020). Csaba K., Bellász, Z. V. (2017) analyzed the relationship between the

amount of legalized funds and the propensity of citizens to commit terrorist activities. Banking regulation plays a vital role in ensuring the financial stability of the national economy and the formation of the level of financial security. So in the work of scientists Islam, S.T., Khan, M.Y.H. (2019). an assessment of the impact of changes in the European banking system, particularly in the context of studying the features of the Financial Markets Directive, on the functioning of the global economy, and emphasizes the incompleteness and inconsistency of the regulatory framework. The study of the effectiveness of information and financial security of countries based on a comparative analysis of complex technical, economic and social systems is thoroughly presented in a study by scientists Yarovenko H., Kuzmenko O., and Stumpo M. (2020). The latest financial instruments on schemes of legalization of criminal proceeds, as well as procedures for identifying the result of illegally obtained funds, are comprehensively presented in the works: Logan, W., and Esmanov, O. (2017); Skare, M., and Porada-Rochoń, M. (2019).

Skrynyk, O. (2020) evaluated the level of security and data protection in the design of organizational development systems based on artificial intelligence, because with the increasing level of digitalization of processes, data security of the entire company system is under threat. An interesting technique was presented by scientists Shymon, S., Kolomiets-Ludwig, E., Osiejewicz, Jo., Krawczyk, D. & Kaminska, B. (2020), who analyzed the impact of marketing determinants on the level of economic security of the country. The study empirically confirms the absence of a statistically significant difference in the level of economic security for countries, as assessed by indicators of deficit or surplus of the state budget, the

unemployment rate, which implement effective policies to promote their brand and do not take appropriate measures.

Therefore, we propose to determine the level of financial security of countries based on the calculation of the value of the integrated indicator by the geometric weighted average and the division of countries into clusters, which will provide a more detailed analysis in terms of financial transactions and monitor compliance with all regulations.

The basis for the study of the risk characteristics of the use of financial institutions in the process of money laundering and determining the level of financial security is spatial data in terms of 102 countries, which are studied by the Financial Action Task Force (FATF).

The input statistical base of the study was formed on the basis of data from the World Bank (2018), Financial Action Task Force on Money Laundering (FATF, 2018), research of the Institute for Economics and Peace on the Global Terrorism Index (2018), ratings reflecting the degree of effectiveness measures of countries in combating money laundering and terrorist financing, and the level of state compliance with technical requirements (4th-Round-Rating, 2018). Therefore, to characterize the tendency of financial institutions in a country to legalize questionable income and, accordingly, to determine the level of its financial security, it is advisable to choose the following list of indicators: Effectiveness (K_1), Technical Compliance (K_2), GDP per Capita (current US\$) (K_3); Ease of Doing Business (K_4); Internally displaced persons, new displacement associated with conflict and violence (number of cases) (K_5); Corruption Perceptions Index (CPI) (K_6); Global Terrorism Index (K_7); Business Freedom (K_8); Monetary Freedom (K_9); Financial Freedom (K_{10}).

The efficiency indicator characterizes the degree of effectiveness of countries' measures in combating money laundering and terrorist financing. The technical compliance indicator represents the degree of state compliance with technical requirements. According to the FATF methodology, these indicators are measured qualitatively. For indicator K_1 it is proposed to use a quantitative scale from 0.25 to 1: HE = 1 – high level of effectiveness, the immediate outcome is achieved to a considerable extent (minor improvements required), SE = 0.75 – substantial level of effectiveness, the immediate outcome is achieved to a large extent (moderate improvements required), ME = 0.5 – moderate level of effectiveness, the immediate outcome is achieved to some extent (major improvements needed), LE = 0.25 – low level of effectiveness, the immediate outcome is not achieved or achieved to a negligible extent (fundamental improvements required). It is proposed to use the following measurement scale for K_2 : C = 1 – compliant (national legislation on combating money laundering meets all approved technical requirements); LC = 0.8 – largely compliant (there are only minor shortcomings); PC = 0.6 – partially compliant technical requirements (the presence of moderate deficiencies); NC = 0.4 – non-compliant technical requirements (presence of significant shortcomings); NA = 0.2 – not applicable (requirement not applicable due to structural, legal or institutional features of the country).

We also emphasize the need and importance of using the indicator K_6 – CPI, to determine the level of financial security, because bribery, corruption, fraud – disincentives that have an inhibitory effect on economic development at the national and global levels. Scientific and practical research by Western economists shows that a 1% increase in corruption slows down the country's economic growth by 0.4%, and a 1% reduction in

it leads to a 0.72% increase in GDP. The Corruption Perceptions Index began to be calculated by temporary interpolation by Transparency International in order to conduct anti-corruption policy at the local, national and global levels in 1995. Until 2012, the CPI calculation methodology did not involve comparing the country indicator with the previous value and since 2012, Transparency International has updated the methodology and comparisons have become possible.

The formation of CPI in today's conditions is based on average on the results of 13 studies of reputable international institutions and research centers. Standardized, on a scale for all countries, research results are combined into an overall score on a scale from 0 to 100, where a score of 0 means that the state is highly corrupt and a score of 100 – no corruption. For example, the CPI of Ukraine includes the results of 9 studies. In 2020, the Corruption Perceptions Index in Ukraine grew by 3 units to 33 points at the end of 2020. Events such as the completion of the anti-corruption infrastructure, namely the launch of the High Anti-Corruption Court and the renewed National Agency for the Prevention of Corruption, had a positive impact on the value of the index. For comparison, in 2013, the value of the CPI of Ukraine was 25 points.

In 2020, with a CPI of 33 points, Ukraine ranked 117th among 180 countries. Next to Ukraine in the ranking are countries such as Egypt, Nepal, Zambia, Eswatini, Sierra Leone, which also received 33 points in 2020. The first place in the ranking according to the value of the Corruption Perceptions Index is occupied by New Zealand and Denmark, with values of the index of 88 points.

As for the neighboring countries, Poland has the highest scores, namely 56, which is 41.07% more than in Ukraine. However, in 2020, the country lost 2 points, Slovakia lost 1 point and received a CPI of 49. Moldova, Belarus and Russia

improved their performance by 2 points. Thus, Moldova ranks 115th with 34 points, Belarus ranks 63rd with 47 points, the Russian Federation has 30 points and is ranked 129th. Hungary and Romania did not change their results – the countries received 44 points each and occupied 69th place.

Compared to the previous year, 2019, the most points for the year, among all countries, added the Maldives (+14) and in 2020 the CPI was 43 points and was in 75th place. For the second year in a row, Armenia is improving its results by 7 points per year.

It is known that the quality of any mathematical calculations depends on the quality of the input indicators of the study, their comparability and the possibility of use within a particular method. Input indicators of the formation of the level of financial security of the studied countries are measured in different scales. Therefore, for the possibility of their further joint use, it is necessary to carry out the normalization procedure. We propose to carry out the normalization procedure using nonlinear normalization:

$$\tilde{m}_{ij} = \left(1 + e^{\frac{\bar{m}_j - m_{ij}}{\sigma_j}} \right)^{-1}, \quad (1)$$

where \tilde{m}_{ij} – normalized value of the i -country of j -index; \bar{m}_j – the average value of j -indicator; m_{ij} – the value of i -country of j -index; σ_j – standard deviation of the j -indicator.

A fragment of the formed information base of the study of normalized indicators to determine the level of security of the country is given in Annex A, Table A1.

Next, according to the recommendations of descriptive statistics from the system of indicators, we should first exclude

those indicators whose coefficient of variation is less than 5%. Such indicators were not detected in the input data set (Table 3).

Table 3. Multiple variable analysis: summary statistics

Indicators	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
Count	102	102	102	102	102	102	102	102	102	102
Average	0,50	0,51	0,48	0,52	0,48	0,49	0,49	0,51	0,51	0,50
Standard deviation	0,22	0,20	0,20	0,18	0,08	0,22	0,21	0,20	0,20	0,21
Coeff. of variation, %	43	38,78	41,31	35,56	16,62	43,73	43,79	39,76	39,35	42,34
Minimum	0,15	0,03	0,31	0,05	0,46	0,21	0,30	0,09	0,083	0,14
Maximum	0,90	0,97	0,96	0,75	0,10	0,89	0,94	0,84	0,813	0,85
Range	0,75	0,93	0,65	0,70	0,54	0,69	0,64	0,75	0,730	0,71
Std. skewness	-0,40	-1,84	4,6	-4,63	20,82	1,60	2,98	-2,60	-3,44	-1,20
Std. kurtosis	-2,34	-0,46	-0,29	1,84	55,7582	-2,32	-2,18	-0,69	-0,65	-2,08

Source: developed by the authors with Statgraphics Centurions package

It is also recommended to use especially carefully indicators in which the values of the coefficients Standard skewness and Standard kurtosis go beyond the interval (-2; 2), because the values of these statistics outside the range of -2 to +2 indicate significant departures from normality, which would tend to invalidate any statistical test regarding the standard deviation.

In addition, the rationale for taking into account all the above indicators was confirmed by the results of correlation analysis (Table 4).

Table 4. Results of correlation analysis of the relationship between financial security indicators of countries

	K ₁	K ₂	K ₃	K ₄	K ₅	K ₆	K ₈	K ₉	K ₁₀	K ₇
Effectiveness	1,000									
Technical Compliance	0,018	1,000								
GDP per capita (current US\$)	0,518	0,066	1,000							

continued Table 4

Ease of Doing Business	0,288	0,033	0,526	1,000						
Internally displaced persons, new displacement associated with conflict and violence (number of cases)	0,104	-0,285	0,298	0,116	1,000					
Corruption Perceptions Index	0,314	0,087	0,786	0,702	0,177	1,000				
Business Freedom	0,283	0,042	0,545	0,865	0,132	0,813	1,000			
Monetary Freedom	0,043	-0,017	0,319	0,704	0,027	0,680	0,825	1,000		
Financial Freedom	0,350	0,084	0,604	0,769	0,054	0,740	0,803	0,715	1,000	
Global Terrorism Index	0,111	0,116	-0,017	0,189	-0,107	-0,002	0,163	0,180	0,099	1,000

Source: developed by the authors with Statistica package

The presence of positive highly correlated relationships between indicators can be traced in the following cases (directly proportional dependence): between GDP per capita (current US \$) (K_3) and Corruption Perceptions Index (K_6) at the level of 79%, between Ease of Doing Business (K_4) and Business Freedom (K_8) – 86%, between Ease of Doing Business (K_4) and Financial Freedom (K_{10}) – 77%, between Corruption Perceptions Index (K_6) and Business Freedom (K_8) at 81%, between Corruption Perceptions Index (K_6) and Financial Freedom (K_{10}) – 74%, between Business Freedom (K_8) and Monetary Freedom (K_9) – 82%, between Business Freedom (K_8) and Financial Freedom (K_{10}) at the level of 80%. A fairly high directly proportional link density is available between the indicators between GDP per capita (current US \$) K_3 and Financial Freedom K_{10} (at 0.604 units), between Ease of Doing Business (K_4) and Monetary Freedom (K_9) (at 0.702 units), between Ease of Doing Business (K_4) and Financial Freedom (K_{10}) (at 0.704 units), between Corruption

Perceptions Index (K6) and Monetary Freedom (K9) (at 0.679 units) and between Monetary Freedom (K9) and Financial Freedom (K10) (at 71%). At the average level, the indicators Effectiveness (K1) and GDP per capita (current US \$) (K3) (at the level of 52%), GDP per capita (current US \$) (K3) and Ease of Doing Business (K4) are positively correlated. levels of 53%).

In order to determine homogeneous groups of countries by the level of financial security on the basis of the values of legalization of criminal proceeds, a cluster analysis was performed using the application software Statistica. The k-means method was used to cluster 102 countries of the world, and the following statistical indicators were used to quantify the distinctive features between clusters: Euclidean distances from the grouping center and arithmetic mean. The substantiation of the number and composition of clusters is confirmed by the results of analysis of variance and the basis of the analysis of the union protocol, namely the values of agglomeration coefficients. The calculation is as follows:

$$K = N - n_i, \quad (2)$$

where K – the number of clusters; N – number of steps; n_i – the number of the i -th step, on which the jump took place (a sharp change in the values of the agglomeration coefficient).

Therefore, within this study, the optimal number of clusters is 10.

In addition, to determine the optimal number of clusters, they were checked for fullness and stability. At least 10% of the total number of objects must be in each cluster. This should be taken into account so that there are no empty groups or groups with very few objects. Objects inside the cluster must be homogeneous. Checking the stability of clusters, ie the

division of countries into 10, 11 or 12 clusters, did not reveal any fundamentally new structures. Thus, forming 10 clusters, the model is optimally stable. The obtained results of clustering are systematized in Table 5 – Table 7.

Table 5. The content of the components of the first, second, third and fourth clusters in terms of Euclidean distances

Country	Cluster 1 (5)	Country	Cluster 2 (11)	Country	Cluster 3 (7)	Country	Cluster 4 (13)
	Distance		Distance		Distance		Distance
Bhutan	10767,43	Australia	2830,930	Bahamas	462,242	Bahrain	1686,285
Guatemala	25528,43	Austria	982,189	Cyprus	653,493	Barbados	590,915
Iceland	16409,72	Belgium	310,673	Italy	1190,242	Czech Republic	1278,514
Latvia	6097,25	Canada	694,767	Korea	817,175	Greece	521,775
Peru	10488,48	Finland	1512,017	Malta	196,983	Hungary	1030,617
		Hong Kong, China	154,873	Slovenia	1486,810	Lithuania	378,539
		Israel	2135,878	Spain	132,432	Palau	1117,119
		Sweden	1945,196			Panama	1196,637
		Chinese Taipei	154,873			Portugal	1404,315
		United Arab Emirates	1468,080			Saudi Arabia	3661,574
		United Kingdom	1718,665			Seychelles	960,390
						Trinidad and Tobago	751,028
						Uruguay	710,991

Source: formed by the authors

The smallest cluster includes one country – Norway. The next largest clusters with the same number of elements are two groups from five countries: cluster 9 – Denmark, Ireland, Singapore, Switzerland, United States of America; cluster 1 – Bhutan, Guatemala, Iceland, Latvia and Peru.

Table 6. The content of the components of the fifth, sixth and seventh clusters in terms of Euclidean distances

Country	Cluster 5 (8)	Country	Cluster 6 (9)	Country	Cluster 7 (14)
	Distance		Distance		Distance
Antigua & Barbuda	265,1430	Belarus	371,351	Albania	426,9444
China	275,1301	Botswana	1450,268	Armenia	97,6666
Costa Rica	400,4084	Colombia	274,367	Cabo Verde	110,2210
Malaysia	166,8423	Cuba	510,357	Indonesia	43,4665
Mauritius	114,8341	Dominican Republic	235,765	Jamaica	448,9208
Mexico	370,8625	Fiji	388,625	Jordan	103,7171
Russian Federation	166,1844	Serbia	196,015	Moldova	536,6523
Turkey	466,7381	Thailand	194,725	Mongolia	73,7658
		Turks&Caicos	226,542	Morocco	230,8338
				Philippines	221,4951
				Sri Lanka	60,3649
				Tunisia	164,0143
				Ukraine	270,0661
				Vanuatu	270,3069

Source: formed by the authors

The largest is cluster 8, which includes 29 countries: Andorra, Bangladesh, Bermuda, Burkina Faso, Cambodia, Cayman Islands, Cook Islands, Ethiopia, Ghana, Gibraltar, Haiti, Honduras, Isle of Man, Kyrgyzstan, Macao, China Madagascar , Malawi, Mali, Mauritania, Myanmar, Nicaragua, Pakistan, Samoa, Senegal, Solomon Islands, Tajikistan, Uganda, Zambia, Zimbabwe.

For a more comprehensive and detailed analysis of the results of clustering of countries on the use of financial institutions to legalize criminal proceeds and determine the level of their financial security, it is advisable to use averages, Euclidean distances, squares of Euclidean distances. Countries that fall into the same cluster should be similar to each other in some way.

Table 7. The content of the components of the ninth and tenth clusters in terms of Euclidean distances

Country	Cluster 9 (5)	Country	Cluster 10 (1)
	Distance		Distance
Denmark	2840,067	Norway	0,00
Ireland	2608,712		
Singapore	1322,779		
Switzerland	3935,882		
United States	2381,750		

Source: formed by the authors

The analysis of the constructed groups of the world's countries allows to state that the carried-out clustering corresponds to the general level of legalization of criminal incomes in the countries from one cluster (Bagmet et al., 2018; Olimkhon et al., 2018). Thus, the smaller the value of the Euclidean distance from the center of grouping for each cluster, the countries in this cluster are more similar in methods and level of legalization of criminal proceeds and have identical values in terms of their level of financial security (Vasylieva et al., 2018; Yarovenko et al., 2020).

A significant addition and justification of the feasibility of the clustering is the analysis of variance. To do this, use the values of intergroup and intragroup dispersion characteristics: the smaller the value of intragroup conflict and the greater the value of intergroup variance, the better the feature characterizes the affiliation of countries to a particular cluster and the better the results of clustering.

In addition, the parameters F and p also characterize the contribution of the feature to the division of objects into groups. The best clustering corresponds to a larger value of the F-criterion (the Fisher's criterion) and a smaller value of the p-value (p-level of significance) (Yarovenko et al., 2020).

Therefore, using Fisher's test and the proximity to zero of the value of p-value, we can say that the difference between the averages for each group and the average for the whole population is statistically significant. The results of analysis of variance for 9 and 10 clusters are presented in table 8 and 9, respectively.

Table 8. Results of analysis of variance for nine clusters

Indicator	Intergroup dispersion	Degrees of freedom	Intra-group dispersion	Degrees of freedom	F-test	p-value
K ₁	6,36E-01	10	1,18E+00	91	4,906716	0,000012
K ₂	1,44E-01	10	5,54E-01	91	2,362216	0,015639
K ₃	4,16E+10	10	4,30E+09	91	87,89317	0
K ₄	2,57E+04	10	2,02E+04	91	11,55826	0
K ₅	3,50E+11	10	8,53E+09	91	373,6569	0
K ₆	2,91E+04	10	9,64E+03	91	27,42683	0
K ₇	4,38E+01	10	4,73E+02	91	0,844099	0,587825
K ₈	2,15E+04	10	1,65E+04	91	11,86229	0
K ₉	4,02E+03	10	6,91E+03	91	5,293554	0,000004
K ₁₀	2,56E+04	10	2,45E+04	91	9,495454	0

Source: formed by the authors

In terms of the indicators studied, the results of Table 6 show better values for the following indicators GDP per capita, ease of doing business, internally displaced persons, new displacement related to conflict and violence, corruption perception index, freedom of business (increasing intergroup and reduction of intragroup variance).

The level of significance of p-value for the indicator K₇ (global terrorism index) in both 10-group clustering (0.67) and 9-group clustering (0.59) exceeds the permissible 5%, but for a thorough and meaningful interpretation of the distribution of illegal funds financial institutions of the studied countries are

recommended to leave this indicator (Taroni et al., 2016; Shkolnyk et al., 2018; Harust et al., 2019).

Table 9. The results of analysis of variance for ten clusters

Indicator	Intergroup dispersion	Degrees of freedom	Intra-group dispersion	Degrees of freedom	F-test	p-value
K1	6,58E-01	11	1,16E+00	90	4,648	0,000014
K2	1,93E-01	11	5,05E-01	90	3,134	0,001279
K3	4,19E+10	11	3,96E+09	90	86,623	0
K4	2,58E+04	11	2,01E+04	90	10,479	0
K5	3,58E+11	11	7,29E+08	90	4019,425	0
K6	2,99E+04	11	8,81E+03	90	27,762	0
K7	4,42E+01	11	4,72E+02	90	0,766	0,672883
K8	2,18E+04	11	1,62E+04	90	11,058	0
K9	4,03E+03	11	6,90E+03	90	4,773	0,00001
K10	2,56E+04	11	2,45E+04	90	8,551	0

Source: formed by the authors

Generalized indicators serve as an aggregation of the initial feature space and determine the level of quality, rating position of certain factors related to the formed research tasks (Dumitrascu, 2017). To do this, use a wide variety of methods of additive convolution and multiplicative. Determining the generalized rating indicator that characterizes the level of financial security of the studied 102 countries, a multiplicative convolution was performed using the weighted geometric mean formula. This convolution procedure allows you to calculate the average rate of dynamics (Bilan et al., 2019; Marcel, 2019):

$$I_p = \sqrt[\Sigma n_j]{\prod_{j=1}^{10} K_j^{n_j}}, \quad (3)$$

where I_p – generalized rating assessment of the financial security of the p-country; $\sum n_j$ – the sum of the frequencies; K_j – the studied indicator ($j = \overline{1, 10}$); n_j – the frequency of the studied value (variant) for the j-indicator.

The results of the summary rating indicator of the level of financial security are shown in Table 10.

Table 10. Integrated rating index I_p of the level of financial security of the country

Country	I_p	Country	I_p	Country	I_p
Albania	0,49	Greece	0,56	Palau	0,27
Andorra	0,21	Guatemala	0,36	Panama	0,51
Antigua & Barbuda	0,38	Haiti	0,31	Peru	0,53
Armenia	0,52	Honduras	0,46	Philippines	0,51
Australia	0,72	Hong Kong, China	0,65	Portugal	0,58
Austria	0,63	Hungary	0,52	Russian Federation	0,43
Bahamas	0,50	Iceland	0,61	Samoa	0,40
Bahrain	0,58	Indonesia	0,53	Saudi Arabia	0,49
Bangladesh	0,37	Ireland	0,71	Senegal	0,40
Barbados	0,50	Isle of Man	0,21	Serbia	0,45
Belarus	0,41	Israel	0,68	Seychelles	0,44
Belgium	0,69	Italy	0,56	Singapore	0,65
Bermuda	0,45	Jamaica	0,44	Slovenia	0,48
Bhutan	0,39	Jordan	0,53	Solomon Islands	0,42
Botswana	0,46	Korea	0,61	Spain	0,63
Burkina Faso	0,41	Kyrgyzstan	0,46	Sri Lanka	0,46
Cabo Verde	0,40	Latvia	0,58	Sweden	0,70
Cambodia	0,34	Lithuania	0,59	Switzerland	0,66
Canada	0,66	Macao, China	0,18	Chinese Taipei	0,64
Cayman Islands	0,19	Madagascar	0,36	Tajikistan	0,39
China	0,43	Malawi	0,38	Thailand	0,57
Colombia	0,54	Malaysia	0,54	Trinidad and Tobago	0,45
Cook Islands	0,22	Mali	0,41	Tunisia	0,46
Costa Rica	0,51	Malta	0,42	Turkey	0,52
Cuba	0,28	Mauritania	0,38	Turks&Caicos	0,23

continued Table 10

Cyprus	0,57	Mauritius	0,48	Uganda	0,38
Czech Republic	0,60	Mexico	0,51	Ukraine	0,43
Denmark	0,67	Moldova	0,46	United Arab Emirates	0,59
Dominican Republic	0,42	Mongolia	0,38	United Kingdom	0,71
Ethiopia	0,34	Morocco	0,46	United States	0,73
Fiji	0,25	Myanmar	0,34	Uruguay	0,49
Finland	0,69	Nicaragua	0,42	Vanuatu	0,38
Ghana	0,40	Norway	0,57	Zambia	0,43
Gibraltar	0,21	Pakistan	0,38	Zimbabwe	0,26

Source: developed by the authors

The larger the value of I_p , the higher the level of financial security. The authors propose to use the following scale for the distribution of countries by level of financial security: $0,8 < I_p \leq 1$ – very high level of financial security, $0,6 < I_p \leq 0,8$ – high level of financial security, $0,4 < I_p \leq 0,6$ – medium level of financial security, $0,2 < I_p \leq 0,4$ – low level of financial security, $0 < I_p \leq 0,2$ – very low (critical) level of financial security.

Thus, among the studied countries, those with a very high level of financial security were not identified. 18 countries have a high level of financial security. These are countries with highly developed economies, namely: United States, Australia, United Kingdom, Ireland, Sweden, Belgium, Finland, Israel, Denmark, Canada, Switzerland, Hong Kong, China, Singapore, Chinese Taipei, Austria, Spain, Korea, Iceland. 53 countries have an average level of financial security – Czech Republic, Lithuania, United Arab Emirates, Portugal, Bahrain, Latvia, Norway, Cyprus, Thailand, Greece, Italy, Colombia, Malaysia, Indonesia, Peru, Jordan, Turkey, Hungary, Armenia, Costa Rica, Panama, Philippines, Mexico, Barbados, Bahamas, Saudi Arabia, Albania, Uruguay, Mauritius, Slovenia, Moldova,

Kyrgyzstan, Tunisia, Morocco, Botswana, Honduras, Sri Lanka, Trinidad and Tobago, Serbia, Bermuda, Seychelles, Jamaica, Zambia, Russian Federation, Ukraine, China, Dominican Republic, Solomon Islands, Nicaragua, Malta, Belarus, Burkina Faso, Mali. It indicates the need for a careful review of the current legislation on the quality of financial monitoring procedures, especially cybersecurity of the financial system, both at the domestic level and when conducting inspections of cross-border financial transactions.

Below the average level of financial security for the use of financial institutions to legalize criminal proceeds have 29 countries: Ghana, Samoa, Cabo Verde, Senegal, Tajikistan, Bhutan, Antigua & Barbuda, Uganda, Mauritania, Pakistan, Vanuatu, Malawi, Mongolia, Bangladesh, Madagascar, Guatemala, Myanmar, Ethiopia, Cambodia, Haiti, Cuba, Palau, Zimbabwe, Fiji, Turks&Caicos, Cook Islands, Andorra, Isle of Man, Gibraltar. On the one hand, most of these countries have a low level of economy and therefore, the level of financial security is very low. On the other hand, a poorly developed economy has a poorly developed financial system. This means that the financial sector of these countries is not interesting for criminals to launder criminal proceeds.

They have a very low level of financial security Cayman Islands and Macao, China.

The next stage of economic-analytical analysis of the strength of 10 indicators to determine the risk of using financial institutions and determine the level of financial security is proposed to conduct a factor analysis based on Principal Components Analysis and orthogonal transformation by Varimax method). This technique will identify the most relevant indicators, reduce the multidimensionality of the feature space without losing its representativeness for further development of econometric models of the dependence of the

level of financial security on the influential signs of the risk of money laundering.

Analytical calculations were performed in the application software Statgraphics Centerion 19. As a result of applying the procedure of maximizing variances in the columns of the matrix of squares of initial factor loads by the Varimax rotation identified 3 most influential factors in shaping the level of financial security. These are the first three factors (Table 11) that Eigenvalues $\lambda_i \geq 1$ – Kaiser’s rule (Kaiser, 1960).

Table 11. Factor Analysis

<i>Factor Number</i>	<i>Eigenvalue</i>	<i>Percent of Variance</i>	<i>Cumulative Percentage</i>
1	4,66772	46,677	46,677
2	1,38339	13,834	60,511
3	1,0297	10,297	70,808
4	0,967837	9,678	80,487
5	0,656214	6,562	87,049
6	0,446624	4,466	91,515
7	0,368089	3,681	95,196
8	0,251906	2,519	97,715
9	0,139931	1,399	99,114
10	0,0885802	0,886	100,000

Source: developed by the authors with Statgraphic Centurion package

Each factor corresponds to its main component, which puts the maximum load on the variables included in it. Factor F_1 is eigenvalue $\lambda_1 = 4.668$ and explains 46.68% of the variance, factor F_2 is eigenvalue $\lambda_2 = 1.383$ and explains 13.83% of the variance. The eigenvalue for the third factor $\lambda_3 = 1,030$, which explains 10.30% of the variance. Together, the first three factors explain 70.81% of the variance.

The quality of the obtained results of factor analysis is confirmed by the conducted Factorability Tests, a came Kaiser-Meyer-Olkin (KMO-Test) and Bartlett’s Test of Sphericity.

Meaning $KMO = 0,798715$, and according to the results of Bartlett's Test of Sphericity we have the following statistical characteristics $Chi\text{-}Square = 593,985$; $D.F. = 45$; $P\text{-}Value = 0.0$.

The factorability tests provide indications of whether or not it is likely to be worthwhile attempting to extract factors from a set of variables. The KMO statistic provides an indication of how much common variance is present. For factorization to be worthwhile, KMO should normally be at least 0.6. Since KMO is equal to 0,798715, factorization is likely to provide interesting information about any underlying factors.

Bartlett's test for sphericity tests the hypothesis that the correlation matrix amongst the variables is an identity matrix, indicating that they share no common variance. Since the P-value is $< 0,05$, that hypothesis is rejected. But Bartlett's test is very sensitive and is usually ignored unless the number of samples per variable is no more than 5. This requirement is taken into account, the number of samples per variable equals 10,2. Therefore, Bartlett's test also confirms the statistical quality of the factor analysis.

Factor loads after rotation are shown in Table 12.

Table 12. Factor Loading Matrix After Varimax Rotation

Indicator/Factor	<i>Factor 1</i>	<i>Factor2</i>	<i>Factor 3</i>
Effectiveness (K_1)	0,485531	0,0897362	0,371311
Technical Compliance (K_2)	0,105059	-0,823952	-0,0517318
GDP per Capita (current US\$) (K_3)	0,848379	0,0436205	0,00120518
Ease of doing business score (K_4)	0,860164	0,0700739	0,218456
Internally displaced persons, new displacement associated with conflict and violence (number of cases) (K_5)	0,15316	0,788751	-0,13644
Corruption Perception Index (K_6)	0,89084	-0,012036	-0,153774
Global Terrorism Index (K_7)	0,00360587	-0,110163	0,933589
Business Freedom (K_8)	0,893872	0,0479125	0,1309
Monetary Freedom (K_9)	0,742139	-0,00630658	-0,0329456
Financial Freedom (K_{10})	0,864872	-0,0426731	0,0830456

Source: developed by the authors with Statgraphic Centurion package

The econometric model for factor F_1 , which describes the dependence of the level of financial security on the influential features of the use of financial institutions in countries to legalize criminal proceeds is represented by formula (4):

$$F_1 = 0,486 \cdot K_1 + 0,105 \cdot K_2 + 0,848 \cdot K_3 + \\ +0,860 \cdot K_4 + 0,153 \cdot K_5 + 0,891 \cdot K_6 + 0,004 \cdot K_7 + \\ +0,742 \cdot K_8 + 0,893 \cdot K_9 + 0,865 \cdot K_{10} \quad (4)$$

Loading coefficients at risk indicators of use of financial institutions for legalization of criminal incomes $K_1 - K_{10}$ for econometric models of factors F_1 and F_2 are given in Table 12.

So the econometric model for the factor F_2 has the form:

$$F_2 = 0,090 \cdot K_1 - 0,823 \cdot K_2 + 0,044 \cdot K_3 + \\ +0,070 \cdot K_4 + 0,789 \cdot K_5 - 0,012 \cdot K_6 - 0,110 \cdot K_7 + \\ +0,048 \cdot K_8 - 0,006 \cdot K_9 - 0,042 \cdot K_{10} \quad (5)$$

And the econometric model for the factor F_3 is given by formula (6):

$$F_2 = 0,371 \cdot K_1 - 0,052 \cdot K_2 + 0,001 \cdot K_3 + \\ +0,218 \cdot K_4 - 0,136 \cdot K_5 - 0,154 \cdot K_6 + 0,934 \cdot K_7 + \\ +0,131 \cdot K_8 - 0,033 \cdot K_9 + 0,083 \cdot K_{10} \quad (6)$$

Table 13 contains a weighted impact of indicators in terms of the three most influential factors.

Table 13. Weighted impact of indicators

<i>Variable</i>	<i>Estimated Communality</i>	<i>Specific Variance</i>
Effectiveness (K_1)	0,381665	0,618335
Technical Compliance (K_2)	0,69261	0,30739
GDP per Capita (current US\$) (K_3)	0,721651	0,278349
Ease of doing business score (K_4)	0,792515	0,207485

continued Table 13

Internally displaced persons, new displacement associated with conflict and violence (number of cases) (K_5)	0,664202	0,335798
Corruption Perception Index (K_6)	0,817387	0,182613
Global Terrorism Index (K_7)	0,883737	0,116263
Business Freedom (K_8)	0,818437	0,181563
Monetary Freedom (K_9)	0,551895	0,448105
Financial Freedom (K_{10})	0,75672	0,24328

Source: developed by the authors with Statgraphic Centurion package

The Estimated Communality column contains the variance of each variable that factors can explain. Indicators K_4 , K_6 , K_7 , K_8 are the most influential for the further development of regression models on the impact of risk factors on the use of financial institutions for money laundering on the level of financial security of the country. The multifactor linear regression model developed based on these indicators for factor F1 is statistically significant according to the coefficient of determination R^2 , Student's Test, and Fisher's Test (Appendix B):

$$STOOL = -12,5674 + 9,640 \cdot K_6 + 5,849 \cdot K_8 + 0,347 \cdot K_7 + +0,975 \cdot K_4 \quad (7)$$

where *STOOL* (inStitutions TO mOney Laundering) – risk indicator of the use of financial institutions for money laundering.

But the level of significance of P-value for the independent variable K_7 (Global Terrorism Index) exceeds the maximum allowable 0.05 and is 0.5526. Therefore, it is advisable to check the model for multicollinearity. This procedure was performed using the procedure backwards stepwise selection in the Statgraphics Centurion program. The results of the obtained

econometric model are represented by formula (8) (Appendix C):

$$STOOL = -12,4235 + 9,512 \cdot K_6 + 5,849 \cdot K_8 + 9,10 \cdot K_4 \quad (8)$$

The developed model (8) is statistically significant. It is confirmed by the criteria of Darbin-Watson (DW-statistic), Student (t-statics), Fisher (Fst) (Tables 14, 15).

Table 14. Statistical characteristics for the regression model

Parameter	Estimate	Standard Error	T Statistic	P-Value
CONSTANT	-12,4235	0,35757	-34,7443	0,0000
K6	9,51198	0,82516	11,5274	0,0000
K8	5,89459	1,30959	4,50109	0,0000
K4	9,09996	1,27059	7,16202	0,0000

Source:developed by the authors with Statgraphic Centurion package

Table 15. Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Model	2036,86	3	678,954	485,86	0,0000
Residual	136,947	98	1,39742		
Total (Corr.)	2173,81	101			

Source:developed by the authors with Statgraphic Centurion package

Indicators K_4 , K_6 , K_8 have a direct proportional impact on the risk of using financial institutions to launder criminal proceeds and, accordingly, have a negative impact on the level of security (the higher the risk, the lower the level of financial security for a particular country).

Thus, the analysis suggests the need to strengthen the legal framework for mechanisms for regulating financial monitoring, taking into account the peculiarities of financial systems, which directly depend on the channels of financial resources of various economic agents and financial intermediaries. Ensuring the transparency of public finances, the development of

powerful automated financial cybersecurity systems is an urgent and one of the main tasks for each country to ensure financial security and stability of the national economy.

3. MODEL OF BUSINESS PROCESS OF AUTOMATED INTERNAL VERIFICATION OF FINANCIAL OPERATIONS OF ECONOMIC AGENTS (THE CASE OF UKRAINE)

There is currently an active demand for the use of economic agents to launder illegal income. So the need to hide the real source of illicit income; the need not to disclose the ultimate beneficial owner of illegal funds; the need to maintain control over illegal finances; ensuring further uninterrupted use of criminal funds; the need to change the form of illegal income to legal; the need to hide the links with the crimes committed, require the criminal segment to invent new schemes and methods to legalize criminal proceeds.

Given the statistics on the number of financial transaction reports subject to financial monitoring submitted by various economic agents (banks and non-banking institutions) to the State Financial Monitoring Service (Figure 7), economic agents, and especially banks, during 2020 a significant the volume of reports on financial transactions that are subject to financial monitoring, which clients have tried to conduct or conducted through various economic agents. Thus, during the first quarter of 2020 banks submitted 2886437 messages, non-banking institutions 26664 messages, during the second quarter of 2020 banks submitted 1023022 messages, non-banking institutions 10765 messages, during the third quarter of 2020 banks submitted 372443 messages, non-banking institutions 6895 messages, During the fourth quarter of 2020, banks submitted 393,530 notifications, non-banking institutions 5,781 notifications.

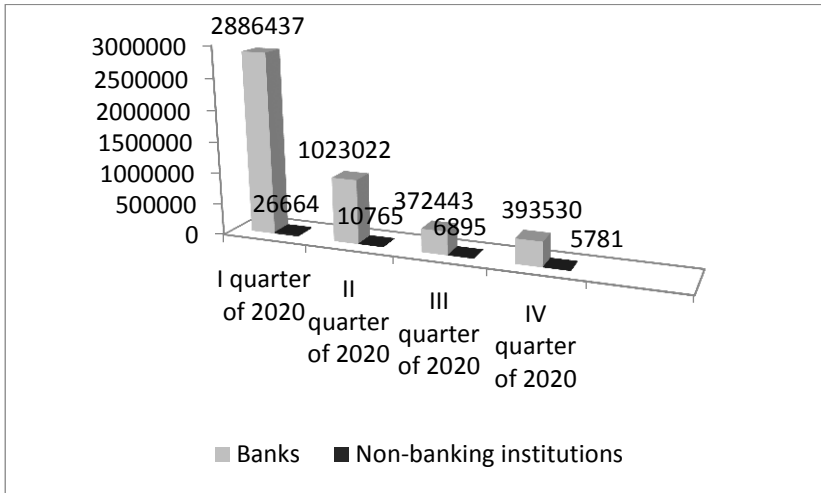


Figure 7. Number of reports on financial transactions subject to financial monitoring submitted by various economic agents (banks and non-banking institutions) to the State Financial Monitoring Service during 2020

Problematic aspects of financial monitoring in recent years have received considerable attention from scientists around the world. The current views on the functioning of financial tracking, combating money laundering, terrorist financing have scientific research of the following domestic scientists: Kuzmenko O., Dotsenko T. and Skrynka L. (2019), Pershin V. (2019), Grabchuk O., Suprunova I. (2020), which in their treaties reveal the role of financial monitoring in the modern system of economic security of the national economy in the framework of combating the legalization of proceeds from crime; Sova O. and Zavadzka O. (2020) show the place of the financial monitoring system in the activity of banking institutions.

Issues of combating money laundering, terrorist financing, the proliferation of weapons of mass destruction are covered in the works of the following scientists: Al-Suwaidi, N.A. and Nobanee, H. (2020) provide an overview of available research on combating money laundering and terrorist financing; Iwa Salami (2018) describes the features of terrorist funding through virtual currencies; Mariya Y. Omelicheva & Lawrence Markowitz (2019) investigate the funding of drug trafficking and terrorism; Repousis, S. (2020) - on the functioning of terrorist organizations.

In turn, the following specialists are engaged in modeling economic business processes, including financial monitoring: Rocha-Salazar, J.-D.-J., Segovia-Vargas, M.-J., Camacho-Miñano, M.-D.-M. Hide (2021), who propose to determine money laundering and terrorist financing using neural networks and the deviation indicator; Jullum, M., Loland, A., Huseby, R.B., Ånonsen, G. and Lorentzen, J. (2020) describe the mechanisms for detecting money laundering transactions using machine transaction research; Dobrowolski Z, Sułkowski Ł. (2020) propose the introduction of a sustainable anti-money laundering audit model.

But, despite the significant contribution of modern scientists in financial monitoring, there are several unresolved issues, including the modeling of automation of certain stages and procedures in the implementation of financial monitoring by economic agents in the course of their operations.

The business process model of automated internal audit of financial transactions subject to financial monitoring for various economic agents involves some stages (Figure 8).

After initiating a financial transaction through the economic agent's automated payment system, each transaction is identified by an automated system using special software with built-in filters. The economic agent checks financial

transactions. Identification of transactions subject to financial monitoring is carried out by analyzing the totality of financial transactions in an automated system, which is carried out at certain times and times: immediately on the same day when the financial transaction is found to be related to terrorist financing, distribution weapons of mass destruction; on the same day when the client refuses to make a financial transaction; no later than the next business day after receiving the necessary information about the financial transaction, for which at the time of its implementation there were no data required to make a decision on maintenance; on threshold transactions – before, during their implementation or attempts to carry them out, but not later than two working days after their performance; no later than five working days after the cash financial transaction with signs of suspicion; no later than ten working days of the month following the month in which the financial transactions were made, taking into account other related transactions with signs of suspicion; every first day of the quarter – a quarterly analysis of financial transactions, their total amounts, for compliance with the financial condition of the client and the essence of his business.

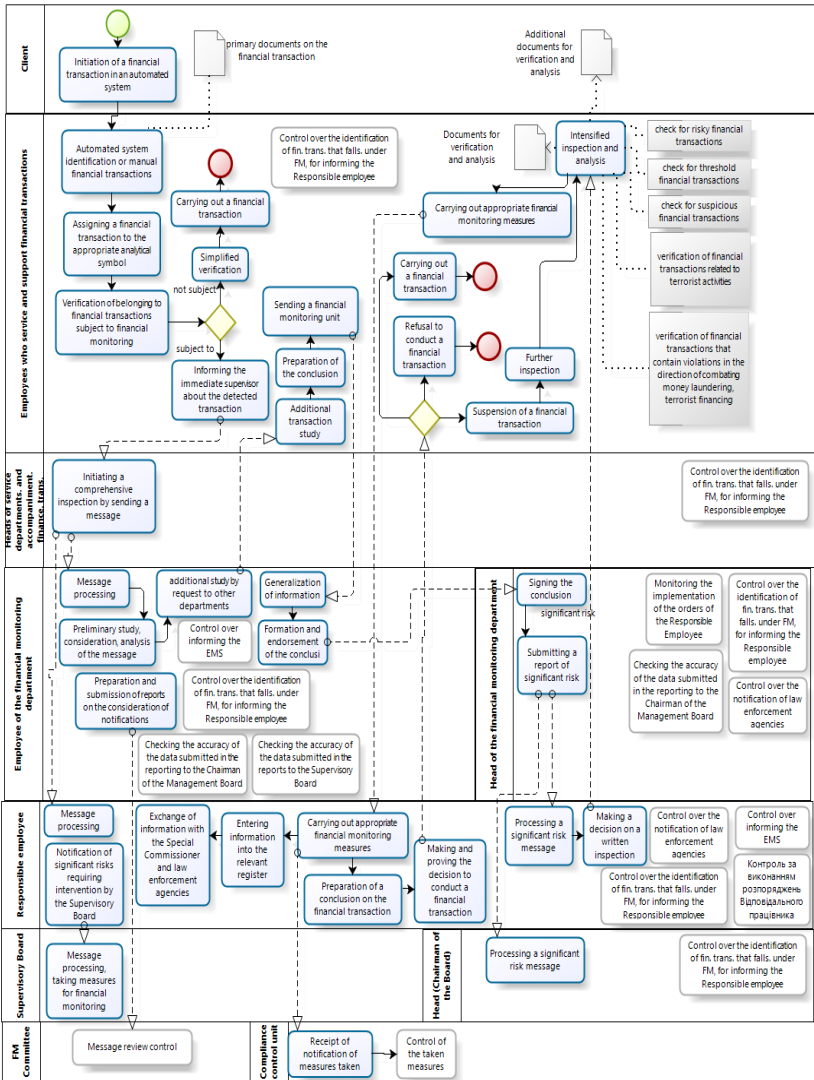


Figure 8. Scheme of the business process model of automated internal audit of financial transactions subject to financial monitoring for various economic agents

Source: developed by the authors

All transactions are assigned a corresponding analytical symbol.

The next step is to check the operations for belonging to financial deals that are subject to financial monitoring. According to the legal and regulatory framework, there are financial transactions that are subject to financial monitoring (Figure 9) by economic agents, which is carried out primarily through internal verification of such transactions.

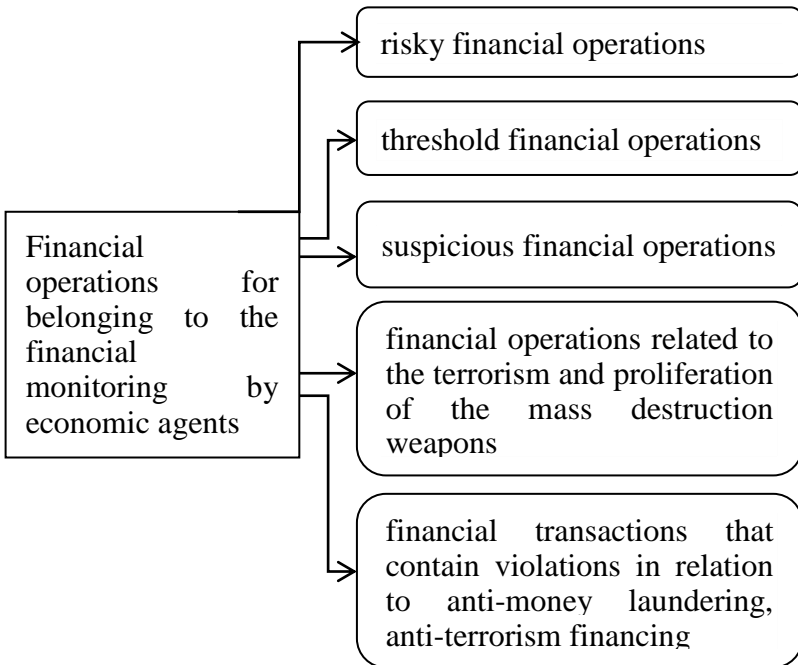


Figure 9. Financial operations subject to financial monitoring by economic agents

Source: developed by the authors

In general, the economic agent selects financial operations that may be subject to financial monitoring based on the risk portfolio of such a client (i.e., the client's financial operations do not provide a rational explanation and justification, are not typical, considering and comparing with information obtained by the economic agent during the client's proper verification procedures by the activity direction, social status, volume and size of business, the amount of income and profit); as well as the client's activities that were planned when establishing a business relationship with the client (taking into account the list of services that the client initially planned to receive, the planned volume of transactions).

The financial operations subject to financial monitoring, which are verified by economic agents include: risky financial transactions, threshold financial operations, suspicious financial operations, financial operations related to terrorist activities and proliferation of mass destruction weapons, financial operations involving violations in the direction of anti-money laundering, anti-terrorist financing.

Financial operations are risky if they have relevant features, and are differentiated depending on the type of client, the amount of financial operations, their regularity:

- one-time financial operation of an individual or regular (three or more per month) in the total amount equal to or exceeding 500 thousand UAH per month, and contain one or more features of risk;
- one-time financial operation of a natural person-entrepreneur or regular (three or more per month) in the total amount equal to or exceeding in equivalent 1500 thousand UAH per month, and contain one or more features of risk;
- one-time financial operation of a legal entity or regular (three or more per month) in the total amount equal to or

exceeding 2000 thousand UAH per month, and contain one or more features of risk;

- one-time financial operation of a legal entity (belonging to the corporate business segment) or regular (three or more per month) in the total amount equal to or exceeding the equivalent of 3,000 thousand UAH per month, and contain one or more features of risk.

Significant attention needs to be paid to the analysis of cash transactions that have risk features (Regulations on the application of measures of influence by the National Bank of Ukraine, approved by the resolution of the Board of the National Bank of Ukraine, as amended on 23.11.2020). These are the grounds for concluding that the transactions are related to the money laundering, withdrawal of financial capital, illegal transformation of non-cash funds into cash, tax evasion, fictitious business activities. This is done by unreasonably regular withdrawals of cash (to purchase goods, works, services, especially agricultural products, securities, scrap metal, waste paper; for economic needs; for administrative purposes; income from business activities; to further provide repayable or non-refundable financial assistance, savings, funds received non-cash from their accounts in other banks, from permanent counterparties related to the client, proxies, equity without contracts); unclear deposit of cash in accounts (to increase the authorized capital of legal entities; financial assistance; loan from the founder or ultimate beneficial owner; replenishment of deposit accounts with subsequent withdrawal of such funds in the short term; savings; for third parties who immediately or in the short term withdraw cash); transfer of funds outside Ukraine; regular receipt of non-cash funds, the origin sources of which are not confirmed; receipt of funds, the sources of which are unknown, through the Client-Bank and subsequent cash withdrawals through ATMs or retail chains;

receipt of funds from another bank with regular withdrawal of such funds in cash, without carrying out other operations on the account; purchase and sale of securities; conducting transactions under fictitious contracts of sale of goods, works, services; application of inappropriate conditions in insurance contracts; using accounts not for their intended purpose; using invalid claims agreements; payment of dividends to the founders or ultimate beneficial owners; regular purchase of goods, works, services, peculiar for one direction of activity, and sale of the corresponding ones in another direction; receipt of funds for goods and services with subsequent transfer of funds for these goods and services to another counterparty; collection of funds (correspondence of volumes); inappropriate turnover of funds on the account; etc.

Special attention should be paid to cash financial transactions with the following cash symbols (Instruction on cash transactions by banks in Ukraine, approved by the Board of the National Bank of Ukraine №103 from 25.09.2018, as amended from 23.11.2020 №148; Regulations on financial monitoring by banks approved by the resolution of the Board of the National Bank of Ukraine №65 of May 19, 2020) on cash withdrawal: 40 (cash withdrawal for expenses related to wages) - cash withdrawal to pay wages and travel expenses to fictitious employees, 45 (cash withdrawal to purchase agricultural products) - products may have a short shelf life and be written off overdue, or due to spoilage during transportation, storage; 53 (cash withdrawal to purchase goods, works, services) - cash withdrawal under the guise of operations related to ordinary business activities; 55 (cash withdrawal from current and deposit accounts of individuals) - the risk of rapid withdrawal of cash through short-term deposits, or early repayment; 58 (cash withdrawal from payment cards) - the risk of prompt access to cash anywhere in the world; 61 (cash

withdrawal for other purposes) - cash withdrawal without decoding the transaction purpose; 62 (cash withdrawal to pay rent for land use) - the risk of withdrawal of funds for expenses through fictitious persons; 63 (cash withdrawal to purchase secondary raw materials and scrap metal) - products can be quickly processed, due to the technological features of working with such products, it is difficult to control; 64 (cash withdrawal for financial assistance) - the risk of withdrawing cash through fictitious persons and for a purpose that is difficult to verify.

Features of cash risky transactions can be grouped according to the following characteristics: risky participants in financial transactions (founders of a legal entity are fictitious persons - mentally ill, disabled and incapacitated, students, retirees, foreigners, homeless, deceased, persons with invalid documents, foreigners; the founders do not live in the region of registration of the legal entity, the founders are registered in the territory that is not controlled by Ukraine, one person is the founder, director and chief accountant; frequent change of ultimate beneficial owners, executives, people who regularly cross the border with the country, to which sanctions are applied; unknown location of executives, small amount of authorized capital; legal entity without employees, lack of office, production facilities for the relevant activities; legal address coincides with the legal address of other enterprises, registration address of the participants in the transaction is common; similarity of the name of the legal entity with the name of large well-known enterprises; newly registered legal entities; legal entities that submit reports with a minimum amount of income; legal entities that have large amounts of income, but pay minimal amounts of taxes); risky financial and economic activities of transaction participants (a significant amount of financial turnover of funds on the newly registered

legal entity; the movement of funds on the legal entity on the account is absent; zero or minimum balance on the account at the end of the day; increase in the turnover of funds on the account at the end of the week; a significant number of participants in one transaction who have one registration address or location in different territorial units; a significant number of counterparties who transfer funds to the account with a significant number of different types of destination; the number of contracts, acts of execution, budget documents for works and services is much more than such an organization can perform); the risk nature of the financial transaction (inconsistency of the transaction to the essence of the legal entity; inconsistency of the transaction purpose to the essence of the legal entity; inconsistency of the transaction amount of the legal entity; transaction entanglement; significant cash flow from activities that do not involve such amounts of cash; a significant increase in funds on the account, which are transferred to one counterparty in a short time; a significant amount of cash placement on the account, which does not correspond to the essence of the legal entity; termination of further financial transactions or closing of accounts after a financial transaction for a significant or threshold amount; conducting transactions for the purchase and sale of goods, works, services without making other payments for the payment of wages, taxes, business activities; carrying out operations on purchase and sale of the goods, works, services the cost of which is difficult to estimate; inconsistency of the value of goods, works and services actually specified in the contracts, their market price; a significant number of identical transactions with the same counterparties for amounts that are less than the threshold, but in total are the threshold; significant withdrawal of funds from the account or withdrawal of funds from the account received on the same business day from

different legal entities; absence of penalties in clauses of the contract with contractors; the amount of fines under contracts is more than 10%; a significant number of transactions by power of attorney; carrying out transactions in securities with cash withdrawal from the account; a significant increase in funds on the account, which in the short term are transferred to the purchase of bearer securities; repeated financial transactions with promissory notes by a person who is not an official participant in the securities market, is not an issuer of promissory notes, does not act as a recipient of funds under the promissory note); risky scheme transactions by legal entities (first, funds with different payment purposes are transferred to the accounts of legal entities from certain legal entities, then they are withdrawn from the accounts in cash, mainly shortly after receipt, by proxies, related to creditors, as well as these proxies are proxies for other legal entities, and legal entities are mostly newly created, with sole management and owners, without declared income in the financial statements, with unpaid taxes; funds on the account of the legal entity in the bank come from the legal entity's own accounts from another bank, and then such funds are transferred to some individuals - employees of the legal entity as financial assistance, and they are withdrawn in cash; financial institutions transfer funds to the accounts of several legal entities related to the staff of the founders and management, for legal services of unknown value, with legal entities small authorized capital, low taxes, one of the founders is a politically significant person, then the funds are transferred to others individuals and legal entities with different purposes, and subsequent withdrawal of funds from cash accounts in amounts not exceeding the threshold; some legal entities transfer funds to other legal entities with the purpose of goods and services, and then the funds are transferred to individuals on business trips with their

withdrawal in cash, where such legal entities do not have employees in the state, and individuals do not work for such legal entities ; funds enter the accounts of legal entities with the purpose of payment for goods of one industry, and then withdrawn in cash from the purpose of purchasing goods of another industry, not related to the activities of such legal entity, legal entities with small authorized capital, sole management and owners, without income declared in the financial statements, with unpaid taxes; a number of legal entities transfer significant funds to the accounts of individuals, with the subsequent withdrawal of these funds in cash, where legal entities according to their financial condition are not able to conduct transactions for such amounts, participants in such transactions have invalid documents, one person has a power of attorney to dispose of accounts, a significant number of additional cards are issued to one individual by different persons, by individuals funds are transferred from one to another individual with a purpose for the economic activity development of a non-resident legal entity, after which funds are transferred to a legal entity, to a non-resident with a condition - in case of non-repayment of the loan on time, the non-resident legal entity becomes the property of the first individual, then the funds are spent abroad by cash withdrawal, or gambling and casinos, with individuals declaring small amounts of income and persons are connected via other legal entities; individuals register legal entities as fictitious persons with a difficult financial situation, for a fee, and in this case, fictitious persons do not perform the required duties, then other legal entities transfer funds to the accounts of such fictitious legal entities and withdraw cash; funds of some individuals are transferred to some individuals' accounts either non-cash or by cash replenishment of accounts through payment terminals, then the funds are withdrawn in cash or as payment for goods

and services, where the participants - unemployed or without official income; replenishment of the account of an individual from many individuals in cash through payment terminals for a significant total amount, with subsequent withdrawal of funds in cash or in the form of payment for goods and service, where such an individual has no official income; deposit of significant amounts of cash by individuals into their accounts and legal entities' accounts, with their subsequent withdrawal in cash and transfer to other card accounts or payment for goods and services, whereby such individuals do not work and do not receive official income; etc.), for state-owned enterprises (transfer of funds from state organizations to the legal entities' accounts as winners of tenders, where the legal entity is related to the state legal entity management; the state legal entity transfers funds to another legal entity with an appointment for goods, services, whereby goods and services are not actually supplied and are not provided; funds from a state legal entity are transferred for goods and services to a legal entity, then distributed and transferred to a significant number of fictitious legal entities and withdrawn in cash; transfer of funds from a state legal entity to another legal entity that has just registered, some funds are transferred to intermediaries to fulfill the tender conditions, and the other part is withdrawn in cash and transferred to the state legal entity employees' accounts and related persons, etc.), by politically significant persons, a politically significant person receives a mortgage loan from a bank for a significant amount, after a short time such a loan is repaid, and the income received by a politically significant person was declared in amounts that do not meet the ability to repay the loan in such lines; a person related to a politically significant person sells for a certain significant amount the corporate rights of a recently registered legal entity that owns property for a small amount and the

authorized capital for a certain significant amount, with the individual declaring insignificant income and funds for the acquisition of property rights received as a gift from the mother, who also declares a small income that does not correspond to the specified gift, then the proceeds from the sale of corporate rights are received in cash by a family member of a person associated with a politically significant), etc.

Financial transactions belong to the threshold operations (Law of Ukraine "On Prevention and Counteraction to Money Laundering, Financing of Terrorism and Proliferation of Mass Destruction Weapons" of December 6, 2019, № 361-IX) according to the following criteria: equal to or exceeding the equivalent of 400 thousand UAH (in the field of gambling and lotteries 30 thousand UAH) and when identifying one or more relevant characteristics (cash financial transactions; financial transactions of politically significant or related persons; financial transactions for the transfer of funds outside Ukraine; financial transactions on enrollment funds, transfer of funds, issuance or receipt of credit funds, other financial transactions, provided that at least one of the participants in the transaction is registered, lives, has an account in a banking institution in a country that does not participate in anti-money laundering and anti-terrorism financing actions).

Suspicious financial transactions (Law of Ukraine "On Prevention and Counteraction to Money Laundering, Financing of Terrorism and Proliferation of Mass Destruction Weapons" of December 6, 2019, № 361-IX) include these financial transactions, and attempts to carry out them, without reference to the transaction amount, but in the presence of suspicion or sufficient grounds for suspicion that financial transactions are related to criminal, illegal, terrorist activities, as well as the proliferation of mass destruction weapons. The economic agent who provides direct customer service constantly monitors the

features of business relations with a particular client, financial transactions conducted by the client during its business activities, and business relations with economic agents to identify suspicious financial transactions. The following information is checked and compared: the correspondence of data on the financial transaction and information about the client that the economic agent has, about the client's activities, shirts-portfolio to the client. Suspicious financial transactions are identified by analyzing the whole set of financial transactions that fall into the automated system of the economic agent, by the presence of indicators of suspicious financial transactions, defined by regulations, as well as the compliance of financial transactions information available to the economic agent and the client, especially the nature of its activities. This selection is carried out, including the use of built-in filters and directories in an automated system based on certain rules and scenarios.

Determination and verification of indicators of financial transactions suspicion ("Regulations on financial monitoring by banks" approved by the Board of the National Bank of Ukraine №65 of May 19, 2020) is in three main sections: indicators of suspicious nature, the client's business features, his or her behavior in establishing business relations, financial transactions (failure to obtain clear information from the client on his/her business nature; the client's understanding of the nature, specifics, features of its activities, financial transactions; unreasonable opening of accounts by a non-resident; failure of the client to provide data or provide doubtful, unreliable data necessary for identification and verification; inconsistency of the client's financial transactions to his/her risk portfolio; inability to communicate with the client on the contact details provided by him/her; avoidance of contact with representatives of the economic agent by the

client; nervous, atypical, inappropriate behavior, excessive interest in legal norms, requirements and restrictions on financial monitoring in contact with the client; unreasonably large number of accounts and cards; refusal of the client from transactions when requesting additional documents and information on such transactions; unreasonable insistence on speeding up non-regulatory transactions; offering the employee of the economic agent material remuneration for suspicious financial transactions; incomprehensible insistence by the client on service by the concrete worker of the economic agent; there is reason to believe that the transaction is carried out in favor of an unknown economic agent of third parties; non-payment or payment of taxes in very small amounts; control of various unrelated persons' accounts by one person; account control by a person unknown to the economic agent; suspicion indicators of direct financial transactions carried out by the client or he wants to conduct large and fast turnover of funds on the account during the day and small balances at the end of the day; significant changes in the amount of financial transactions by the client; significant turnover of funds without opening accounts; receipt of small amounts of funds on the client's account from a significant number of counterparties, with the subsequent aggregation of such funds and withdrawal to another person; account activity provides non-cash receipts with their withdrawal in cash, without the presence of other transactions; transfer of funds by a resident legal entity to a non-resident legal entity and, accordingly, receipt of funds by a non-resident legal entity from a resident legal entity; unsubstantiated transactions that do not correspond to the client's activities; a significant number of cash transactions that have no obvious connection with the client's business activities; discrepancy between income and expenditure transactions of the client; payments with unclear purpose; operations on

artificial formation of the client's authorized capital; significant discrepancy and incompatibility of payment details with information contained in the supporting documents; the amounts and volumes of the client's financial transactions do not correspond to those that are similar to the clients of his/her branch; unusual circulation of funds abroad; circulation of funds abroad in one transaction day by different persons, but with signs of connection; crediting funds from abroad with rapid withdrawal of funds received abroad; attempts to conduct transactions within one working day with different employees of the economic agent; turnover of funds between a legal entity and an individual - an employee of a legal entity; the client tries or conducts transactions with counterparties that have a negative background, reputation with the economic agent; the circulation of funds between the client and his/her counterparty, when there is reason to believe that they do not know each other; collection of funds for non-residents by non-profit organizations; refund of the counterparty bank owing to the refusal to conduct the transaction; circulation of funds with the appointment of borrowings between counterparties of unrelated groups of persons; repeated financial transactions for assignment of claims; significant collection of funds for the issuance of cash loans from the client's cash desk; a significant number of non-cash financial transfers to issue loans; a significant number of financial transactions for the issuance of loans without repayment operations for loans; issuance of funds by the client as credit to individuals who do not have a reasonable financial ability to repay them; receipt of only funds from the state, without other receipts; sending funds to the border with countries with a risk of terrorist activity branches of the economic agent; operations with the list of dual-use goods; permanent reimbursement of funds to persons who have not previously made payments; by the information on the use

of the merchant POS-terminal by an unknown third party; absence of revenue collection operations on the accounts of the retail client; purchase of a large number of impersonal cards by one client; receiving a significant number of payments online in the absence of trade on the Internet or online activities; conducting transactions on the account of an individual with signs of entrepreneurial activity; acquisition of assets in a short period with funds received from non-profit, charitable, religious legal entities; carrying out financial transactions for significant amounts and in large quantities on the accounts of an insurance company with certain properties - concluding insurance contracts on significantly unfavorable terms, concluding insurance contracts for amounts that do not meet possible risks, concluding insurance contracts for impossible risks, significant changes to contracts in short period, unreasonable increase of the sum insured, payment of insurance premiums for more than the contractual amount, insurance of inconsistent financial condition of the client's property, occurrence of the client in a very short period of the insured event, cash reimbursement of insurance payments, reinsurance under the same contracts significantly exceeding the previous ones, reinsurance of clients with unsatisfactory financial condition, invalid or forged documents for insurance payments, re-concluding an insurance agreement with a client who previously received insurance benefits, reinsurance of risks from an insurer with unsuitable financial condition, concluding articles an accounting agreement with a client who bears risks in relation to uninsured persons, concluding an insurance agreement with a limited list of documents for making insurance payments; cash life insurance with a one-time payment of the sum insured, termination of the insurance contract early with the withdrawal of funds in favor of a third party, the payment of sums insured by third parties, fairly large

payments of agency fees; suspicion indicators of different services and products of economic agents (as for cash transactions - inconsistency of clients' cash transactions to the type, nature, size, segment of its economic activity, repeated systematic cash transactions for significant round amounts, constant exchange of small banknotes for large banknotes confirmation of depositing cash proceeds for large amounts, depositing cash for insignificant amounts from many people with subsequent transfer of funds per person, repeated depositing funds by the client to his/her account with subsequent accumulated withdrawal of funds from the account within one transaction day, cash withdrawal for documentation unconfirmed settlements with counterparties in cash, withdrawal of cash from the client's account, for which no transactions have been carried out for at least six months, complete zeroing of several clients' accounts through one ATM or self-service terminal at the same time, the client's transactions through the payment terminal self-service for a large total amount, systematic purchase or sale of foreign currency for significant amounts of cash, unusual cash turnover of the client's business of more than a third of total turnover, cyclical circulation of cash through the client's account, the implementation of cash financial transactions with the avoidance of threshold transactions; regarding loan transactions - unreasonable repayment of a loan by a third party, absence of questions from the client regarding significant loan conditions and the client's interest in such conditions, the property guarantor is a third party unrelated to the client, misuse of loan funds, overdue loan repayment from sources not clear to the bank, repayment of a long-term loan in a very short time, obtaining a loan by a client is economically impractical, a loan on deposit; regarding securities transactions – economic inexpediency of securities purchase or sale transactions,

closed-end securities purchase or sale transactions, purchase or sale of illiquid securities for a significant amount, non-market purchase or sale price of securities, complex and confusing nature of securities transactions, purchase or sale securities not listed on the stock exchange, regular circulation of securities with one counterparty unrelated clients, settlement period on securities transactions more than two weeks, unreliable, inaccurate, erroneous, fictitious supporting documents on securities transactions, short-term growth of the client's securities portfolio, there are suspicions that the ultimate beneficiary of securities transactions is an unknown third party, the presence of client requests from the Specially Authorized Body for Financial Monitoring or law enforcement agencies, banks, regular unprofitable financial transactions with securities, purchase and sale of some securities by the client on the same day or for a short period, unreasonable investment income; as for trade transactions - setting non-market and inappropriate prices of goods and services, inaccurate information about the quantity, volume, types, categories of goods for export or import, unclearly complex and confusing nature of the financial transaction, inappropriate use of letters of credit, unreasonable import or export of goods according to foreign trade contract, supply of goods under the terms of the foreign trade contract to those related to money laundering, terrorist financing and proliferation of mass destruction weapons in the countries or transit of goods through such countries, economically unreasonable route of good transit, making significant or repeated changes to the terms of the letter of credit agreement; regarding transactions related to storage of valuables – the client's unusual behavior, use of three or more cells by one client, incomprehensible use of the safe by a legal entity, visit of the client to the safe before depositing cash, use of the safe by a trustee; as for online transactions - conducting

online banking operations by unrelated persons from one or similar IP addresses, discrepancy between the actual location of the client when conducting transactions and data in the bank about the client's location when using online banking).

Financial transactions related to terrorist activities and the proliferation of mass destruction weapons involve the use of funds for the direct or indirect financing of terrorism, the preparation or commission of terrorist acts, the involvement in terrorist activities, public incentives and calls for terrorist acts, groups, assistance in carrying out terrorist acts, training in terrorist acts, crossing the border of Ukraine to commit terrorism, financing the proliferation of mass destruction weapons; participation in the transaction, persons included in the lists of terrorists or related persons (Law of Ukraine "On Prevention and Counteraction to Money Laundering, Terrorism Financing and Financing of the Proliferation of Mass Destruction Weapons" of December 6, 2019, № 361- IX).

An economic agent, when attempting to conduct a financial transaction that may relate to terrorist activities, regardless of the amount for which the transaction is carried out, must immediately, but not later than one hour after blocking the transaction, notify the Responsible Officer and immediate supervisor; make copies of the identification documents of such a person; to carry out additional research on the client; provide the client to fill in the questionnaire; request additional information on contractors; take a written explanation of the purpose, the essence of the financial transaction from the client. Then the employee from the financial monitoring department studies and analyzes the obtained data by conducting an additional check on the financial transaction participants. A Responsible employee decides to classify the transaction as terrorism-related and, accordingly, to block the transaction, or resume the transaction and unlock it.

Financial operations that contain violations in the direction of anti-money laundering, anti-terrorist financing are financial transactions that violate the regulations of domestic and foreign law, norms, recommendations of international, intergovernmental organizations in anti-money laundering, anti-terrorist financing, proliferation of mass destruction weapons.

If the operation is not subject to financial monitoring, a simplified check is performed on such a transaction. Then the transaction is successfully completed by the economic agent and the process is completed.

If the transaction is identified as subject to financial monitoring, the employee which is responsible for conducting and verifying the financial transaction shall inform his/her supervisor of the detection of this transaction.

The head of the structural department where there was an attempt to make a financial transaction, subject to financial monitoring, initiates an intensified inspection of the client's operations by sending a message to the Financial Monitoring Department and the Personnel responsible for financial monitoring. Moreover, the Responsible Employee must be notified for different types of transactions in due time: for threshold financial transactions - within two working days from the date of their implementation or attempt to perform; on suspicious financial transactions - as soon as there is a suspicion of financial transactions or sufficient grounds for suspicion. Technically, the notification of financial transactions is affixed by selecting a certain date in the automated system among all transactions using filters of the required transaction according to criteria and indicators; affixing the appropriate mark-comment on the operation with the code and the operation criterion name. One should note that the methods and forms of financial transaction messages that contain violations

in anti-money laundering, anti-terrorist financing have own features: methods of submission (sending a letter in the prescribed form to e-mail Financial Monitoring Department; agent with a note for the Financial Monitoring Department, by filling out an electronic message form on the internal portal of the economic agent, by creating an electronic message on the external website of the economic agent); the content of the message (surname, name, patronymic, e-mail address, position of the economic agent; essence of the financial transaction containing violations in anti-money laundering, anti-terrorist financing - date of financial transaction, amount of financial transaction, currency of financial transaction, participants of the financial transaction, their functions, content of the financial transaction, form of settlements, type of asset, how such financial transactions were identified, list of signs of money laundering and terrorist financing, data on final beneficiaries, information on third parties related to the financial transaction on money laundering, terrorist financing, list of supporting documents regarding the financial transaction).

The employee of the Financial Monitoring Department conducts a preliminary study, verification and analysis of the notification (within ten working days from the next working day after receiving the message, if necessary, the review period is extended) if required for additional study of transaction information. The relevant units of the economic agent study the transaction (within seven working days from the date of receipt of the request from the Financial Monitoring Department), prepare an appropriate conclusion and send it to the Financial Monitoring Department.

Then the employee of the Financial Monitoring Department summarizes the information, forms a reasoned conclusion (the information regarding the message, the date of the transaction,

the suspect, the essence of the message describing transaction parameters, circumstances, facts, comments on the studied information, result of consideration are given clearly, logically, consistently, fully, comprehensively); the employee of the Financial Monitoring Department approves the conclusion, head of the Financial Monitoring Department signs it. Upon confirmation of significant risks, an immediate message about the study results of a financial transaction with significant risk for taking appropriate measures is sent to the Responsible Employee and the Head of the Economic Agent (Chairman of the Management Board). All messages are registered in the message registers. Then the Responsible Employee decides to intensify the verification of the transaction.

The next step is to intensify the verification and analysis of transactions depending on the type of financial transactions subject to financial monitoring, audited by economic agents: risky financial transactions, threshold financial transactions, suspicious financial transactions, financial transactions related to terrorist activities and proliferation of mass destruction weapon, financial transactions involving violations in anti-money laundering and anti-terrorist financing.

Intensified verification and analysis of the client's transactions subject to financial monitoring are carried out using the following documents available to the economic agent, and additional documents requested from the client: for individuals - documents confirming the sources of funds (of sale contracts of movable and real property, documents on inheritance, on the gift of property, documents on dividends, documents on winnings, etc.); statements and certificates of accounts from other financial institutions; explanation from the client in writing with a detailed description of the features and nuances of the transaction legality, and the subsequent use of the received cash; data from the questionnaire; other

documents at the request of the economic agent; for legal entities - financial reports in the form of balance sheets, statements of financial performance, declarations and other forms of financial statements; documents on paid tax payments; documents on profit distribution; reports and certificates of accounts from other financial institutions; agreements, contracts; explanation from the client in writing with a detailed description of the features and nuances of the legality of the transaction, and the subsequent use of the received cash; data from the questionnaire; founding documents; other documents at the request of the economic agent.

The responsible employee organizes and carries out relevant financial monitoring measures. Messages are entered into the appropriate registers, information is exchanged with the Specially Authorized Body, if necessary, by law enforcement agencies. If necessary, the Responsible Employee of the Economic Agent sends messages regarding significant risks to the Supervisory Board if there is a need for its intervention (in turn, the Supervisory Board receives messages of substantial risks and takes appropriate measures for financial monitoring).

Business processes of automated internal audit of financial transactions subject to financial monitoring for various economic agents are properly controlled at all stages. Control over the timely identification of financial transactions subject to financial monitoring, as well as information about such transactions Responsible employee is entrusted to employees and heads of departments of the economic agent, which within its authority to service, support financial transactions of the client, employees and heads of departments monitoring of the economic agent, the Chairman of the Management Board, the Responsible Employees; such control is constantly carried out. Control over the consideration of messages is entrusted to the

Financial Monitoring Committee, to which the Financial Monitoring Department reports quarterly on the results of the examination of messages on financial transactions subject to financial monitoring.

The control over the timely informing of the Specially Authorized Body is entrusted to the employees of the financial monitoring unit and the Responsible employees of the economic agents; such control is constantly carried out. Control over the timely informing of law enforcement agencies is entrusted to the employees of the Financial Monitoring Department and the responsible employees of economic agents; such control is conducted when providing such messages. Control over the proper execution of orders and directives of the Responsible Employee of the Economic Agent is entrusted to the employees from the Financial Monitoring Department and the Responsible Employees of the Economic Agents; such control is constantly carried out.

The Compliance and Supervision Department control the measures taken for financial monitoring to which the Responsible Employee reports on a quarterly basis and in response to individual inquiries. The employees and the head of the Financial Monitoring Department verify the accuracy of the data submitted in the reports to the Chairman of the Management Board; such verification is performed once a month before reporting. The employees and the head of the Financial Monitoring Department verify the accuracy of the data submitted in the reports to the Supervisory Board; such inspection is carried out once a year.

After a thorough study of the financial transaction subject to financial monitoring, the Responsible Officer prepares a general conclusion, initiates consideration of the decision and makes a decision in the form of an order or order to conduct a financial transaction: permission to conduct financial

transactions and complete the process; refusal to conduct a financial transaction, notification of the client and entry of data in the relevant register, notification of the Specially Authorized Body, and completion of the process; suspension of the financial transaction, initiation of further verification, entry of data into the relevant register, notification of the Specially Authorized Body.

After a thorough study of the financial transaction subject to financial monitoring, the Responsible Employee prepares a general conclusion, initiates consideration of the problem and makes a decision in the form of an order to conduct a financial transaction: permission to conduct financial transactions and complete the process; refusal to conduct a financial transaction, informing the client and entry of data in the relevant register, informing the Specially Authorized Body, and completion of the process; suspension of the financial transaction, initiation of further verification, entry of data into the relevant register, informing of the Specially Authorized Body.

One should note that all measures and actions of employees and responsible persons of the economic agent to identify financial transactions that are subject to financial monitoring must be documented. The date of information receipt, position and signature of the employee of the economic agent are fixed. All documents received about the client regarding the proper inspection and study of the client, supporting documents, are formed in the client's case.

One should also note that the circulation, accounting, and storage of information on transactions that fall under the financial monitoring, have their own features: the data has the status of banking and trade secrets; it is forbidden to leave documentation in electronic and paper form unattended; it is forbidden to acquaint and study information with persons who do not have a special permit; copy, duplicate documents on

such transactions for purposes not provided for in the financial monitoring procedures.

Thus, the business process model of internal verification of financial transactions subject to financial monitoring by economic agents involves several stages: initiation of a financial transaction by a client, identification of a transaction by an automated system of an economic agent and assigning it an analytical symbol, preliminary and, if necessary, additional study and consideration of transactions subject to financial monitoring, conducting, if necessary, enhanced verification of the client's financial transactions (verification of risky financial transactions, verification of threshold financial transactions, verification of suspicious financial transactions, verification of financial transactions related to terrorist activities, verification of financial transactions that contain violations in anti-money laundering, anti-terrorist financing), conducting appropriate financial monitoring measures, making decisions on conducting a financial transaction. In turn, the relevant officials supervise all stages of the internal audit of financial transactions subject to financial monitoring depending on their responsibilities.

Development and implementation of an effective automated internal verification model by economic agents of financial transactions subject to financial monitoring will allow identifying risky financial transactions, threshold financial transactions, suspicious financial transactions, financial transactions related to terrorist activities and financing terrorism at an early stage, financial transactions involving violations in anti-money laundering, anti-terrorist financing, financing the proliferation of mass destruction weapons to prevent the release of criminal funds into the economy. It will help stop and hinder these operations, identify new sources, channels, participants, funding schemes for illegal income,

identify and apply appropriate, practical ways and methods to prevent, combat money laundering, terrorist financing, the proliferation of mass destruction weapons through legal economic agents.

4. DEVELOPMENT OF TEMPLATES OF INPUT AND OUTPUT DOCUMENTS, MESSAGES RELATED TO THE BEGINNING OF INSPECTIONS AND OBTAINED MONITORING RESULTS (ON THE EXAMPLE OF UKRAINE)

Given the annual plan of banking and non-banking institutions inspections by the National Bank of Ukraine on financial monitoring, compliance with currency and sanctions legislation for 2021 (Table 16), as well as the report of the State Financial Monitoring Service of Ukraine for 2020 on the results of inspections (Table 17), fruitful work carried out by coordinating, regulatory bodies in the financial monitoring can be traced.

Table 16. Annual plan for inspections of banking and non-banking institutions by the National Bank of Ukraine on financial monitoring, compliance with currency and sanctions legislation for 2021

1 st quarter	2 nd quarter	3d quarter	4 th quarter
Banking institutions			
JSC "ALPARI BANK"	JSC "A-BANK"	JSCB "INDUSTRIALBANK"	JSC "CB "ZEMELNY CAPITAL"
JSC "FIRST INVESTMENT BANK"	JSC "BANK SICH"	JSC "UKRAINIAN BANK FOR RECONSTRUCTION AND DEVELOPMENT"	PSC "MTB BANK"
	JSC "OSHCADBANK"	JSC "VCB "KONKORD"	JSC "RVC BANK"
	JSC "BANK 3/4"	PSC "BANK VOSTOK"	JSC "UKRBUDINVESTBANK"
	JSC "MEGABANK"	JSC "SBERBANK"	JSC "UNIVERSALBANK"
Non-banking institutions			
LLC "FC Elaence" (USREOU-Code 38905834)	JSC UKRPOSHTA (USREOU-Code 21560045)	LLC "SWIFT GARANT" (USREOU-Code 39859339)	LLC "E-PAY" (USREOU-Code 36495136)

continued Table 16

TDV "SK" PREMIER GARANT PROFI "(USREOU-Code 37689635)	LLC "FC" FRASER "(USREOU-Code 42013017)	LOMBARD DONCREDIT LLC "INTER-REALITY COMPANY" (USREOU-Code 30416462)	TD "LOMBARD" "HROSHI TUT" "WITH THE PARTICIPATION OF DISCOUNT SALE, LLC CENTER FOR FINANCIAL SERVICES MARKET DEVELOPMENT (USREOU code 35197210)
JSC "IC" VARTA "(USREOU code 14080209)	PJSC SK "ALLIANCE" (USREOU code 32495221)	LLC "FC MARE" (USREOU code 40996391)	Credit union "EXPRESS CREDIT UNION" (USREOU code 39045012)
PJSC "Insurance Company ASKO- Medservice" (USREOU code 13550765)	PJSC IC "Insurance House" (USREOU code 23364325)	LLC "FC ACTIVITIES" (USREOU code 38800017)	PA "IT LOMBARD" WITH THE PARTICIPATION OF "DATE TRADE" LLC, "CITY TRADE COMPANY" LLC (USREOU code 40104950)
PJSC IC FINEX (USREOU code 22321992)	LLC "FC FALCON" (USREOU code 42114342)	LLC "FC" OMEGA GROUP "(USREOU code 41883355)	LLC FC "Systema" (code USREOU 37453888)
	LLC "FC" INVEST- SERVICE" (USREOU code 41738672)	LLC "FC" FINHELPPHARM" (USREOU code 40027358)	LLC "ALPHA-LEASING UKRAINE" (USREOU code 33942232)
	LLC FC "ARTFIN" (USREOU code 38488377)	LLC "POST FINANCE" (USREOU code 38324133)	LLC "FC INTERLEASING" (USREOU code 41765203)
	LLC FC "KONGUR" (USREOU code 41962174)	"Hromada" Credit Union (USREOU code 24108251)	LLC "ULF-FINANCE" (USREOU code 41110750)
	TDV IC "GRANITE" (USREOU code 42217958)	LLC "LAVRIN FINANCE" (USREOU code 40369854)	LLC FC "OKTAVA FINANCE" (USREOU code 39628794)

Source: developed by the authors based on the plan of inspections on financial monitoring, compliance with currency and reorganization laws (2021)

Thus, in 2021, the NBU appointed 17 banking institutions and 32 non-banking institutions to verify compliance with the requirements of financial monitoring. Also, according to the report of the SCFM of Ukraine on the results of inspections for 2020, 1036 materials were handed over to law enforcement and intelligence agencies by the State Financial Monitoring Service of Ukraine, including 607 generalized materials and 429 additional generalized materials.

Table 17. Report of the State Financial Monitoring Service of Ukraine for 2020 on the results of inspections

Law enforcement and agencies	Number of generalized materials, pcs.	Number of additional generalized materials, pcs.
Office of the Attorney General	14	48
State Fiscal Service of Ukraine	214	78
National Police of Ukraine	198	35
Security Service of Ukraine	119	133
National Anti-Corruption Bureau of Ukraine	54	114
State Bureau of Investigation	7	21
Foreign Intelligence Service of Ukrain	1	0

Source: developed by the authors on the based of the report of the State Financial Monitoring Service of Ukraine (2020)

The results obtained by the financial system after such control measures and inspections indicate a well-chosen course aimed at organizing a comprehensive system of cross-checks of economic agents by both external bodies and internal units, in terms of taking appropriate financial monitoring measures.

Despite the fact that the issues of financial monitoring have been the focus of a wide range of scientists and economists, aspects of this area remain undiscovered. Thus, scientists Leonov, S., Yarovenko, H., Boiko, A., & Dotsenko, T. (2019)

investigate the information system for monitoring banking operations related to money laundering; Vovk, V., Zhezherun, Y., Bilovodska, O., Babenko, V., & Biriukova, A. (2020) consider financial monitoring in a bank as a market instrument in the conditions of innovative development and digitalization of the economy; Lyeonov, S., Žurakowska-Sawa, J., Kuzmenko, O., & Koibichuk, V. (2020) disclose gravitational and intellectual data analysis by assessing the risk of money laundering by financial institutions.

Kuzmenko, O., Šuleř, P., Lyeonov, S., Judrupa, I., & Boiko, A. (2020) select data and analyze bifurcations of money laundering risk involving financial institutions; Yashina, N. I., Kashina, O. I., Pronchatova-Rubtsova, N. N., Yashin, S. N., & Kuznetsov, V. P. (2021) describe financial monitoring of financial stability and digitalization in federal districts.

Inspections play an important role in both financial and economic and other areas. The need to increase the total volume of medical examinations in primary care is being studied by scientists Sallis, A., Gold, N., Agbebiyi, A., James, R. J. E., Berry, D., Bonus, A., Chadborn, T. (2021); Cheng, X., Wang, J., & Chen, K. (2021) describe the meaning of the policy of further checks to combat poverty; safety testing is performed by specialists Huang, G., Yang, L., Zhang, D., Wang, X., & Wang, Y. (2021); Kidido, J., Wuni, I., and Ansah, E. (2021) reveal the need for verification in construction; Fan, M., Wei, W., Xie, X., Liu, Y., Guan, X., & Liu, T. (2021) emphasize mandatory software testing.

The successful operation of institutions and organizations largely depends on the pattern of processes and the typicality of the documentary component. This is confirmed by the study of

the effective use of templates in the medical field by scientists Koley, S., Dutta, P. K., and Aganj, I. (2021); Krause, M., Kamal, M., Kruber, D., Halama, D., Hierl, T., Lethaus, B., & Bartella, A. K. (2021); Positive aspects of the application of templates in technology and engineering are highlighted by scientists Wadhvani, K., and Awate, SP (2021), Weng, Y., Zhang, W., Jiang, Y., Zhao, W., and Deng, Y. (2021), Xu, Y., Zhang, J., & Brownjohn, J. (2021). Patterns are no less important in the economic sphere.

The procedure for conducting audits of the subjects of primary financial monitoring for internal audits is determined by internal instructions and regulations of the economic agent, and for the requirements of individual regulatory authorities responsible for financial monitoring.

The subjects of primary financial monitoring compile various types of reports and outgoing notifications for incoming requests and documents related to financial monitoring.

The Bank's internal audits of financial monitoring are performed by the following structural units of the banking institution: financial monitoring unit, financial monitoring committee, customer examination commission, internal audit unit, audit and control unit, compliance control and supervision unit, risk unit, Board, Supervisory Board. The scheme of the structure of incoming and outgoing documents, messages related to the start of internal inspections and the obtained monitoring results is shown in Figure 10.

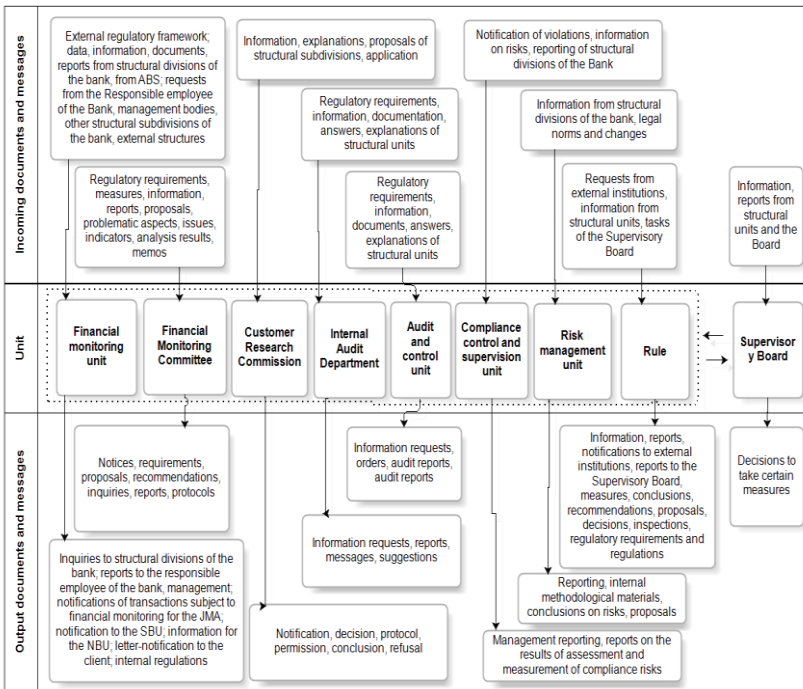


Figure 10. Scheme of the structure of incoming and outgoing documents, notifications related to the start of internal inspections and the obtained monitoring results

Source: compiled by authors

To ensure the organization and functioning of the bank's effective system for combating money laundering, terrorist financing and financing the proliferation of weapons of mass destruction and in accordance with the Regulation on financial monitoring by banks, approved by the National Bank of Ukraine from 19.05.2020 № 65, in the bank organizes a financial monitoring unit. The input documents of the financial monitoring unit are: external regulatory framework; data, information and documents from structural divisions of the

bank, from the automated banking system, regarding clients and transactions that may be subject to financial monitoring; reports from structural divisions of the bank; inquiries from the Bank's Responsible Officer for financial monitoring, inquiries from governing bodies, inquiries from other structural divisions of the bank, inquiries from external structures. The source documents of the financial monitoring department are: inquiries to the structural divisions of the bank; reports to the responsible employee of the bank on financial monitoring and management; notifications of transactions subject to financial monitoring for SOU (Standard of the Organization of Ukraine) (notifications of financial transactions, notifications of suspicious financial activity, notifications of differences in ultimate beneficial owners, notifications of customer refusals, notifications of freezes and thaws of assets); notification to the SBU (information on the freezing or thawing of assets by clients who are included in the List of people or ultimate beneficial owners to whom sanctions have been applied, as well as those who are included in the list of terrorists); information for the NBU (on the results of inspections); letter-notification to clients (on suspension of relevant financial transactions, refusal to establish business relations with the client, refusal to service, refusal to conduct financial transactions, freezing of the client's assets or assets on the financial transaction frozen by the economic agent); internal regulations.

In compliance with the requirements of the Regulation on financial monitoring by banks of the NBU №65 (2020), a committee on financial monitoring is formed - a collegial permanent internal body of the banking institution, which manages the risks of money laundering, terrorist financing, proliferation destruction of the banking institution and minimizes such risks in accordance with the powers granted to

it by the Management Board of the Bank. The Committee on Financial Monitoring considers issues related to the following aspects: legislative changes in the direction of combating money laundering, prevention of terrorist financing, proliferation of weapons of mass destruction; the results of evaluation of new products and services of the bank, their inherent risks of money laundering, terrorist financing; problematic aspects of due diligence of clients, especially politically significant, and related persons; cases of refusal of clients from service for prevention of realization of risky processes. Incoming documents related to the tasks of the Financial Monitoring Committee contain the following information: requirements of the NBU as well as regulations on the management and minimization of risks of money laundering and terrorist financing; features of internal interaction of structural subdivisions of a banking institution in terms of management and minimization of risks of money laundering and terrorist financing; measures to reduce, limit, regulate the risk of money laundering, bringing it to an acceptable level; information and reports on monitoring the business relations of the banking institution and its clients, their financial transactions in terms of financial monitoring; proposals to refuse to continue business relations with clients; problematic aspects and issues of proper customer due diligence; legislative changes on combating money laundering and terrorist financing; indicators for assessing the bank's products and services, their levels of risk; problematic aspects of training of bank employees; problematic aspects of establishing and continuing business relations with politically significant and related persons; the results of the analysis of the received reports on violations of anti-money laundering in the work of the bank; unresolved issues for compliance by the banking institution with the requirements of the legislation on

financial monitoring. Members of the Financial Monitoring Committee submit input information in the form of a memorandum, which includes the following information: name of the agenda item, brief description of the issue, name and position of the speaker, time of the report, description of the proposed draft decision, available materials, name structural unit of the bank, which submits the issue for consideration. The source documents related to the tasks of the Financial Monitoring Committee contain the following notifications and requirements: proposals and recommendations to other structural units, committees and commissions, the bank's board on certain issues on which the Financial Monitoring Committee has no right to make decisions; requirements to banking structural subdivisions to fulfill the decisions of the financial monitoring committee within the established terms; notification of the appointed responsible persons to implement the decisions of the Financial Monitoring Committee; inquiries, requirements for explanations by the management of the relevant structural units of the bank; requirements and requests to the structural divisions of the bank to provide certain information; reporting of the committee on financial monitoring (general information about the work of the committee, organizational features of the committee, input issues and initial results decided by the committee in the reporting year, feedback on the implementation of structural units of the committee). The initial information of the Financial Monitoring Committee is made out by the minutes of the meetings of the Financial Monitoring Committee, which contains data: number of the minutes, date of the minutes, form of the meeting, composition and number of voters, composition and number of attendees, list of members of the Financial Monitoring Committee, list of guests, quorum reached, agenda, composition of speakers, results of voting, description of

decisions, proposals, recommendations, instructions, deadlines for implementation of decisions, structural units responsible for implementation, date of next meeting of the Financial Monitoring Committee; name, positions and signatures of participants.

In compliance with the requirements of current legislation of Ukraine, regulations of the NBU, as well as the internal needs of the bank, a commission is organized to study clients, which evaluates the feasibility of establishing or continuing business relations with clients, conducting financial transactions for clients that are politically significant or persons associated with them. Input documentation and materials for the client study commission contain the following information on public figures, relatives of public figures, related persons with public figures, received from clients, collected by bank employees on identification, verification and study of clients, explanations of heads of relevant departments , proposals for establishing or renewing relations with the client, the application is made by the initiating unit (application number, application date, name or name of the person, client category and comment on how the client belongs to a certain category (public person close to the public person public person), the purpose of establishing business relations (opening a current account, opening a card account, opening an account for payment of wages, social benefits, pensions, concluding an agreement without the need to open an account, opening a deposit, obtaining credit, securities transactions, etc.) , or a list of services provided by the client nt already uses (current account, card account, payment of wages, social benefits, pensions, service under the contract without the need to open an account, deposit, loans, securities transactions, etc.), or a description of a one-time financial transaction, a list of documents that must be submitted to the application separately for an individual (copy

of passport, copy of TIN, questionnaire, financial statements, ie tax return, declaration of property, income, expenses and liabilities of a financial nature, etc.), individual entrepreneur (copy of passport , copy of TIN, USR extract and information from USR, questionnaire, financial statements, ie tax return, etc.), legal entity (copy of passport and TIN of persons indicated in the card with sample signatures, questionnaire, ownership structure, extract and information with USR, financial statements, etc.), position, name and signature of the person to whom the application is made, position, name and signature of the head of the initiating unit. The initial message of the commission for the study of clients is a decision, made in the form of a protocol (has the following structure: number, date, chairman, attendees, guests, agenda, description of issues for consideration, decision on each issue, indicating the name or name of the client, decision on it, list of measures, description of the conclusions of the commission for studying clients in relation to persons provided separately, name and signatures of the chairman of the commission, deputy chairman, members of the commission, secretary of the commission), permit (has the following structure: date, name of permit, number and date of protocol description of permitted or refused measures, name or name of the person who exactly belongs to public figures, position, name and signature of the person responsible for granting the permit), notification (has the following structure: resolution of the responsible person, date, name of the notification, name or name of the person, number and date of the protocol, the conclusion of the commission, position, name and signature of the responsible member of the commission is provided separately), the conclusion (has the following structure: date, name, name or name of the person, category client's comment and comment on how the client belongs to a certain category (public person,

close to a public person, related to a public person), the purpose of establishing business relations (opening a current account, opening a card account, opening an account for payment of wages, social income, pensions, concluding an agreement without the need to open an account, open a deposit, obtain credit funds, securities transactions, etc.), or a list of services that the client already uses (current account, card account, payment of wages, social income, pensions, services under the agreement without the need to open an account, deposit, loans, securities transactions, other, if there are account numbers and account balances), or a description of a single financial transaction, the conclusions of the relevant departments of the bank (security, risks, lawyers, customer service, financial monitoring), list of relevant comments of subdivisions of the bank to the package of documents, to the questionnaire, sufficiency of information available for analysis, its reliability, remarks on the client's reputation, his financial condition, conclusion on approval, refusal or sending for revision, position, name and signature of the secretary and chairman of the commission), formed on the basis of the conclusions of the relevant departments and the analysis of the commission for the study of clients on the possibility of establishing new business relationships with the client or continue existing ones with public figures, relatives or persons related to them; regarding the bank's refusal to serve the client; regarding temporary suspension, blocking.

According to the Regulation of the NBU on the organization of internal audit in banks of Ukraine, approved by the Board of the National Bank of Ukraine dated 10.05.2016 № 311, banks have an Internal Audit Department to control the internal activities of the bank and as a subsidiary body to perform supervisory functions in terms of inspection and evaluation efficiency of work of structural divisions of bank in various

directions, and system of interbank control). Any area of banking is subject to internal audit, including compliance with financial monitoring. The input documents of the internal audit department are: requirements of legislation and regulations; information and documentation obtained from the automated banking system, databases, electronic or paper archive; informational and documentary answers and explanations of the audited structural units on the organization of their activities, customer service (data of the electronic card of the client and tabs financial monitoring of the electronic questionnaire about the client, identification, financial, statutory information, documents on financial monitoring, questionnaire, electronic archive, primary documents, settlement and cash documents, contracts, as well as postings on the client's financial transactions, movement and balances on accounts). The source documents of the internal audit department are information requests to the audited structural units on the organization of their activities and customer service and requests on the status of implementation of recommendations based on the results of the audit; reports on scheduled and unscheduled audits (they have the following structure: purpose, subjects, scope, scope and directions of audits, audit methods, list of documentation and information for analysis, list of audit issues and processes, list of clients, their accounts and of audited transactions, list of comments, list of internal regulations that were violated, list of violations required to take measures and recommendations, deadlines for elimination of violations, position of name and signature of responsible auditors, position, name and signature of persons responsible for the audited unit); written information notices, proposals and reports for the relevant decisions and certain measures taken by the Supervisory Board and the Management Board.

To conduct inspections of the work of structural units and fulfill the requirements of internal regulations, an audit and control unit is formed. The input information for the audit and control department is: requirements of internal banking regulations; information and documents obtained from the automated banking system, databases, electronic or paper archives; informational and documentary answers and explanations of audited structural units on their activities, customer service of the bank (data of the electronic card of the client and tabs financial monitoring of the electronic questionnaire of the client, identification, financial, statutory data, documents on financial monitoring, questionnaire, electronic archive, primary documents, settlement and cash documents, contracts, as well as postings on the client's financial transactions, movement and balances on accounts). The source documents of the audit and control unit are information requests to the audited structural units to conduct their activities and customer service and requests on the status of implementation of the recommendations provided by the audit; audit order (indicate the number and date of the order, the subject of the order, a description of the necessary actions and structure, position, name and signature of the authorized manager); audit report (has the following structure: date of the act, type of audit, name of the audited structural unit, period of audited data, basis of audit, position and name of the responsible employee of the audit and control unit, position and name of the responsible person of the structural unit, audit period, structuring and description information on the directions of inspections, signatures of responsible persons); audit report (date, position and name of the responsible employee of the audit and control unit, audit topic, subject and scope of inspection, accompanying information, conclusions,

description of the established inspection results, signatures of responsible people).

In order to regulate compliance risk management of the bank, as well as to comply with the law and the Regulation on the organization of internal control in banks of Ukraine and banking groups (2019), banking institutions create a compliance control and supervision unit to help control problematic aspects. include financial monitoring (regarding non-compliance with legal requirements, prevention of financial crimes, settlement of reputational risk, minimization of financial services risk, risk management of bank employees' behavior, risks of conflict of interest, unacceptable behavior, risk management of internal banking processes, bank violations). The input base for compliance and oversight inspections is quite broad, as it covers a significant number of areas to be analyzed and verified. Thus, as an input base of the compliance control and supervision unit, we note: reports of violations (unacceptable behavior, violations in the work of the banking institution, compliance risks, signs of such risks, reports of conflicts of interest), information on risks detection and monitoring of compliance risks); reporting of structural subdivisions of the bank (information on the current state of compliance risk management, measures to avoid or reduce the impact of such risks, proposals for managing such risks, reports on inspections and results of inspections of structural subdivisions, reports on financial monitoring, information on inspections of structural subdivisions , information on the measures taken to improve the internal banking system of financial monitoring, information on the use of the bank in illegal transactions, other additional reports on compliance risks, minutes of meetings of certain bodies of the bank). Accordingly, the source documents and reports on inspections of the compliance control and supervision unit are extensive:

management reporting (on products, processes, activities, cases of violation of the law, cases of violation of internal requirements of the bank, cases of unreliable reports, significant legislative changes, on measures to implement new legal requirements, on external information on compliance risks on fines, on cases of conflict of interest, on conducted trainings, on exceeding compliance risk limits, on results of work with unacceptable behavior, on violation of internal banking control, on changes in external environment, on violations of remuneration policy); reports on the results of assessment and measurement of key indicators of compliance risks (on losses from compliance risks, on stress testing of compliance risks, on self-assessment of compliance risks, on key indicators of such risks, etc.).

The Risk Management Unit is important. It helps to ensure the effectiveness of the risk management system, including risks of financial monitoring, provides identification, assessment, measurement, analysis, monitoring, control, settlement, reduction and reporting of significant risks, prevents violations risk indicators, develops appropriate methodological materials, etc. The input for the risk management unit is information from the structural units of the bank, legislation and changes, and the output - reporting, internal methodological materials, conclusions on risks, proposals. The Management Board ensures the proper implementation of decisions and tasks of the Supervisory Board of the banking institution regarding the management of the bank, including the area of financial monitoring. Input information for the Management Board - information from structural units, tasks of the Supervisory Board, inquiries of external institutions, output - reports for the Supervisory Board, measures, conclusions, recommendations, decisions,

inspections, regulatory requirements and regulations, information and reports to external institutions.

The Supervisory Board is fully responsible for creating a comprehensive, adequate and effective management system of the bank, including the financial monitoring system. The input information for the Supervisory Board is information and reports from the structural divisions of the bank and the Management Board of the bank, and the output information is the decision to take certain measures.

According to the Law of Ukraine “On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Financing of Terrorism and Financing of Proliferation of Weapons of Mass Destruction” external inspections of the economic agent for financial monitoring are carried out by the following bodies: securities and stock market, the Ministry of Digital Transformation of Ukraine and the State Financial Monitoring Service (specially authorized body), external audit. The scheme of the structure of incoming and outgoing documents, messages related to the start of external inspections and the obtained monitoring results is shown in Figure 11.

Regulations on the organization and implementation of supervision in the field of financial monitoring, currency supervision, supervision over the implementation and monitoring of the effectiveness of personal special economic and other restrictive measures (sanctions) of the NBU determine the features of inspections of banks by the National Bank of Ukraine.

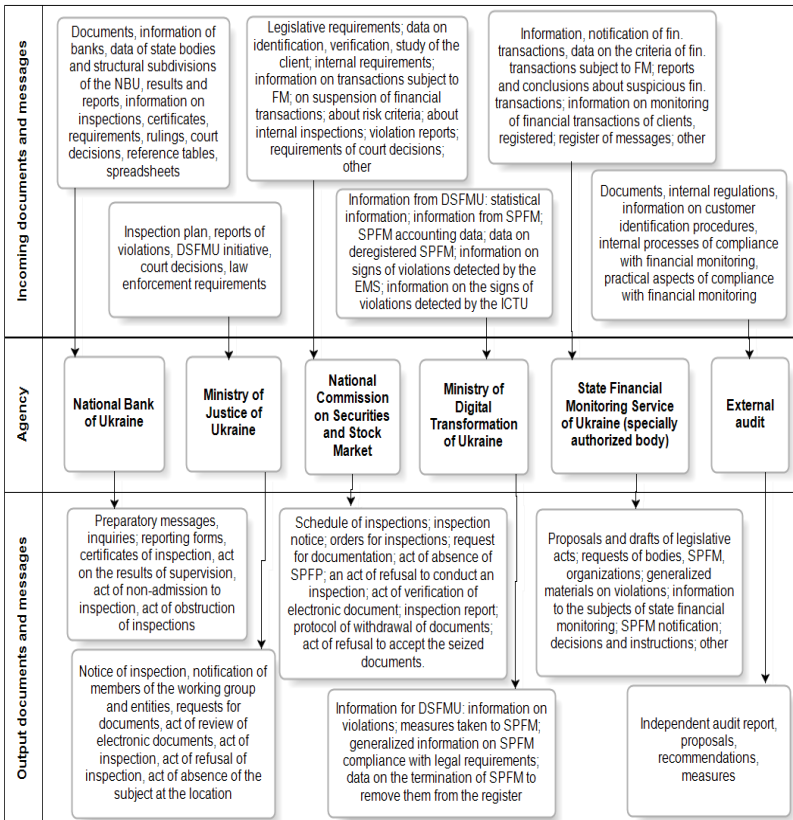


Figure 11. Scheme of the structure of incoming and outgoing documents, messages related to the start of external inspections and the obtained monitoring results

Source: compiled by authors.

Input documents for the NBU during bank inspections are documents and information received by the NBU from banks or non-bank financial institutions during on-site supervision of financial monitoring; documents and information received by the NBU from banks or non-bank financial institutions during the on-site inspection in terms of financial monitoring; data received from government agencies, certain structural units of the NBU; foreign government agencies; generalized results and reports on previous on-site and off-site inspections of banks and non-bank financial institutions; information obtained as a result of on-site inspections for compliance with currency legislation. Responses from banks have a certain form and structure: references (data on cases of banks refusing to establish or continue business relationships with customers – name or surname, name, patronymic, USREOU or RNOKPP code of the person, the date of the bank's decision, the basis data on refusals to conduct financial transactions for a certain period of time – name or surname, name, patronymic, USREOU or RNOKPP code of the person, date and time of the transaction attempt, amount of financial transaction in the currency of its conduct, currency code, amount in UAH equivalent, grounds for refusal, data on suspension of financial transactions according to the bank decision – name or surname, name, patronymic, USREOU or RNOKPP code of the person, date of attempted transaction, amount of financial transaction in the currency of its implementation, code currency, the amount in hryvnia equivalent); tabular forms (data on the number of requests received by the bank from correspondent banks for a certain period in relation to clients for financial monitoring – date of receipt of the request, name of the correspondent bank that sent the request, name or full name,

USREOU code or RNOKPP of the client whose financial transactions request, information on the financial transaction in respect of which the request was sent in terms of the amount in the currency of the transaction, currency code, hryvnia equivalent, date of the transaction, the date of submission of the response by the bank); requirements, rulings and court decisions (data on the bank's clients, for which during the audited period received written requests from law enforcement agencies, prosecutors of Ukraine, the State Bureau of Investigation, SBU, National Police, National Anti-Corruption Bureau of Ukraine to disclose information secrecy, or on which court decisions were received, decisions on seizure of funds on accounts, decisions on temporary access to things, seizure of documents, others – name or surname, name, patronymic, USREOU or RNOKPP code of persons, date of receipt request by the bank, the body that sent the request); references – tables (data on the bank's customers, which are defined as politically significant or related persons – name or surname, name, patronymic, USREOU or RNOKPP code of persons, date of establishment of business relations or one-time financial transaction on significant amount, the date of termination of the bank's business relationship with the client, the level of risk during the inspection, data on the client's attitude to the category of politically significant persons in terms of the date of detection of the client's classification transactions for a significant amount, for a legal entity – signs of belonging to such a category, the position of a politically significant person, for an individual and a natural person-entrepreneur – links with such categories of persons, categories of such persons, name, other identification data, their residence, the date of termination of the bank's restrictive measures, the amount of balances on customer accounts, the amount of credit and debit defenses on them); reference tables (list of bank clients – client category,

name or name of the client, RNOKPP of persons, date of birth or USREOU code of clients, relations with politically significant and related persons, date of beginning of business relations with the client or holding the first one-time financial transactions of a significant amount, the volume of financial transactions for crediting funds to customer accounts, the amount of cash deposits, the volume of financial transactions for crediting the client with non-cash funds from abroad, the volume of financial transactions for crediting the client with cash, the volume of financial transactions customer accounts, volumes of financial transactions for writing off non-cash funds abroad from client accounts, balances on client accounts, amounts of client's credit funds, name of the unit where the business relationship was established or a one-time financial transaction was made, residence, sign of connection with banking institutions oyu, place of work, position, NACE, date of entry in the USSR for inclusion in the USSR, availability of securities, date and method of client verification, level of risk, date of the bank's refusal to do business with the client); spreadsheets (data on financial transactions carried out on the accounts of a group of clients of the bank, which was determined in the request from the inspection team - crediting or debiting funds, reference financial transaction in the automated banking system, name or name of the client, RNOKPP or USREOU code, account number client, name or name of the counterparty, RNOKPP or USREOU code of the counterparty, MFI of the counterparty bank, name of the counterparty bank, counterparty account number, date of the financial transaction, its amount, currency code, hryvnia equivalent, purpose of payment). The source for the NBU in bank inspections are two types of documents: preparatory and reporting. Preparatory messages from the NBU to the inspected institutions (have the structure: date of inspection, date of

completion of the inspection, inspection period, data of the head of the inspection team, his contact phone number, etc.) and inquiries from the NBU to the inspected institutions (have the structure: summary information on the total amount and the number of financial transactions for the transfer of funds, detailed data on all financial transactions for the transfer of funds, a list of politically significant and related persons with whom business relations were established, generalized data on all financial transactions for the transfer of funds). Reporting source documents are: certificates of inspection (have the following structure: date of certificate, name of the inspected bank or institution, date and number of the inspection order, data on the composition of the inspection team, their name, position, description of inspected issues, type of inspection, date and period inspections, inspection deadline, description of conclusions, information on violations, description of information obtained during the inspection, accompanying information, bank recommendations, description of the facts of obstruction of the inspection, etc.); act on the results of supervision (has the structure: date of the act, name of the inspected bank, description of information on the basis of which the supervision was conducted, data on detected violations, description of information obtained during the inspection, supporting information, bank recommendations, etc.); acts on non-admission to inspections, act of obstruction of inspections (includes information on the fact of failure to provide the requested documents and information, description of the inability of the inspection team to obtain information, conduct inspections).

According to the Procedure for inspections by the Ministry of Justice of Ukraine and its territorial bodies of primary financial monitoring entities of the Ministry of Justice of Ukraine, the Ministry of Justice of Ukraine has the right to

conduct scheduled and unscheduled inspections of primary financial monitoring entities. Input information for the Ministry of Justice of Ukraine is: inspection plan; violation reports; SCFM initiative; court decisions; requirements of law enforcement agencies (the structure of such documents is regulated by the bodies initiating such documentation). The source information is: notification of the inspection; notification on the rights, responsibilities and powers of the members of the working group and the rights, responsibilities of the entity and officials of the entity (has the structure: name of the state financial monitoring body, name of the entity, USREOU or RNOKPP code and series and passport number , rights and obligations of the head and members of the working group, rights and obligations of the subject and officials of the subject, initials and surname of the subject, head of the subject, their signature, date of receipt of the notice); request for documents (has the structure: name of the state financial monitoring body, name of the subject, USREOU or RNOKPP code and series and passport number, location, date of request, position and name of the head of the working group, grounds, number and date of the order, description of requested documents , position, name, signature of the responsible person); electronic document review act (has the structure: name of the subject, USREOU or RNOKPP code and series and passport number, location, date of the act, name of the state financial monitoring body, number, date, body issuing the certificate for inspection, position and name of the working group members , list of provided electronic documents, results of review, signatures of members of the working group); inspection report (has the structure: copy number, inspection report number on compliance with legal requirements in the field of prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and

financing of proliferation of weapons of mass destruction, full name of the subject, its location, date signing the act, type of inspection, date of inspection, postal address of the inspection site, document that is the basis for the activity, USREOU or RNOKPP code and passport series and number, bank details, telephone number, name and position of working group members, name and positions of responsible officials of the entity, the grounds for verification, issues to be verified and the results, the period of verification, date, number and authority to issue a certificate of state registration of the entity, the list of documents provided by the entity for verification, their name and details, description of the revealed violations of the requirements of the legislation in the field of prevention and counteraction to legalization (laundering) of incomes, received criminal financing, terrorist financing and financing the proliferation of weapons of mass destruction in terms of the list of violations, subparagraphs, paragraphs, parts, articles, chapters, sections, etc., and the names of regulations, the rules of which are violated, a description of proposals to eliminate violations (improper implementation) of legislation in the field of prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and financing of proliferation of weapons of mass destruction for each violation, description of documents attached to the Verification Act in terms of title and details, number of pages, Name and signatures with the date of the members of the working group, name of the entity, head of the entity with the signature and date of receipt of the second copy of the inspection report); act on refusal to conduct an inspection (has the structure: name of the subject, USREOU or RNOKPP code and series and passport number, location, date of the act, name of the state financial monitoring body that issued the inspection certificate, name of the official, date of issue, certificate number, positions

and names of members of the working group, location of the subject, description of the circumstances of refusal to inspect, signatures of members of the working group); act on the absence of the subject at the location (has the structure: name of the subject, USREOU or RNOKPP code and series and passport number, location, date of the act, name of the state financial monitoring body that issued the inspection certificate, name of the official, date of issue, certificate number, position and name of the working group members, location of the subject, description of departure to the location of the subject in terms of information about the building (residential, non-residential, etc.), date and time of arrival at the address (hours, minutes), presence or absence with the name of the subject, information from the owner of the house, other established data, signatures of members of the working group).

To control the work of the subjects of primary financial monitoring in the securities market, in accordance with the Law of Ukraine “On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing of Proliferation of Weapons of Mass Destruction” and the Procedure for Monitoring Compliance Professional participants of the stock market (securities market) requirements of legislation in the field of prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and financing of proliferation of weapons of mass destruction, established the National Commission on Securities and Stock Market. Input documents and information for the National Commission on Securities and Stock Market are: legal requirements, information on the employee responsible for financial monitoring, data on identification, verification, study of the client and clarification of information about him; data on approval of internal requirements on financial monitoring; information on

transactions subject to financial monitoring; data on the suspension of financial transactions; information on storage of documents on financial monitoring; information on the criteria of risks of legalization obtained illegally, financing of terrorism, financing of proliferation of weapons of mass destruction; information on conducting internal audits for compliance with financial monitoring requirements; violation reports; requirements of court decisions; detected violations; failure to submit documents on request; detection and confirmation of falsity and inaccuracy of data. The source documents and information for the National Commission on Securities and Stock Market are: the schedule of SPFM inspections; inspection notice; order for inspection (copy number, order number, name of SPFM, USREOU code, position and full name of the NSSMC authorized person, position and full name, powers of working group members, term of inspection, signatures of persons, date of receipt of the second copy); request for documentation or information (date of request, details of SPFM, name of the head of the working group, description of the request, name of SPFM, USREOU code, date and number of the order, deadline for submission of documents, signatures of persons); act on the absence of SPFP by location (name of SPFM, USREOU code, city, date, number, date, power of attorney, position and name of members of the working group, description of visit, location address, signatures of responsible persons); act on refusal to conduct an inspection (name of SPFM, USREOU code, city, date, number, date, power of attorney, position and name of members of the working group, description of the circumstances of refusal, signatures of persons); act of verification of the electronic document (name of SPFM, USREOU code, date, address, number, date, issuing authority, position and name of the working group members, description

of the electronic document review, signatures of persons); inspection report (name of SPFM, USREOU code, city, date, introductory part, inspection dates, location, bank details of SPFM, means of communication, positions and names of members of the working group, responsible officials of SPFM, grounds for inspection, list of audited issues, period of SPFM work, data on SPFM state registration, descriptive part, list and description of inspected documents, answers to questions, operative part, description of revealed violations, list of inspection materials, signatures of persons); protocol of withdrawal of documents (city, date of protocol, position and name of the head of the working group, name of SPFM, USREOU code, number, date, body issuing the power of attorney, position and name of members of the working group, date of return of documents, signatures of officials); act on refusal of SPFM to accept seized documents (name of SPFM, USREOU code, address, date, number, date, body issuing power of attorney, position and name of members of the working group, date of seizure protocol, description of SPFM reasons for acceptance of seized documents, explanations of officials, list and description of documents, signatures of persons).

According to the Procedure for Exchange of Information between the State Financial Monitoring Service of Ukraine and the Ministry of Digital Transformation of Ukraine to increase the effectiveness of supervision over the compliance of primary financial monitoring entities with legislation on preventing and combating legalization (laundering) of proceeds from crime, terrorist financing and financing weapons of mass destruction of the Ministry of Finance of Ukraine, the Ministry of Digital Transformation of Ukraine, one of the subjects of state financial monitoring, which controls and conducts inspections of SPFM is the Ministry of Digital Transformation of Ukraine.

The input for the Ministry of Digital Transformation of Ukraine is the information received from the State Financial Monitoring Service of Ukraine regarding the measures taken by SPFM in terms of combating money laundering, terrorist financing and financing the proliferation of weapons of mass destruction (statistical information on financial transactions for financial monitoring, as well as other information that may be related to money laundering obtained from SPFM, data on the registration of SPFM in the State Financial Monitoring Service of Ukraine, data on deregistered SPFM, information on signs of violations of SPFM legal requirements VK / FT counteractions detected by the AMS, information on the signs of violations of the legislative requirements for VK / FT counteractions revealed by the Ministry of Digital Transformation of Ukraine. The source information for the Ministry of Digital Transformation of Ukraine is the information provided to the State Financial Monitoring Service of Ukraine on improving regulatory and supervisory measures to monitor the implementation of SPFM legal requirements in terms of combating money laundering, terrorist financing and proliferation of weapons of mass destruction. anti-VC / FT legislation, measures taken against SPFM for violation of VC / FT anti-legislation, generalized information on compliance with SPFM legislation on anti-money laundering, terrorist financing, generalized information on violations of VC / FT anti-money laundering legislation and taken to SPFM measures for such violations; data on the termination of SPFM to remove them from the register).

To comply with the Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing of Proliferation of Weapons of Mass Destruction" and the Regulation on Financial Monitoring Institutions, the State Financial Monitoring Service

of Ukraine controls and verifies financial monitoring of SPFM. specially authorized body). The input information for the SFMSU during inspections is: information on financial transactions subject to financial monitoring; data on the criteria for conducting the analysis of financial transactions subject to financial monitoring, defined by the central executive body; notifications on financial transactions subject to financial monitoring; reports of suspicious financial transactions; conclusion on suspicious financial transactions; information on monitoring of financial transactions of clients, which are registered for financial monitoring; register of messages; other. The initial information for the SFMSU during inspections is: proposals for legislation; draft regulations; requests to state bodies, organizations and institutions, SPFM for information; generalized materials on violations of the law; information to the subjects of state financial monitoring to increase the effectiveness of supervision in the field of prevention of money laundering; notification of SPFM on suspicion of committing violations; decisions and instructions on suspension or resumption of financial transactions; other.

In order to comply with legal and regulatory requirements, the audit of SPFM activities is also conducted by the External Audit. The input information to be verified by an independent external audit is: documents, internal regulations, information on customer identification procedures, internal processes of financial monitoring, practical aspects of financial monitoring. The source information to be verified by an independent external audit is: an independent audit report, proposals, recommendations, measures.

It should be noted that before taking certain regulatory measures in the direction of financial monitoring, it is first necessary to conduct an audit of persons and transactions subject to financial monitoring. This will allow timely

detection of possible and existing fraudulent schemes, illegal operations and their suspicious participants to prevent the illegal activities of criminals and their associates. And the creation of templates of incoming and outgoing documents, notifications related to financial monitoring and their results, will allow a comprehensive and structured approach to the consideration and resolution of a wide range of issues arising in the financial sphere between the participants of financial and economic processes.

In turn, the checks of the subjects of primary financial monitoring on the state of financial monitoring are divided into internal and external. The Bank's internal audits of financial monitoring are conducted by the following structural divisions of the Bank: financial monitoring unit, financial monitoring committee, client examination committee, internal audit unit, audit and control unit, compliance control and supervision unit, risk management unit, Supervisory Board. The Bank's external audits of financial monitoring are conducted by the following bodies: the National Bank of Ukraine, the Ministry of Justice of Ukraine, the National Commission on Securities and Stock Market, the Ministry of Digital Transformation of Ukraine and the State Financial Monitoring Service, external audit. The structure of incoming and outgoing documents, messages related to both internal and external audits of financial monitoring, has its own characteristics depending on the specifics of the information they include.

This approach to developing the structure of templates for incoming and outgoing documents, notifications related to the start of inspections and monitoring results will allow both economic agents and regulators to optimize a number of processes to prevent money laundering and speed up the speed of standard inspection procedures. on financial monitoring.

5. DEVELOPMENT OF DATABASES INTERNAL FINANCIAL MONITORING OF ECONOMIC AGENTS (EVIDENCE FROM UKRAINE)

In all areas of scientific and practical activities of the modern world, a key role is played by multidimensional data sets, which can be represented in the form of diagrams, structures, images, directories, links, etc. Most often, certain groups of data today are stored in separate sources, and also have forms, which are characterized by tendencies to destruction and non-compliance with the growing current requirements of management. Accordingly, there are questions about the convenience and accessibility of such arrays, their sufficient manufacturability and practicality. Thus, meaningful structuring of data in combination with appropriate methods of their automated use can be an effective tool for any data analysis, forming a number of significant advantages in terms of performance, functionality, flexibility, scalability, scalability. Thus, offering ready structural data sets can take the quality of information processing to a qualitatively new level.

If we analyze the research work of scientists in various fields, there is a tendency to use a wide range of specialists relevant databases, regulatory information. Thus, Baumann, P., Misev, D., Merticariu, V., and Huu, B. (2021) study general concepts, standards, and reactions to array databases; Mohammadipanah, F., and Sajedi, H. (2021) disclose a blockchain approach to the development and security of microbial databases; Haddaway, N. R., Gray, C. T., and Grainger, M. (2021) offer new tools and methods for designing multifunctional machine-readable databases. In turn, Li, Y., Li, X., Yang, Y., Li, M., Qian, F., Tang, Z., Li, C. (2021) provide for practical application a comprehensive database of transcription information human beings; Zraly, C. B., Zakkar,

A., Perez, J. H., Ng, J., Slattery, M., and Dingwall, A. K. (2021) offer a set of data for programming regulatory information and supporting epigenetic memory; Kleiner, M. M., and Timmons, E. J. (2020) disclose improved access to regulatory information through professional licensing. But all arrays of information in any field, scientists group and structure for further processing. In particular, Alemayoh, T. T., Lee, J. H., and Okamoto, S. (2021) recommend to use a new structure of sensor data for deeper extraction of features in recognition of human activity; Mukhin, A. M., Genaev, M. A., Rasskazov, D. A., Lashin, S. A., and Afonnikov, D. A. (2020) propose a hybrid technology for structuring and processing data; Zhang, J., Yao, Y., and Wang, D. (2019) describe the structuring of aircraft maintenance report data. Peculiarities of financial monitoring are revealed in the works of the following scientists: Yashina, N. I., Kashina, O. I., Pronchatova-Rubtsova, N. N., Yashin, S. N., and Kuznetsov, V. P. (2021), who describe important aspects of financial monitoring of financial stability and digitalization; Beketnova, Y. M. (2020), which studies the specifics of financial monitoring of economic entities; Mordvintsev, A., Polyakov, D., Sazonov, S., and Dmitriev, A. (2020), who study external public (municipal) financial monitoring in the current context. The treatises of the modern scientific community on financial monitoring of economic agents should be singled out: for example, Vovk, V., Zhezherun, Y., Bilovodska, O., Babenko, V., and Biriukova, A. (2020) consider financial monitoring in banks as market tool in terms of innovative development and digitalization of the economy; Bukhtiarova, A., Semenog, A., Razinkova, M., Nebaba, N., and Haber, J. A. (2020), who evaluate the effectiveness of financial monitoring in the banking system of Ukraine.

The anti-money laundering experts: Lyeonov, S., Żurakowska-Sawa, J., Kuzmenko, O., & Koibichuk, V. (2020) offer gravitational and intellectual data analysis to assess the

risk of money laundering by financial institutions; Leonov, S., Yarovenko, H., Boiko, A., & Dotsenko, T. (2019) consider the information system of monitoring of bank operations related to money laundering.

Although some issues related to the importance of database formation, structuring of regulatory information in various fields and industries are reflected in the research of some specialists, and a number of other researchers are engaged in a separate area of financial monitoring, combining these two areas to form optimal and convenient automated the structure of databases of internal financial monitoring of economic agents by developing clear data schemes, with clear relationships, as well as the structure of units of regulatory information required for the organization of basic monitoring procedures that needs refinement, continuous improvement and consistency.

For economic agents, a certain structure of internal financial monitoring databases is proposed in the form of a data scheme taking into account the entities, their attributes, key fields and relationships, as well as the structure of units of regulatory information needed to organize basic monitoring procedures. This structure of databases and regulatory information involves the use of information from internal or external sources.

Databases and normative-reference information, grouped on the basis of internal sources of economic agents are the following: client's financial monitoring questionnaire; list of risky clients according to the system of economic agent; the list of clients for which there are court rulings and financial transactions which may contain signs of risk; list of PEP clients of the economic agent; list of clients with OSH; list of prohibited industries; directories of codes (directory of code of type of financial transactions; directory of code of sign of financial transactions of obligatory financial monitoring; directory of code of sign of financial transactions of internal financial monitoring; directory of code of identity document;

directory of code of type of subject of primary financial monitor; notification; directory of the legal status code of the participant of the transaction; directory of the type code of the person connected with the financial transaction; directory of the code of permission to submit information; directory of the code of the financial transaction; directory of the region of Ukraine; directory of risk criteria; clients with FATCA status. The scheme of the structure of databases and normative-reference information of internal financial monitoring of economic agents on the basis of internal sources is shown in Figure 12.

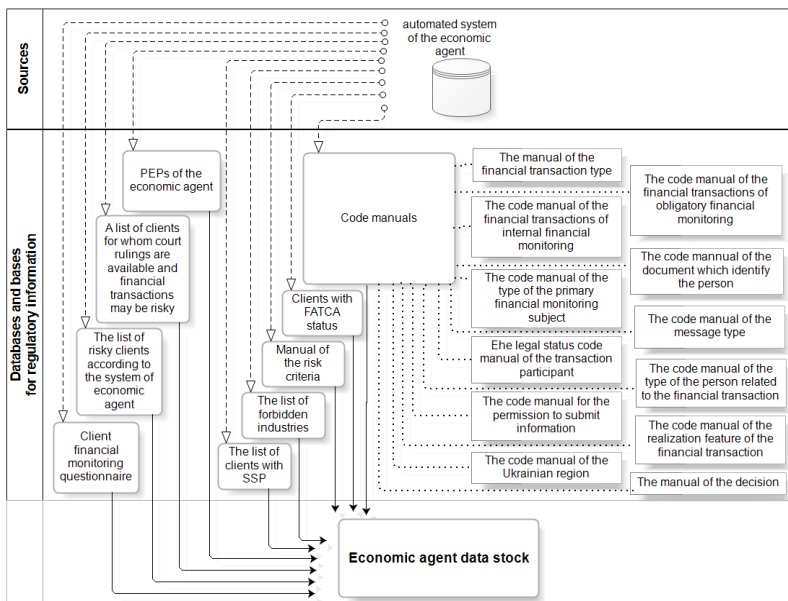


Figure 12. Scheme of the structure of databases of internal financial monitoring, regulatory information required for the organization of basic procedures for monitoring economic agents based on internal sources.

Source: compiled by authors.

The client's financial monitoring questionnaire is information on the economic agent's client, collected from various sources and databases, and stored in a single automated database of the economic agent. the client's financial monitoring questionnaire contains the following data: citizenship, date of verification, date of initial entry of information in the questionnaire, date of identification (data clarification), information on identification, assessment of a person's reputation, conclusion on assessment of financial condition, data of economic agent, which is responsible for identification and proper study of the client (surname, name, patronymic, position, telephone), description of sources of income, e-mail, address of the client's place of work, for a non-resident it is a temporary residence address, code and type of economic activity, if available, type of independent professional activity, list of services used by the client, if there is information on registration of the client as an individual entrepreneur, date of waiver of business relations by the client's economic agent, date of last changes to the questionnaire, date of asset freezing , the planned date was held identification, date of defrosting of assets, date and information on other measures taken to properly verify the client, sources of funds (average monthly income, own funds, others, loan, claims, non-repayable and repayable financial assistance, futures, securities, other financial derivatives tools), information on the history of service (characteristics of cooperation, data on services), permits and licenses for certain activities, place of work, position, correspondence between the client's financial condition and its transactions, correspondence between the client's transactions and the nature and direction of its activities, information on assessing the financial condition of the client (whether the business, the amount of loss for the reporting year, the amount of profit for the last year, whether

foreign economic activity, the number of major counterparties, number of employees, information on deposits in other banks, the existence of accounts payable, current creditors debt, the amount of principal income, monthly family income, social status, ownership of real estate, cars, equipment, securities), the level of assigned risk, accounts in other financial institutions, the method of identification, if there is a unique entry in the electronic information and telecommunication system, description the essence of the client's activities.

For the individual entrepreneur and legal entity, the client's financial monitoring questionnaire includes the following data: information on the executive body, date of verification, date of initial entry of information in the questionnaire, date of identification (data clarification), information on identification, assessment of the person's reputation, assessment conclusion financial condition, data of the employee of the economic agent who is responsible for identification and proper study of the client, characteristics of sources of income, description of the activity, e-mail address, data on separate divisions of the organization, code and type of economic activity, list of services information on information on registration of the income taxpayer, date of refusal of business relations by the economic agent to the client, date of last changes in the questionnaire, date of freezing of assets, date of planned identification, date of defrosting of assets, date and information on other measures taken. on proper verification of the client, sources of funds, information on service history, permits and licenses for certain activities, information for non-residents (date and authority of registration, information on the state registration certificate), series and number of state registration certificate, data on authorities management (their name and composition), the correspondence between the client's financial condition and its transactions, the correspondence

between the client's transactions and the nature and directions of its activities, information on assessing the client's financial condition (long-term or short-term loans, current accounts payable, long-term liabilities) loss for the reporting year, the amount of profit for the last year, whether foreign economic activity, the number of major counterparties, number of employees, revenue for the reporting year, net income from sales of goods, services, information on deposits in other banks, statutory fund, ownership real estate, land, ru property, cars, equipment, securities), the level of assigned risk, accounts in other financial institutions, the method of identification.

Belonging to the category of PEP is singled out (permission of PEP, grounds for inclusion in PEP, category of PEP, degree of connection of family members with PEP, surname, name, patronymic of PEP, category of PEP positions, name of organization where PEP works, date of assignment persons to the PEP, the date of obtaining a permit to service the PEP, the date of termination, the date when the economic agent ceased to take special measures for the PEP). Additionally, information on related parties is provided (name of the ultimate beneficial owner of the national public figure, foreign public figure, figure who performs public functions in international institutions, family member or a related person with a national or foreign public figure, figure who realizes public functions in international institutions).

The list of risky clients on the system of economic agent contains data on individuals and legal entities, namely: client's name, EDRPOU (National State Registry of Ukrainian Enterprises and Organizations) or TIN, (Taxpayer Identification Number) date, as well as the result of termination of business relations with the client, or refusal of the client to serve the economic agent (for example, closing the account, no cash flow); comments and additional explanations on the client

(for example, refusal of service in oral form, refusal of service on the system of urgent transfers, refusal to establish business relations with the client related to terrorist activities to which sanctions are applied, group of legal entities, related to terrorism, proliferation of weapons of mass destruction, to which sanctions are applied, by verbal agreement with the client, permission only for crediting salaries, pensions, social benefits, the client filed an application with the bank to commit fraudulent actions by third parties, unsatisfactory reputation of the client, discovery against the client of enforcement proceedings, lack of official refusal of the client, permission or prohibition of transactions on other client accounts related to local charities, warning the client orally, the client is involved in criminal offenses and cases, etc.); the name of the serving regional office.

The list of clients for which there are court rulings and financial transactions which may contain signs of risk provides the following information about the clients of the economic agent: the name of the legal entity or individual; EDRPOU (National State Registry of Ukrainian Enterprises and Organizations) or TIN (Taxpayer Identification Number), number and date of the court decision, comments and additional information about the client, list of risky transactions.

The list of PEP clients of an economic agent - includes a basic list of politically important persons, members of their families and related persons who are clients of the bank. This list contains the following information about clients of individuals and legal entities: regional office, economic agent unit, EDRPOU or identification code, series and number of passport, name or surname, name, patronymic; category of person (public person, close person, related person, legal entity in which the ultimate beneficial owner is PEP); when

establishing a person close or related to a public person, the surname, name, patronymic of the public person shall be indicated; the grounds for belonging to the PEP are entered (the head of the state enterprise, the ultimate beneficial owner or the head is the PEP, the head is a close person with the PEP, family ties); availability of permission to establish business relations (yes or no), term of permission; notes.

The list of clients with NPV is clients for which there is a share of state ownership. This list contains information on the name of the economic agent's unit, the client's name, the EDRPOU code, the client's registration number in the system, the size of the state ownership share, the parameter assigned to clients with NPV. Clients are assigned to such lists automatically by the code of economic activity of the person, or by checking from open sources. Clients with NPV are divided into state with NPV 100% (12100 NBU, 12201 State corporations accepting deposits, 13110 Central government), state with NPV 50-100% (11001 State non-financial corporations, 12301 State money market funds, 12401 State non-money market investment funds, 12501 Other public financial intermediaries, except insurance corporations and pension funds, 12601 State auxiliary financial corporations, 12701 State captive financial corporations, 12801 State insurance corporations, 12901 State pension funds, 13120 Regional and local administration, 13132 Regional and local social insurance funds) and non-state with NPV 0-50%.

The list of prohibited industries is the industries that include the activities of clients who, according to internal regulations, are prohibited from servicing and conducting financial transactions to an economic agent. Such areas include the following: illegal gambling; shell banks; telemarketing organizations; sex services; sale of herbal drugs, including marijuana; institutions that require mandatory licensing but

operate without licenses; purchase and sale of faceted diamonds; trade or other transactions with counterfeit products; unwanted activity. For such prohibited industries, a ban will be imposed on carrying out certain actions with such clients, and the risks from the possible service of such clients for each of the industries are determined.

According to the Law № 24 of January 29, 2016. The Ministry of Finance of Ukraine “On approval of forms of accounting and submission of information related to financial monitoring and instructions for their completion” and Instructions for filling in forms of accounting and submission of information related to financial monitoring are developed directories of financial agent codes in automated system (directory of type’s code of financial transactions; directory of sign’s code of financial transactions of obligatory financial monitoring; directory of sign’s code of financial transactions of internal financial monitoring; code’s directory of identity document; code’s directory of primary financial monitoring; the legal status code’s directory of the transaction; directory of the type code of the person associated with the financial transaction; directory of the code of permission to submit information; directory of the code of the financial transaction; directory of the region of Ukraine. Such directories have a certain number of characters and the following structure: the name of the property, the format of the property, the value of the property (form of payment, type of asset, location, object of transaction, features of financial transaction, identity document, type of primary FM entity, type notification, legal status of the subject of the primary FM or the participant of the transaction, the type of person associated with the financial transaction, the presence of a permit, the implementation of the financial transaction, the region of Ukraine, the type of decision).

In the automated system of the economic agent the Handbook of Risk Criteria is formed, according to the risk criteria defined by internal regulations and the program of risk management of the economic agent. The directory of risk criteria has the following structure: risk code, identifier of assignment of risk criteria to the client, name and description of risk.

In accordance with the requirements of the Tax Code of Ukraine and the requirements of the US Law on “Tax Requirements for Foreign Accounts”, FATCA Agreement, clients with FATCA status are clients with tax residency of the United States of America, as well as clients with tax credit US residence. Such information on confirmation or refutation of the status of clients is selected from the questionnaire and entered into the automated system of the economic agent. If the client is assigned FATCA status, the following information is provided: type of FATCA status (active or passive foreign entity), US taxpayer identification code TIN / EIN), global intermediary identification number GIIN, name of the person in English, address in English language, types of income, data forms W-8BEN-E.

Databases and normative-reference information, grouped from external sources, are the following: USR information on LE (legal entity), IE (Individual Entrepreneur), a list of individuals involved in terrorism and international sanctions; list of public figures and members of their families; sanctions lists (NSDCU sanctions list; MEU Ukraine sanctions list; OFAC SDN List - US sanctions list; worldwide sanctions lists; EU sanctions lists); lists of high-risk countries (aggressor state, countries with strategic shortcomings, countries with hostilities, list of the European Commission for countries with a weak CML/ TF

regime, countries with high levels of corruption, self-proclaimed countries, countries with high risk of TF, offshore countries); First Ukrainian Bureau of Credit Histories; International credit history bureau; list of dual-use goods; list of persons with NPV; AntiFraud HUB - information about fraudsters; register of bankruptcies; register of debtors; register of court decisions; database of invalid documents; list of persons hiding from the authorities; register of single tax on imputed income payers; registers of encumbrances on movable and immovable property; data on securities; lustration register; register of arbitration trustees; corruption register; bases of Ukrainian organizations; information on foreign companies. The scheme of the structure of databases and normative-reference information of internal financial monitoring of economic agents on the basis of external sources is shown in Figure 13.

USR information on LE (legal entity), IE (Individual Entrepreneur), a list of individuals involved in terrorism and international sanctions – these are data on legal entities, natural persons-entrepreneurs, public formations, public associations, notaries, lawyers of Ukraine. Such data include information on the name of the business entity, its code, address, information on the founders and final beneficiaries, management, legal form, authorized capital, types of business activity, registration data, on termination of activity, on existing enforcement proceedings, contact information.

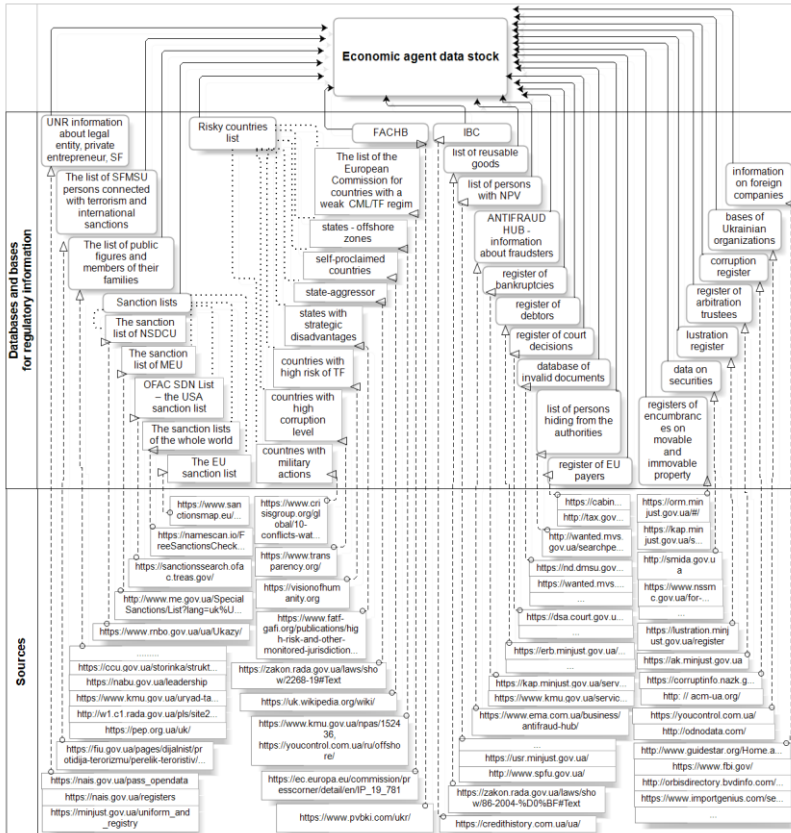


Figure 13. Scheme of the structure of databases of internal financial monitoring, regulatory information needed to organize the basic procedures for monitoring economic agents on the basis of external sources.

Source: compiled by the authors.

This information is formed on the website of the Ukrainian Ministry of Justice https://minjust.gov.ua/uniform_and_registry and State Enterprise “National Information Systems” <https://nais.gov.ua/registers>; https://nais.gov.ua/pass_opendata.

The SFMSU list of persons associated with terrorism and international sanctions contains a list of persons associated with terrorist acts or to whom international sanctions apply. Such a list is approved by the State Financial Monitoring Service of Ukraine and is formed in accordance with the current “List of persons connected with terrorist activities or in respect of whom international sanctions have been applied”, and is posted at the link <https://fiu.gov.ua/pages/dijalnist/protidija-terorizmu/perelik-teroristiv/aktualnij-perelik-osib-pov-yazanix-iz-zdijsnennyam-terroristichnoji-diyalnosti-abo-stosovno-yakix-zastosovano-mizhnarodni-sankcziji.html>.

The SFMSU list persons related to terrorism and international sanctions contains the following information: list number, date of entry, type of person, source of entry, name 1, name 2, name 3 if available, name 4 if available, type of name, category, quality, date of birth, place of birth, series and number of the passport document, country of issue, name of the issuing authority, address, nationality, identification number, position, additionally, relevance.

The list of public figures and members of their families is a general list of public figures and members of their families. The list of public figures and members of their families contains the following information: surname, name, patronymic, date of birth, place of birth, citizenship, name and year of birth of father, mother, spouse, children, education, name of organization, position, date of embrace positions related to public figures, date of dismissal, autobiography by dates if available, date of relevance; The open register of national public figures of Ukraine can be found at the link <https://pep.org.ua/uk/>. Also, to obtain data on national public figures, you can use information from other web resources: the list of people's deputies of Ukraine according to the information of the Verkhovna Rada of Ukraine

(http://w1.c1.rada.gov.ua/pls/site2/p_deputat_list), data from the Government portal is the Unified web portal of the executive authorities of Ukraine on the government and authorities, namely the composition of the Cabinet of Ministers of Ukraine (<https://www.kmu.gov.ua/uryad-ta-organi-vladi/team>), data on the structure and management of the National Anti-Corruption Bureau of Ukraine (<https://nabu.gov.ua/leadership>), data on structure and composition (<https://ccu.gov.ua/storinka/struktura-ksu>) Courts of previous cadences of the Constitutional Court of Ukraine (<https://ccu.gov.ua/storinka/suddi-ksu-poperednih-kadenciy>), information about the leadership of the Supreme Court (https://supreme.court.gov.ua/supreme/pro_sud/keriv/) ta structure and composition of the Judicial Corps (https://supreme.court.gov.ua/supreme/pro_sud/sud_korpus/), data on the management and judges of the Supreme Anti-Corruption Court (https://hcac.court.gov.ua/hcac/info_sud/leadership_and_judges/), composition of members of the High Qualification Commission of Judges of Ukraine (https://court.gov.ua/kvalifikatsijni_komisiyi/), data on declarations of family ties and integrity of members of the High Qualification Commission of Judges of Ukraine (<https://www.vkksu.gov.ua/ua/dieklaracii-rodinnich-zwiazkiw-suddi-ta-dobrotchiesnosti-suddi/>), composition of the heads of the Office of the Prosecutor General (<https://www.gp.gov.ua/ua/leadership>) and the leadership and composition of regional prosecutor's offices (https://www.gp.gov.ua/ua/sop_1), management of the Security Service of Ukraine (<https://sbu.gov.ua/ua/pages/5>) and regional bodies of the Security Service of Ukraine (<https://ssu.gov.ua/rehionalni-orhany>), management of the National Anti-Corruption Bureau of Ukraine /

(<https://nabu.gov.ua/leadership>), information from the unified state register of the National Agency for the Prevention of Corruption on declarations of persons performing the functions of the state or local self-government (<https://public.nazk.gov.ua/>), management and members of the Accounting Chamber (<https://rp.gov.ua/Management/>), members of the Central Election Commission (https://cvk.gov.ua/sklad_cvk.html), heads of the State Bureau of Investigation (<https://dbr.gov.ua/management>), members of the National Council of Ukraine on Television and Radio Broadcasting (<https://www.nrada.gov.ua/about/#members>), heads of the Antimonopoly Committee of Ukraine (<https://amcu.gov.ua/persons>), management of the National Agency for the Prevention of Corruption (<https://nazk.gov.ua/uk/kerivnytstvo/>), heads of the Ministry of Defense of Ukraine (<https://www.mil.gov.ua/ministry/kerivnicztvo/>), information from the Register of Declarations of Family Relations and Integrity (<https://data.gov.ua/dataset/5664fc8e-82e0-4a38-aeba-68607cafdc64>), information on the declaration of officials (<https://declarations.com.ua/>), information from the Internet resource “Public figures” (<http://www.public.biz.ua>), national and international PEP search data (<http://www.lexisnexis.com>), information from the lists of politically important people in the world (<https://namescan.io/FreePEPCheck.aspx>).

Sanction lists are certain lists of relevant individuals and legal entities to which the relevant sanctions, restrictions and prohibitions of various countries and organizations have been applied.

The sanctions list of the National Security and Defense Council includes information on individuals and legal entities to which personal special economic and other restrictive measures are applied. Such sanctions lists are approved by a

decision of the National Security Council of Ukraine and formed on the basis of proposals of the Verkhovna Rada of Ukraine, the Security Service of Ukraine, the President of Ukraine, the National Bank of Ukraine, the Cabinet of Ministers of Ukraine. The sanctions lists of the National Security and Defense Council are annexes to the Decision of the National Security and Defense Council of Ukraine “On the application of personal special economic and other restrictive measures (sanctions)”. The sanctions lists of the National Security and Defense Council are available at the link <https://www.rnbo.gov.ua/ua/Ukazy/>.

The sanctions list of the National Security and Defense Council of individuals who fall under certain types of restrictions (sanctions) contains the following information about individuals:

- surname, name, patronymic in Ukrainian and Russian, date of birth, citizenship, registration address, details of passports of a citizen of Ukraine for traveling abroad (series, number, name and surname in English), if there is passport data of a foreign state (number, surname and first name in English), individual taxpayer number, in the presence of professional activity, position;

- types of restrictive measures, actions, prohibitions, according to the Law “Sanctions” (the main of which are temporary blocking of the right of an individual to use and dispose of their own assets; restrictions on trade transactions; application of partial or continuous restrictions on transit, transportation through Ukraine; impeding the circulation of capital abroad, a ban on fulfilling financial and economic obligations, suspending certain activities by revoking licenses, permits for such activities, including the use of subsoil, a ban on non-residents and persons controlled by non-residents, or acting in their favor, for privatization and lease of state assets,

blocking the entrance to the sea territory, inland waters, ports of Ukraine, as well as in its airspace, or landing on its territory, foreign non-military and military vessels; restrictions on transactions with securities issued to persons on the sanctions list of the National Security and Defense Council of Ukraine; a ban on issuing licenses and permits to invest in foreign countries, as well as the ability to place currency values in accounts opened in foreign countries; ban on issuing licenses and permits for the movement of currency values across the Ukrainian border; restrictions on the issuance of cash from foreign payment cards; etc.); the term of application of sanctions (usually three years).

The sanctions list of the National Security and Defense Council of legal entities that fall under certain types of restrictions (sanctions) contains the following information about legal entities:

- full and abbreviated name of the legal entity in Ukrainian and, if available, in Russian and English; information on the legal entity according to the Unified State Register of Legal Entities of the country where the client is registered - state registration number or identification code of the legal entity, identification number as a taxpayer, if available in the trade register, legal and actual address in Ukrainian and if available in Russian, English languages, if available position, citizenship and surname, name of management;

- types of restrictive measures, actions, prohibitions, according to the Law “Sanctions” (the main of which are the temporary blocking of the right of an individual to use and dispose of their own assets; restrictions on trade transactions; application of partial or continuous restrictions on transit, transportation through Ukraine obstruction of the circulation of capital abroad, prohibition to fulfill obligations of a financial

and economic nature, suspension of certain activities by revoking licenses, permits for such activities, including the use of subsoil, prohibition for non-residents and persons controlled by or acting on non-residents benefit, privatization and lease of state assets, ban on the purchase of state legal entities - non-residents products, goods, services, works, as well as products, goods, services of foreign origin from countries subject to sanctions of the National Security and Defense Council of Ukraine; blocking the entry into the sea territory, inland waters, ports of Ukraine, as well as into its airspace, or landing on its territory, foreign non-military and military vessels; restrictions on transactions with securities issued by persons on the sanctions list of the National Security and Defense Council; a ban on issuing licenses and permits to invest in foreign countries, as well as the ability to place currency values in accounts opened in foreign countries; ban on issuing licenses and permits for the movement of currency values across the Ukrainian border; restrictions on the issuance of cash from foreign payment cards; a ban on increasing the authorized capital of legal entities in which the share of ownership of a non-resident or a foreign state is 10 or more percentage points, or there is a direct or indirect influence on such a legal entity; additional actions and measures for environmental, veterinary, sanitary, phytosanitary controls; abolition of industrial projects, trade agreements, other cooperation in certain areas of activity, in particular the defense industry and security; ban on the exchange of technologies, rights to intellectual property; ban on the use of Ukrainian radio frequency channels; ban on the use of public telecommunications; ban on scientific cooperation, cultural exchange, educational interaction, sports contacts, entertainment events with foreign countries and their legal entities; ban on official visits, negotiations, meetings on concluding agreements, contracts; etc.);

- the period of application of sanctions (usually three years).

The sanctions list of MEU of Ukraine is the sanctions list of the Ministry of Economic Development and Trade of Ukraine, ie the list of persons on whom special sanctions are imposed (<http://www.me.gov.ua/SpecialSanctions/List?lang=uk%UA&showFrng=True&company=linge>). The relevant list has the following structure: for Ukrainian subjects of foreign economic activity – region, region, search word for all criteria, the number of the order to impose a sanction, the number of the order to lift the sanction, the name of the enterprise; for foreign business entities - country, identification code of the enterprise, number of the order for imposition of the sanction, number of the order for cancellation of the sanction, name of the enterprise, search word according to all criteria.

OFAC SDN List – it is a US sanctions list established by a decision of the US Treasury Department's Office of Foreign Assets Control, a division of the US Treasury Department (OFAC), regarding sanctions that apply to a number of legal entities. This list can be found at <https://sanctionssearch.ofac.treas.gov/>. The OFAC list contains the following information: country of the legal entity, name of the legal entity, what exactly are the blocking measures (prohibition of certain activities, cooperation with sanctioned persons, freezing of assets of sanctioned persons, prohibition to provide assistance to affected persons under sanctions, prohibition to carry out transactions with representatives of certain industries), the amount of transactions, the parties involved, the dates and duration of activities.

It is also worth highlighting the sanctions lists around the world: <https://namescan.io/FreeSanctionsCheck.aspx> and EU sanctions lists: <https://www.sanctionsmap.eu/#/main>, which have a similar structure to other sanctions lists.

- Lists of high-risk countries include a list of high-risk countries where the client is registered, has a location, location or place of registration of the bank where the client has opened an account, counterparties with location or location, or location, place of registration of the bank where the counterparty account opened. The following countries are grouped according to risk characteristics:

- the aggressor is the state defined by the Verkhovna Rada of Ukraine as the aggressor state, the occupying state, it is the Russian Federation, including according to the Law “On features of the state policy on ensuring the state sovereignty of Ukraine in the temporarily occupied territories of Donetsk and Luhansk areas”, information on which is at the link <https://zakon.rada.gov.ua/laws/show/2268-19#Text>;

- Countries with strategic shortcomings are those countries for which information comes from reliable sources that they have strategic shortcomings in terms of combating money laundering, terrorist financing, proliferation of weapons of mass destruction; Currently, such regions include Albania, Barbados, Botswana, Ghana, Yemen, Zimbabwe, Cambodia, Mauritius, Myanmar, Nicaragua, Pakistan, Panama, Syria, and Uganda. Jamaica; such information can be found at the link <https://www.fatf-gafi.org/publications/high-risk-and-other-monitored-jurisdictions/documents/increased-monitoring-october-2020.html>; these are also countries (Iran and the DPRK) that do not implement or improperly implement the recommendations provided by international, intergovernmental organizations working to prevent the legalization of fraudulently obtained fraudulent proceeds, terrorist financing, proliferation of weapons of mass destruction;

- countries with hostilities - ie countries where hostilities and conflicts take place; such countries today are Afghanistan, Burkina Faso, Ethiopia, India, Libya, Pakistan, Syria, South

Sudan, Venezuela, Yemen; a list of such countries can be found at the link <https://www.crisisgroup.org/global/10-conflicts-watch-2020> and from other external sources;

- the EC list of countries with a weak CML/TF regime is a list formed by the European Commission and identifies countries with weak regimes against money laundering (legalization), terrorist financing; such countries are Afghanistan, American Samoa, Bahamas, Barbados, Botswana, Cambodia, North Korea, Ghana, Guam, Iran, Iraq, Jamaica, Libya, Mauritius, Mongolia, Myanmar (Burma), Nigeria, Nicaragua, Pakistan, Panama, Puerto Rico, Samoa, Saudi Arabia, Syria, Trinidad and Tobago, US Virgin Islands, Yemen, Zimbabwe; relevant information can be found at the links https://ec.europa.eu/commission/presscorner/detail/en/IP_19_781

- countries with a high level of corruption are states that are characterized by a high level of corruption; according to the Corruption Perceptions Index at <https://www.transparency.org/>; Countries with high levels of corruption have a fairly wide list of states (Afghanistan, Albania, Algeria, Angola, Azerbaijan, Bangladesh, Bolivia, Bosnia and Herzegovina, Brazil, Burundi, Cambodia, Cameroon, Central African Republic, Republic of Chad, Kaluga, Kolu , Côte d'Ivoire, the Democratic Republic of the Congo, Djibouti, the Dominican Republic, Ecuador, Egypt and others);

- self-proclaimed countries are self-proclaimed state formations; these are such as the Donetsk Republic, the Luhansk Republic, the Nagorno-Karabakh Republic of the Artsakh Republic, the Republic of Abkhazia, the Republic of Kosovo, the Saharan Arab Democratic Republic, Somaliland, South Ossetia, the Transnistrian Moldavian Republic, Turkey; links to such countries are available at <https://uk.wikipedia.org/wiki/>

- TF high-risk countries are countries that, according to the Global Terrorism Index report, have an increased level of risk of terrorist financing; such countries include Afghanistan, Burkina Faso, Cameroon, the Central African Republic, Colombia, the Democratic Republic of the Congo, Egypt, Ethiopia, India, Iraq, Kenya, Libya, Mali, Mozambique, Myanmar, Nepal, the Republic of Nigeria, Philippines, Somalia, South Sudan, Sri Lanka, Sudan, Syria, Thailand, Turkey, Yemen; link to the current list of countries are available at <https://visionofhumanity.org>;

- offshore states countries belonging to the list of offshore zones; these are British dependent territories (Guernsey, Jersey, Maine, Alderney), Central America (Belize, Panama), Europe (Andorra, Gibraltar, Monaco), the Caribbean (Anguilla, Antigua and Barbuda, Aruba, Bahamas, Brittany) Virgin Islands, Virgin Islands (USA), Grenada, Cayman Islands, Montserrat, Netherlands Antilles, Puerto Rico, Saint Vincent and the Grenadines, Saint Kitts and Nevis, Saint Lucia, Commonwealth of Dominica, Thorx and Turks and Caicos Islands), Africa (Liberia, Namibia, Seychelles), Pacific (Vanuatu, Guam, Marshall Islands, Nauru, Niue, Palau, Cook Islands, American Samoa, Samoa, Fiji); South Asia (Republic of Maldives); link to the list of offshore zones <https://www.kmu.gov.ua/npas/152436>, <https://youcontrol.com.ua/ru/offshore/>.

First Ukrainian Bureau of Credit Histories, describing the credit history, credit risks of individuals and legal entities in Ukraine. It contains the following information: general information – type of person (natural or legal), identifier (USREOU or TIN), date of formation, date of last update; information about the subject – name or surname, name, patronymic, status of the subject (negative or no negative), marital status, residency, education, surname at birth, date of

birth, sex, citizenship, place of birth, activity , dependents, their codes, monthly income; identification, primary key for individuals and individual entrepreneurs, composite key (name + surname + date of birth), passport of a citizen of Ukraine (series and number. date of issue, issuing authority); address - the address of permanent residence or registration, the actual address; consolidated financial information – contracts by type (credit, instalment, etc.), total amount of loans (amount and currency), amount of open loans (amount and currency), contracts by currency, total credit limit (amount and currency), limit on open (amount and currency), contracts by phases (current, completed ahead of schedule, etc.), amount of collateral, debt balance (amount and currency), role contracts (borrower, etc.), amount of monthly payment (amount and currency), total delay (amount and currency), number of statuses, collateral, requests for the subject; information on the loan agreement (separately for each agreement) – contract status, type of contract, creditor, type of loan agreement, currency of the agreement, status of the agreement, role of the subject, purpose of crediting, method of payment, frequency of payments, status of the agreement , loan application date, last update, loan agreement signing date, actual completion date, expected completion date, full agreement amount (amount, currency, number of periods), payment amount in the next period (amount and currency), balance (amount , currency, number of periods), current delay (amount and currency), historical calendar payments for the entire term of the contract (fixing date, financial behavior, balance (amount, currency, period), delay (amount, currency, period, days); register of requests and information transfer - number, date, time, creditor, event, credit statement – identifier, last update, credit history, date of formation Reference to the First Ukrainian Bureau of Credit Histories – <https://www.pvbki.com/ukr/>.

International Bureau of Credit Histories, which describes the credit history of individuals and legal entities of clients of Ukrainian economic agents. It contains the following information: code; personal information about the data subject – full name, identification number, passport information, date of birth, classification of the person (natural or legal), sex, marital status, sign of residence, citizenship, registration address, actual address, contact information (domestic worker , mobile phones, fax, e-mail, others); identification data (type of identifier (identification code, passport, key), number of the identification document, date of issue of the document, date of registration, who issued it, date of expiration of the document); the number of creditors who have made entries in the last 12 months; the number of users who reported the negative status of contracts in the last 12 months; aggregate information on all types of contracts (number of valid contracts, number of completed contracts, number of unprocessed applications, number of rejected applications, total outstanding amount, total amount of overdue payments, total number of overdue payments, number of canceled applications); detailed information on existing contracts (agreement number, subject's comment, basic information (agreement phase, date of last renewal, loan application date, agreement date, start date, planned end date of the agreement, actual expiration of the agreement, role of the subject , purpose of financing, order of contract execution, additional status of contract, type of creditor, creditor, status of creditor), subjects of contract (document number, role of subject), security, details, total amount, amount of periodic payment, total planned number of payments , number of payments actually left to be paid, amount of payments actually left to be paid, number of unpaid payments, unpaid overdue payments, interest rate, frequency of payments, method of payment, date of completion of interest

payment, number of days overdue interest, number unpaid interest payments, unpaid overdue interest, according to the statement updated payment schedule), annual historical payment calendar; detailed information about expired contacts (similar to existing contracts); search queries by subject for the last 12 months (query date, user, user type); the number of creditors who made inquiries in the last 12 months. Reference to the International Bureau of Credit Histories – <https://credithistory.com.ua/ua/>.

The list of dual-use goods is the only list of dual-use goods, which is an appendix to the Procedure for State Control over International Transfers of Dual-Use Goods, which can be found at the link <https://zakon.rada.gov.ua/laws/show/86-2004-%D0%BF#Text>. These include goods in the following areas: nuclear facilities, materials and equipment; special materials and related equipment; material processing; electronics; computers; communication; information protection; special technical means; sensors and lasers; navigation equipment and aviation radio electronics; nautics; aerospace industry and propulsion / power plants; sensitive goods; very sensitive goods; category I goods that can be used to create missile weapons.

The list of people with NPV is the people for whom there is a share of state property. Information about such customers can be obtained from the following open sources:

– site of the State Property Fund of Ukraine (link: <http://www.spfu.gov.ua/>, <http://www.spfu.gov.ua/ua/content/spf-stateproperty-Subiekti-gospodaruvannya.html> – Register (list) of economic entities of the public sector of the economy (state enterprises, their associations, subsidiaries and companies, the state share in the authorized capital of which exceeds 50 percent) with information on management entities and certain indicators of

financial and economic activity business entities; it contains information: USREOU code, full name, location, code of organizational and legal form of management, code of the subject of management, name of the subject of management, code and name of the region (location), main type of economic activity, stage of bankruptcy, bankruptcy procedure, state of the enterprise (restructuring, liquidation, size of the state share of the company in%, authorized capital in UAH, indicators of financial and economic activity of the business entity, last reporting date “Balance”, residual value of fixed funds in thousands of hryvnias, last reporting date “Statement of financial results”, net profit (loss) in thousands of hryvnias), organizational form of the business entity – state-owned enterprises – SOEs, business associations, note; <http://www.spfu.gov.ua/ua/content/civil-access-data-Reestr-korporativnih-prav-derzhavi.html> – Register of corporate rights of the state in the authorized capital of companies, containing information: USREOU code, name,% of state share, number of shares in state share, authorized capital in UAH, region, control over efficiency, management body, in SPFU / Ministries management, type business partnership, sign of bankruptcy, form of existence of shares, strategist, address, nominal value of shares in UAH, nominal value of shares of state share in UAH, USREOU code of the governing body, NACE, postal code);

– website of the Ministry of Justice of Ukraine (link <https://usr.minjust.gov.ua/>, <https://usr.minjust.gov.ua/content/publication-info>).

Anti-Fraud HUB – information about fraudsters is a portal that allows for cross-sectoral anti-fraud information exchange. This information includes data on the illegal use of payment information systems, equipment that can be used to compromise data; regarding counterfeiting of means of

payment, electronic money and wallets; about illegal activities in the direction of loans, credits; regarding the results of payment monitoring, as well as authorization histories; on improper identification of subject payers. This information is located at <https://www.ema.com.ua/business/antifraud-hub/>.

Bankruptcy Register – is the only register of enterprises on which bankruptcy proceedings have been initiated, ie it is such an information certificate provided at the request of the user; it contains information on the initiation of bankruptcy proceedings against the enterprise, or recognition of its bankruptcy, or being in bankruptcy proceedings. The Unified Register of Bankruptcies contains information on the date of the decision, date of registration, date or name of the bankrupt, case number, registration record, state of proceedings, responsible person, date and time of creation, date and time of last update, identification number of the data set, grounds and purpose of the set information, passport of the information set, structure of the information set. Such information can be found in the Cabinet of Electronic Services of the Ministry of Justice of Ukraine at https://kap.minjust.gov.ua/services?product_id=3&is_registry=1&keywords=&usertype=all, on the Government portal - the Unified web portal of the executive authorities of Ukraine <https://www.kmu.gov.ua/service/vidomosti-z-reyestru-bankrutstva>.

The register of debtors is the only register of debtors. Information on the register of debtors can be found on the website of the Ministry of Justice of Ukraine at <https://erb.minjust.gov.ua/#/search-debtors>, <https://data.gov.ua/dataset/506734bf-2480-448c-a2b4-90b6d06df11e>, in the Automated system of enforcement proceedings <https://asvpweb.minjust.gov.ua/#/search-debtors>, in the Unified Register of Debtors of NAIS <https://nais.gov.ua/m/ediniy-reestr-borjnikiv-549>. The register

of debtors includes the following data: for an individual - last name, first name, patronymic, date of birth, registration number of the taxpayer's account card, category of collection; for a legal entity - the name of the legal entity, its identification code, category of recovery; data on enforcement proceedings, responsible person, date and time of creation, date and time of last update, identification number of data set, name of data set, grounds and purpose of data set, passport of information set, structure of information set, registration number of enforcement proceedings, period of opening of enforcement proceedings proceedings.

Register of court decisions provides for the Unified State Register of Court Decisions. This register has the structure: data on the court and judges (court region, name of the court, instance, name of the judge), court decision (registration number of the decision, period of court decision, period of receipt, form of court decision), court case (form of proceedings, category cases, case number, statuses of the parties to the trial), as well as the status of cases (case number, proceedings, quick search of the court by name, region, court, date of receipt, party to the case - the name of the party, name). The data of the unified register of court decisions can be found on the website of the State Judicial Administration of Ukraine at the link <https://dsa.court.gov.ua/dsa/inshe/oddata/>, <https://court.gov.ua/fair/>, <https://reyestr.court.gov.ua/>.

The database of invalid documents is a set of databases that include information of the State Migration Service of Ukraine on invalid documents (<https://nd.dmsu.gov.ua/>), the Ministry of Internal Affairs of Ukraine according to the Unified state web portal of open data on stolen and lost passports of citizens of Ukraine (<https://wanted.mvs.gov.ua/passport/>), on stolen, lost, invalid passports of citizens of Ukraine (<https://data.gov.ua/dataset/ab09ed00-4f51-4f6c-a2f7->

1b2fb118be0f), on stolen, lost, invalid passports of citizens of Ukraine for travel abroad (<https://data.gov.ua/dataset/b465b821-db5d-4b8b-8131-12682fab2203>), the First Ukrainian Bureau of Credit Histories on lost passports documents (<https://service.pvbki.com/passport/>). The database of invalid documents has the following structure: the document type is selected, the series and number of the document are entered, data on the availability of information on document invalidation, stolen, lost, additional information (value created, last updated, format) are displayed.

The list of people hiding from the authorities, it includes people who, according to the information of the Ministry of Internal Affairs of Ukraine, are hiding from the authorities (<http://wanted.mvs.gov.ua/searchperson/>), and contains the following structure: surname, name, by father, region and body of the Ministry of Internal Affairs, date of birth, date of disappearance, sex, description / comment, date of last update.

The Register of EP Taxpayers is a register of single tax payers according to the Electronic Cabinet of the Taxpayer of the State Tax Service of Ukraine (<https://cabinet.tax.gov.ua/registers/edpod>, <http://tax.gov.ua/businesspartner>), which is formed for checks of reliability of the client, his honesty in payment of taxes. The register of EP taxpayers contains the structure: tax number, ie USREOU code, registration number of the taxpayer's account card or series and passport number, name of the organization or surname, name, patronymic, date / period of election or transition to the single tax, rate, group, codes and types of economic activity, presence or absence of tax debt, amount of debt, if any, date of exclusion from the register.

Registers of encumbrances on movable and immovable property are information on the property of persons regarding

the presence or absence of encumbrances on movable and immovable property, which are formed by the Ministry of Justice in the State Register of Immovable Property (<https://orm.minjust.gov.ua/#/>) and through the Cabinet of Electronic Services State Register of Real Property Rights (https://kap.minjust.gov.ua/services?product_id=1).

Encumbrance registers include information: extract number, issuance date, issuance body according to which the extract was provided, request parameters - encumbrance types, subject parameters (name, code), results of generated encumbrance information (if available, which property is encumbered, under what conditions), the responsible person who formed the extract.

Data on securities are information generated by the National Commission on Securities and Stock Market regarding information on the securities market Smida - Agency for Development of Infrastructure of the Stock Market of Ukraine (<http://smida.gov.ua>), information on owners or owners of voting shares of joint-stock companies (<https://www.nssmc.gov.ua/for-market-participants/services/open-data/#>), information on the Stockmarket resource (<http://stockmarket.gov.ua>), registers law enforcement, ie issuers with signs of fictitiousness, absence at the specified location, prohibition of trading in securities on exchanges

(<https://www.nssmc.gov.ua/register/nahliad/kontrolna-diialnist/>), information of Stock Exchanges (<https://www.nssmc.gov.ua/register/litsenzuvannia-ta-reestratsiia/stock-exchanges/>). Data on securities include information: name of securities, maturity date, placement date, maturity date, ISIN international identification number, type and currency of IGLBs, date of interest payment, nominal level of yield, notes, number of securities, price of securities, the

number of securities in the issue, the date of concluding an exchange contract, transactions, the name of the issuer of securities, the USREOU code of the issuer, the type of financial instrument that is the object of civil rights under the transaction.

According to the Law of Ukraine “On Purification of Power”, a register on lustration is formed – a register of individuals who are prohibited from holding certain positions or serving in public authorities, as well as local governments. Such a register contains information: surname, name, patronymic of the person. Link to the register <https://lustration.minjust.gov.ua/register>.

In accordance with the legislation of Ukraine on bankruptcy, the state body on bankruptcy shall form the Register of Arbitration Trustees – the Unified Register of Arbitration Trustees of Ukraine (property managers, reorganization managers, sales managers, restructuring managers, liquidator in bankruptcy proceedings): //ak.minjust.gov.ua/ – Public site of the Unified Register of Arbitration Trustees. The register of arbitration trustees includes data: surname, name and patronymic of the arbitration trustee, number of the certificate for the right to conduct the activities of the arbitration trustee, date of issuance of the certificate, date of decision on awarding the right to conduct the arbitration trustee, certificate number of the arbitration trustee. bankruptcy proceedings, date of issuance of the certificate, validity of the certificate, location of the arbitral trustee, means of communication with the arbitral trustee, if any, number of the decision on bringing the arbitral trustee to disciplinary responsibility, date of decision, type of disciplinary punishment, number of termination decision or suspension of the arbitration trustee, the date of the decision, if there is a surname, name, patronymic of the assistant arbitration trustee.

Corruption register is formed by the National Agency for Prevention of Corruption The Unified State Register of people, who have committed corruption or corruption-related offenses (<https://corruptinfo.nazk.gov.ua/>) Public anti-corruption examination of the results of state tenders in Ukraine (<http://acm-ua.org/>). The registers contain information on individuals and legal entities that committed corruption (name, name, USREOU code, article number on which the court decision was issued, order number), as well as additional information on the anti-corruption monitor (bulletin, contract amount, currency, index “FOX”, details “FOX”, winner, USREOU of the winner, customer, USREOU of the customer, region of the customer, type, branch, winner (found out), age of the winner, address of the winner, victories in tenders, means from the tender).

Databases of Ukrainian organizations: YouControl, Odnodata contain open information about Ukrainian legal entities (<https://youcontrol.com.ua/>, <http://odnodata.com/>). The database includes registration data, founders and key persons, ownership structure and permits, tax and financial information, court documents and decisions, group of related parties, relations between contractors, enforcement proceedings, history, tax data.

Information about foreign companies is formed from a number of information resources. For example, the GuideStar resource (<http://www.guidestar.org/Home.aspx>) is available to find information on nonprofits. /; <https://www.fbi.gov/wanted/topten>), for better decision-making use information about private companies analytical company Bureau van Dyck - Bureau of Foreign Companies, Orbis Directory (<http://orbisdirectory.bvdinfo.com/> OrbisDirectory / Companies), world trade database (<https://www.importgenius.com/search>), market analysis

platform for global enterprises (<http://www.exportgenius.in/>); information from the Forbes Global 2000 - the list of the richest people in the world (<http://www.forbes.com/global2000/list/#search>), the register of world organizations (<http://www.rba.co.uk/sources/registers.htm> # UK), trade registers of the countries of the world (http://www.egrul.ru/ino_reestry.html), databases of offshore companies - the Panamanian register (<https://offshoreleaks.icij.org/>), information of the World-check resource about dishonest business, corrupt officials, dubious personalities (<https://www.world-check.com/frontend/logout/>) registers of certain countries of the world are used for the analysis of enterprises of certain countries - Register of Cypriot companies (<http://cy-check.com/>), <https://efiling.drcor.mcit.gov.cy>, <https://i-cyprus.com/>), Register of UK organizations (<https://beta.companieshouse.gov.uk/>), Register of Polish companies <http://krs.infoveriti.pl/index.html>), Register of Czech Companies (<https://rejstriky.finance.cz;> <https://rejstrik.penize.cz/>).

In conclusion, we note that databases and reference information are grouped on the basis of internal sources of economic agents and external resources, the complex use of which allows solving a number of today's problems of financial monitoring. The integration, structuring of databases of internal financial monitoring of economic agents in the form of the data scheme taking into account essences, their attributes, key fields and interrelations, and also structure of units of the normative reference information necessary for the organization of the basic monitoring procedures, will be of paramount importance. processing and analysis of significant amounts of various information in the future. Therefore,

efficient, efficient use of databases can provide users with a significant promising advantage and a useful basis in terms of speed, accuracy, flexibility, filtering, consistency, compatibility, comprehensiveness, scalability of analytics, taking into account all necessary factors and factors, saving resources, reducing costs.

CONCLUSIONS

The challenges nowadays related to the exponentially growing digitalization of socio-economic and political processes, the consequences of the COVID-19 pandemic, prompt many countries around the world to develop their own theoretical basis for a quality financial security system and especially cybersecurity. One of the main problems of global cyberspace at the present stage is the lack of an international legal system that would legally establish norms and rules of conduct in this area.

The monograph contains the results in terms of three areas: economic and political support of financial monitoring procedures to combat money laundering and the organization of cybersecurity of the financial and information sphere; economic and analytical support to determine the level of financial security for 102 countries; information support of financial monitoring procedures (the evidence from Ukraine).

A generalized analysis of the current financial monitoring systems for combating money laundering and prevention of cyber fraud is presented for the member states of the European Union, as well as the United States of America and Ukraine.

In order to determine the level of financial security, a comprehensive analysis of the values of individual indicators that affect the transparency of the financial system and characterize the possibility of using socio-economic facilities, especially such as banking institutions, financial institutions, business organizations, laundering companies criminal proceeds. And, also, an integral rating indicator was formed, reflecting the level of security of a particular country (very high, high, medium, low, very low). For the purpose of a detailed analysis of financial transactions and the study of the features of financial systems between groups of countries of the world, a cluster analysis was carried out, the results of

which are the distribution of 102 countries of the world, which are studied by the Financial Action Task Force (FATF), into 10 groups, statistically confirmed by dispersion instruments. analysis and agglomeration protocol.

In terms of the information plane, an automated module for internal financial monitoring of economic agents has been developed in accordance with the current legislation of Ukraine using Bizagi Studio software and BPMN 2.0 notation. The module contains models of business processes to identify signs of involvement in the process of money laundering: 1) many parameters of various economic agents; 2) payments through the system “Client-Bank” (provides blocking the user in the absence of a source of income and documents confirming the legality of the transaction); 3) operations of financial intermediaries (verification according to the criteria regulated by national regulations, FATF recommendations or determined by the financial monitoring entity itself); 4) people, who carry out financial transactions (automated identification and verification of clients regarding their illegal transactions, changes in the data provided by them, the accuracy of the information provided by them, etc.). Algorithmic support of this information system is created from the use of elements of machine business logic, database structure, pseudocode, program flowcharts. In addition, the developed module provides for the integration of internal monitoring results with the automated system of state financial monitoring.

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84. Pro zatverdzhennia Poriadku kontroliu za dotrymanniam profesiynomy uchasnykamy fondovoho rynku (rynku tsinnykh paperiv) vymoh zakonodavstva u sferi zapobihannia ta protydii lehalizatsii (vidmyvanniu) dokhodiv, oderzhanykh zlochynnym shliakhom, finansuvanniu teroryzmu ta finansuvanniu rozpovsiudzhennia zbroi masovoho znyshchennia, zareiestrovano v Ministerstvi yustytzii Ukrainy 06 serpnia 2015 r. za № 955/27400, zghidno rishennia NKTsPFR 17.07.2015 № 1038: Natsionalna komisiia z tsinnykh paperiv ta fondovoho rynku. URL: <https://zakon.rada.gov.ua/laws/show/z0955-15#Text>

85. Poriadok obminu informatsiieiu mizh Derzhavnoiu sluzhboiu finansovoho monitorynhu Ukrainy i Ministerstvom tsyfrovoi transformatsii Ukrainy dlia pidvyschennia efektyvnosti zdiisnennia nahliadu za doderzhanniam subiektamy pervynnoho finansovoho monitorynhu vymoh zakonodavstva z pytan zapobihannia ta protydii lehalizatsii (vidmyvanniu) dokhodiv, oderzhanykh zlochynnym shliakhom, finansuvanniu teroryzmu ta finansuvanniu rozpovsiudzhennia zbroi masovoho znyshchennia, zatverdzenyi Nakazom Ministerstva finansiv Ukrainy, Ministerstva tsyfrovoi transformatsii Ukrainy 01 veresnia 2020 roku № 541/12.

86. Poriadok provedennia perevirok Ministerstvom yustytzii Ukrainy ta yoho terytorialnymy orhanamy subiektiv pervynnoho finansovoho monitorynhu, zareiestrovano v

Ministerstvi yustytsii Ukrainy 13 travnia 2015 r.za № 528/26973.

87. Richnyi plan perevirok z pytan finmonitorynhu, dotrymannia valiutnoho ta sanktsiinoho zakonodavstva na 2021 rik. <https://bank.gov.ua/ua/news/all/oprilyudneno-richniy-plan-perevirok-z-pitan-finmonitoringu-dotrimannya-valyutnogo-ta-sanktsiynogo-zakonodavstva-na-2021-rik>.

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APPENDIX A

Initial data for determining the level of financial security

Table A.1. Initial standardized data to determining the level of financial security

Country	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
Albania	0,54	0,43	0,36	0,56	0,46	0,37	0,56	0,64	0,70	0,40
Andorra	0,70	0,61	0,31	0,05	0,46	0,21	0,09	0,08	0,14	0,30
Antigua & Barbuda	0,37	0,49	0,43	0,46	0,46	0,42	0,39	0,08	0,60	0,48
Armenia	0,70	0,47	0,35	0,63	0,46	0,36	0,67	0,49	0,70	0,48
Australia	0,76	0,70	0,87	0,71	0,46	0,83	0,78	0,74	0,85	0,60
Austria	0,58	0,55	0,83	0,69	0,46	0,82	0,64	0,67	0,70	0,50
Bahamas	0,30	0,53	0,67	0,47	0,46	0,72	0,55	0,57	0,60	0,30
Bahrain	0,66	0,53	0,58	0,59	0,48	0,37	0,64	0,59	0,79	0,71
Bangladesh	0,50	0,33	0,32	0,29	0,46	0,26	0,34	0,33	0,28	0,84
Barbados	0,26	0,64	0,50	0,45	0,46	0,75	0,57	0,70	0,60	0,30
...
Turkey	0,54	0,49	0,41	0,65	0,46	0,43	0,48	0,40	0,60	0,91
Turks&Caicos	0,33	0,20	0,38	0,05	0,46	0,21	0,14	0,50	0,14	0,30
Uganda	0,15	0,53	0,31	0,46	0,46	0,26	0,27	0,60	0,38	0,71
Ukraine	0,58	0,58	0,34	0,58	0,46	0,32	0,47	0,17	0,28	0,86
United Arab Emirates	0,41	0,78	0,78	0,71	0,46	0,77	0,69	0,59	0,60	0,31
United Kingdom	0,90	0,44	0,77	0,73	0,46	0,85	0,80	0,70	0,79	0,84
United States	0,88	0,73	0,89	0,73	0,46	0,78	0,72	0,55	0,79	0,86
Uruguay	0,54	0,74	0,50	0,49	0,46	0,77	0,62	0,37	0,28	0,33
Vanuatu	0,15	0,47	0,34	0,48	0,46	0,49	0,38	0,49	0,38	0,30
Zambia	0,45	0,69	0,32	0,54	0,46	0,36	0,57	0,26	0,49	0,37
Zimbabwe	0,20	0,08	0,32	0,37	0,46	0,22	0,19	0,51	0,14	0,46

Source: formed by the authors

APPENDIX B

Multiple regression model of the dependency of the financial security from factors indicators Ease of doing business (K4), Corruption Perception Index (K6), Global Terrorism Index (K7), Business Freedom (K8)

Dependent variable: *STOOL*

Independent variables: K6, K8, K7, K4

Number of observations: 102

<i>Parameter</i>	<i>Estimate</i>	<i>Standard Error</i>	<i>T Statistic</i>	<i>P-Value</i>
CONSTANT	-12,5674	0,432369	-29,0663	0,0000
K6	9,64015	0,855362	11,2703	0,0000
K8	5,84895	1,31615	4,44398	0,0000
K7	0,346557	0,581488	0,595982	0,5526
K4	8,97464	1,29201	6,94626	0,0000

Analysis of Variance

<i>Source</i>	<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F-Ratio</i>	<i>P-Value</i>
Model	2037,36	4	509,341	362,09	0,0000
Residual	136,447	97	1,40667		
Total (Corr.)	2173,81	101			

R-squared = 93,7231 percent

R-squared (adjusted for d.f.) = 93,4643 percent

Standard Error of Est. = 1,18603

Mean absolute error = 0,901044

Durbin-Watson statistic = 1,80204 (P=0,1599)

Lag 1 residual autocorrelation = 0,0924564

The StatAdvisor

The output shows the results of fitting a multiple linear regression model to describe the relationship between *STOOL* and 4 independent variables.

The equation of the fitted model is

$$\text{STOOL} = -12,5674 + 9,64015 * \text{K6} + 5,84895 * \text{K8} + +0,34656 * \text{K7} \\ ++8,97464 * \text{K4}$$

Since the P-value in the ANOVA table is less than 0,05, there is a statistically significant relationship between the variables at the 95,0% confidence level.

The R-Squared statistic indicates that the model as fitted explains 93,7231% of the variability in STOOL. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 93,4643%. The standard error of the estimate shows the standard deviation of the residuals to be 1,18603. This value can be used to construct prediction limits for new observations by selecting the Reports option from the text menu. The mean absolute error (MAE) of 0,901044 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in your data file. Since the P-value is greater than 0,05, there is no indication of serial autocorrelation in the residuals at the 95,0% confidence level.

APPENDIX C

Multiple regression model of the dependency of the financial security from factors indicators Ease of doing business (K4), Corruption Perception Index (K6), Global Terrorism Index (K7), Business Freedom (K8) with the application of procedure backward stepwise selection

Dependent variable: STOOL

Independent variables: K6, K8, K7, K4

Number of observations: 102

<i>Parameter</i>	<i>Estimate</i>	<i>Standard Error</i>	<i>T Statistic</i>	<i>P-Value</i>
CONSTANT	-12,4235	0,35757	-34,7443	0,0000
K6	9,51198	0,82516	11,5274	0,0000
K8	5,89459	1,30959	4,50109	0,0000
K4	9,09996	1,27059	7,16202	0,0000

Analysis of Variance

<i>Source</i>	<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F-Ratio</i>	<i>P-Value</i>
Model	2036,86	3	678,954	485,86	0,0000
Residual	136,947	98	1,39742		
Total (Corr.)	2173,81	101			

R-squared = **93,7001** percent

R-squared (adjusted for d.f.) = **93,5073** percent

Standard Error of Est. = **1,18212**

Mean absolute error = **0,905282**

Durbin-Watson statistic = 1,79993 (P=**0,1574**)

Lag 1 residual autocorrelation = 0,0939615

Stepwise regression

Method: backward selection

P-to-enter: 0,05

P-to-remove: 0,05

Step 0:

4 variables in the model. 97 d.f. for error.

R-squared = 93,72% Adjusted R-squared = 93,46%
MSE = 1,40667

Step 1:

Removing variable K7 with P-to-remove =0,552575
3 variables in the model. 98 d.f. for error.

R-squared = 93,70% Adjusted R-squared = 93,51%
MSE = 1,39742

Final model selected.

The StatAdvisor

The output shows the results of fitting a multiple linear regression model to describe the relationship between

Factor 1 and 4 independent variables. The equation of the fitted model is

$$\text{STOOL} = -12,4235 + 9,51198 * K6 + 5,89459 * K8 + 9,09996 * K4$$

Since the P-value in the ANOVA table is less than 0,05, there is a statistically significant relationship between the variables at the 95,0% confidence level.

The R-Squared statistic indicates that the model as fitted explains 93,7001% of the variability in STOOL. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 93,5073%. The standard error of the estimate shows the standard deviation of the residuals to be 1,18212. This value can be used to construct prediction limits for new observations by selecting the Reports option from the text menu. The mean absolute error (MAE) of 0,905282 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in your data file. Since the P-value is greater than 0,05, there is no indication of serial autocorrelation in the residuals at the 95,0% confidence level.

Strengthening the economic security of the country: optimization of the financial monitoring procedure

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